Alaska Department of Environmental Conservation
Air Permits Program

TECHNICAL ANALYSIS REPORT

For the terms and conditions of
Minor Permit AQ0272MSS03

Issued to Hilcorp North Slope, LLC
For the Lisburne Production Center (LPC)

Preliminary – December 23, 2024

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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 AQ0272MSS03 to Hilcorp North Slope, LLC (Hilcorp) for the Lisburne Production Center (LPC) Rich Gas Compressor Project.

The Department is issuing this permit under 18 AAC 50.508(5) to establish owner requested limits (ORLs) to avoid Prevention of Significant Deterioration (PSD) review under 18 AAC 50.306.

2. STATIONARY SOURCE DESCRIPTION

The Lisburne Production Center (LPC) is an existing stationary source owned by Hilcorp North Slope, LLC, ConocoPhillips Alaska, Inc., ExxonMobil Alaska Production Inc., and Chevron USA Inc. LPC processes fluids received from crude oil reservoirs located on the North Slope. These reservoirs include but are not limited to the following: Lisburne, Point McIntyre, Niakuk, West Beach State, and North Prudhoe Bay State. The processed fluids are then separated into oil, gas, and water.

The emissions unit (EU) inventory consists of turbines, heaters, reciprocating engines, fire pumps, and flares. Hilcorp currently operates the stationary source under shielded Operating Permit AQ0272TVP02 Revision 3 due to pending Title V permit renewal.

3. APPLICATION DESCRIPTION

Hilcorp submitted its minor permit application on June 18, 2024 for the LPC Rich Gas Compressor Project. This project involves installing and upgrading components within the LPC facility. Hilcorp states that the project will entail connecting a new electrically-driven gas compressor to the LPC internal power bus, an increased power generation from the LPC power plant Solar Mars power generation turbines, and an upgrade of the two Solar Mars GSC T-12000 combustion turbines, EU IDs 6 and 7, each with a Solar Mars 90-13000S SoLoNOx combustion turbine.

Hilcorp anticipates that construction associated with the project will begin in the first quarter of 2025 when one (or two) of the power plant emissions units will be upgraded with a Solar Mars 90-13000S SoLoNOx combustion turbine. Once the turbine is upgraded, the rich gas compressor can be connected to the LPC internal power bus. From that point forward, it will be important that the Solar Mars SoLoNOx combustion turbine remains above 50% load and the operational hours of the upgraded turbine(s) is at least 75% of the LPC power generation hours per rolling consecutive 12-month period to validate the assumptions used to determine the projected actual emissions (PAE) presented in this application.

Currently, the LPC gas handling capability is constrained by two gas injection compressors driven by General Electric Model MS582C combustion turbines operating at maximum load. By adding the new rich gas compressor (rated approximately 4 MWe) to the LPC internal power bus after the installation of the SoLoNOx combustion turbine, the production at LPC will be debottlenecked.

Hilcorp requests the emission reductions be made enforceable through ORLs to avoid a PSD permit classification for NO_x under 18 AAC 50.306. Specifically, the application requests are as follows:

1. Require an upgrade on two of the Solar Mars GSC T-12000 Electric Generator Turbine emissions units (EU IDs 6 and 7) each with a Solar Mars 90-13000S SoLoNOx unit.

2. Require operating the upgraded LPC power plant SoLoNOx combustion turbines above 50% load (excluding startup, shutdown, and malfunctions) upon completion of the upgrade described in item 1 above.[14]

3. Require operating the upgraded LPC power plant SoLoNOx combustion turbines for at least 75% of the generation hours of the LPC power plant (excluding startup, shutdown, and malfunctions) upon completion of the upgrade described in item 1.[14]

4. CLASSIFICATION FINDINGS

The Department finds that Minor Permit AQ0272MSS03 is classified under:

1. 18 AAC 50.508(5) because Hilcorp requests ORLs to avoid PSD review under 18 AAC 50.306 for NO_x.

5. APPLICATION REVIEW FINDINGS

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

1. The minor permit application for the Lisburne Production Center (LPC) contains the elements listed in 18 AAC 50.540.

2. Originally, Hilcorp submitted an application (AQ0272MSS02) for the Rich Gas Compressor Project on April 21, 2023, but was withdrawn on June 4, 2024 because the project scope changed enough to invalidate parts of the emissions review in the AQ0272MSS02 application.

3. The LPC Rich Gas Compressor Project will install a new 4-MWe electrically driven gas compressor to increase the LPC gas handling capability. The new rich gas compressor will be connected to the internal LPC power bus and receive power from the LPC power plant, which consists of the four existing GSC T-12000 Electric Generator Turbines (EU IDs 6 through 9).

4. Per notification of modification received by the Department on October 3, 2024, EU IDs 6 and 7 are selected to be replaced by the SoLoNOx turbines (EU IDs 6A and 7A) on February 1 and March 1, 2025, respectively.

5. The actual emissions will increase due to the increased power demand from the LPC power plant after installation of the rich gas compressor. However, based on the information provided in the application, the project would not trigger minor permitting under 18 AAC 50.502(c)(3)(A) since the stationary source's PTE will not be affected by the proposed project. This is because the existing cap limits for Best Available Control Technology (BACT) and PSD avoidance for combined NO_x emissions from EU IDs 6 through 9, CO emissions for EU IDs 4 through 9, and SO_2 emissions for EU IDs 1 through 9 remain the same under this permit action. There will also be no change in the total combined fuel consumption limit of 3,272 MMscf/yr for EU IDs 6 through 9 for NO_x PSD avoidance. This total combined fuel consumption limit forms the basis for the current potential to emit (PTE) calculations for EU IDs 6 through 9 for NO_x, PM_{10}, $PM_{2.5}$, and VOC. Therefore, the Department asserts that an ORL for minor permitting under 18 AAC 50.502(c)(3) is not necessary. See Table 2.

[14] Refer to Notes to Table A-3 regarding the assumed scenario.

6. Hilcorp asserts that an upgrade on EU IDs 6 and 7 with SoLoNOx combustion turbines will support installation of an electrically powered gas compressor which will debottleneck the facility gas handling and increase the LPC's gas handling capability without triggering a PSD review under 18 AAC 50.306 for NO_x. Without an upgrade, the emissions increase resulting from the project would cause a significant increase in NO_x and inconsequential changes to the other regulated new source review (NSR) pollutants, CO, SO_2, PM, PM_{10}, and $PM_{2.5}$. Table 3 shows both scenarios.

7. In accordance with EPA's December 24, 2020 final rule on Project Emissions Accounting[15] and the associated March 3, 2018 guidance[16], both increases and decreases in emissions resulting from a proposed project can be considered in Step 1 of the major NSR major modification applicability test, referred to as project emissions accounting. As shown in Table 3, the emissions increases and decreases from the LPC Rich Gas Compressor Project are accounted for in Step 1. The Department used the baseline actual emissions (BAE) to projected actual emissions (PAE) for PSD applicability check under 40 C.F.R. 52.21(a)(2)(iv)(c); i.e., the applicability test for projects that only involve existing emissions units. Under the scenario where two of the existing turbines, EU IDs 6 and 7, are each upgraded with a SoLoNOx unit (which is what Hilcorp proposes to install) and does not operate at the same time (including transitional period between the upgraded EUs) while in load-sharing mode with one or both of EU IDs 8 and 9, the project emissions accounting does not result in a significant increase.

8. Emissions reductions are not required to be enforceable in Step 1 of the PSD permit applicability determination; therefore, a permit would not be required for this project. However, given that the project includes an ORL to upgrade on EU IDs 6 and 7 to Solar Mars 90-13000S SoLoNOx units and operate them for an amount of hours no less than 75% of the total generation hours of the LPC power plant during a rolling 12-consecutive-month period to avoid triggering PSD review, the Department deems it appropriate to issue a minor permit to implement the ORLs and corresponding MR&R requirements, as requested by Hilcorp.

9. Hilcorp used the vendor performance data for the Solar Mars 90-13000S SoLoNOx Combustion Turbine to calculate the PAE for NO_x and CO based on the assumption that the SoLoNOx turbine is operated above 50% load at all times during normal operation. Therefore, Condition 10 is included in the permit to address the EUs operational load requirements to ensure that the basis for NO_x and CO PAE for PSD avoidance are valid.

10. Hilcorp states that after one of EU IDs 6 through 9 has been upgraded with a Solar Mars 90-13000S SoLoNOx, it will be important that Solar Mars SoLoNOx combustion turbine generate power for an amount of hours no less than 75% of the total generation hours of the LPC power plant during a rolling 12-consecutive-month period and is not operated below 50% load during normal operations (i.e., online at rated temperature range with no malfunction status indicated). The Department included these ORLs as Conditions 11 and 10, respectively.

[15] See https://www.federalregister.gov/documents/2020/11/24/2020-23784/prevention-of-significant-deterioration-psd-and-nonattainment-new-source-review-nnsr-project.
[16] See nsr_memo_03-13-2018.pdf (epa.gov).

11. Per correspondence with Hilcorp on December 6, 2024, the Department added Condition 12 to allow the flexibility to transition between using EU IDs 6A or 7A to support the Rich Gas Compressor Project, under the condition that the EUs do not operate in load sharing during a transition.
12. The Department has also added Condition 13 requiring compliance of the upgraded SoLoNOx turbines (EU IDs 6A and 7A) with the existing limits and MR&R requirements associated with the corresponding conventional turbines (EU IDs 6 and 7) that will be upgraded to ensure continuous compliance with the ORLs for PSD major classification avoidance and protection of AAAQS that are already in place.
13. Hilcorp anticipates the SoLoNOx turbines (EU IDs 6A and 7A) will become affected EUs under NSPS Subpart KKKK. The Department has added the applicable NSPS Subparts A and KKKK requirements in Conditions 15 through 22 and 24 through 27, which will be incorporated by reference into the shielded Title V Operating Permit AQ0272TVP02 Revision 3 via an administrative amendment, in accordance with 18 AAC 50.542(e).

6. EMISSIONS SUMMARY AND PERMIT APPLICABILITY

Table 2 and Table 3 show the permit applicability analysis for the Rich Gas Compressor Project. The upgrade of two of EU IDs 6 through 9 with a SoLoNOx combustion turbine (EU IDs 6A and 7A) does not affect the emissions from other emission units, therefore, this section only addresses the changes in emissions resulting from modification of two of EU IDs 6 through 9. Table 4 shows the assessable emissions for the stationary source's operational modifications allowed under this minor permit.

6.1 Minor Permit Applicability under 18 AAC 50.502(c)(3)(A)

Table 2 shows minor permit applicability under 18 AAC 50.502(c)(3)(A) for the proposed LPC Rich Gas Compressor Project with and without a SoLoNOx upgrade of EU IDs 6 and 7, to a Solar Mars 90-13000S SoLoNOx (EU IDs 6A and 7A). The PTE for NSR pollutants in Table 2 is based on the existing cap limits for BACT and PSD review avoidance for combined emissions from EUs that include (but not limited to) EU IDs 6, 7, 8, and 9. These existing cap limits are not affected by the proposed project and remain the same under this permit action. Therefore, there is no change on the stationary source's PTE after the modification.

Table 2 – Minor Permit Applicability and PTE (TPY)[1]

Description	PTE[1], TPY					
	NO_x[2]	CO[3]	PM_{10}[4]	$PM_{2.5}$[4]	SO_2[5]	VOC[6]
PTE BEFORE Modification	745	366	11.27	11.27	157	3.59
PTE AFTER Modification (No SoLoNOx)	745	366	11.27	11.27	157	3.59
PTE AFTER Modification (EU IDs 6 and 7 are replaced with upgraded SoLoNOx turbines)	745	366	11.27	11.27	157	3.59
Change in PTE	0	0	0	0	0	0
18 AAC 50.502(c)(3)(A) Thresholds	10	N/A	10	10	10	N/A
Permit under 502(c)(3)(A) required?	**No**	**N/A**	**No**	**No**	**No**	**N/A**

Notes:
1 Existing PTE for the stationary source is from the most current stationary source's emissions calculations spreadsheets submitted with the Minor Permit AQ0272MSS03 application.
2 NO_x PTE is based on the existing combined NO_x BACT limit for EU IDs 6 through 9 of 745 tons per year.
3 CO PTE is based on the existing combined PSD avoidance limit for CO for EU IDs 4 through 9.
4 $PM_{2.5}$ and PM_{10} emissions are part of PM. PTE values are for EU IDs 6 through 9, conservatively estimated

based on emission factor (EF) of 0.0066 lb/MMBtu fuel input for PM in AP-42 Table 3.1-2a, and fuel use constrained by a combined fuel consumption limit of 3,272 MMscf/yr and a fuel gas heat content of 928 Btu/scf.

5 SO_2 PTE is based on the existing combined SO_2 BACT limit for EU IDs 1 through 9.

6 VOC PTE for EU IDs 6 through 9 is estimated based on EF of 0.0021 lb/MMBtu fuel input for VOC in AP-42 Table 3.1-2a, and fuel use constrained and combined fuel consumption limit of 3,272 MMscf/yr and a fuel gas heat content of 928 Btu/scf.

6.2 PSD Permit Applicability under 18 AAC 50.306 and 40 C.F.R. 52.21(b)(23)(i)

Prevention of Significant Deterioration (PSD) applicability is a two-step process. The first step determines if the emissions increases for the project reach or exceed the significant emissions thresholds listed in 40 C.F.R. 52.21(b)(23)(i). The second step evaluates the net emissions increase during the five-year contemporaneous period. The project will require a PSD review if the project results in a significant emissions increase and a significant net emissions increase. A second step PSD review is not warranted because the significant emissions increase is less than the thresholds at Step 1.

Table 3 shows the PSD permit applicability for the proposed LPC Rich Gas Compressor Project, with and without the requested ORLs. As shown in the table, without ORLs to upgrade to a SoLoNOx turbine and operate above a 75% utilization limit, the emissions increase resulting from the project would cause a significant increase in NO_x and inconsequential changes to the other regulated new source review (NSR) pollutants, CO, SO_2, PM, PM_{10}, and $PM_{2.5}$. However, the project would not trigger PSD permitting at Step 1 of the two-step PSD permit applicability analysis including the ORLs. Baseline Actual Emissions (BAE) and Projected Actual Emissions (PAE) calculations basis are provided and explained in APPENDIX A to this TAR.

Table 3 – PSD Permit Applicability – Step 1[1]

Emissions/Thresholds (TPY)	NO_x	CO	VOC	PM	PM_{10}	$PM_{2.5}$	SO_2
Step 1 - Project Emissions Increase (WITHOUT ORLs)							
BAE[2] – EU IDs 6 through 9	**269.43**	**7.99**	**1.38**	**4.34**	**4.34**	**4.34**	**8.17**
PAE[3] – Remove EU IDs 6 and 7 (EU IDs 8 and 9 in operation)	241.75	3.02	1.07	3.37	3.37	3.37	6.34
PAE[4] – ADD EU IDs 6A and 7A (No ORLs)	241.75	3.02	1.07	3.37	3.37	3.37	6.34
PAE Total	**483.50**	**6.04**	**2.14**	**6.74**	**6.74**	**6.74**	**12.68**
Total Step 1 Project Increase (PAE – BAE)	**214.07**	**-1.95**	**0.76**	**2.40**	**2.40**	**2.40**	**4.51**
PSD Significant Emissions Increase Threshold[5]	40	100	40	25	15	10 (direct)	40
PSD Permit Required?	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**
Step 1 - Project Emissions Increase (WITH ORLs)							
BAE[2] – EU IDs 6 through 9	**269.43**	**7.99**	**1.38**	**4.34**	**4.34**	**4.34**	**8.17**
PAE[3] – Remove EU IDs 6 and 7 (EU IDs 8 and 9 in operation)	241.75	3.02	1.07	3.37	3.37	3.37	6.34
PAE[4] – ADD EU IDs 6A OR 7A (with ORLs)	46.62	31.56	0.73	2.29	2.29	2.29	4.32
PAE Total[5]	**288.37**	**34.58**	**1.80**	**5.66**	**5.66**	**5.66**	**10.66**
Total Step 1 Project Increase (PAE – BAE)	**18.94**	**26.59**	**0.42**	**1.32**	**1.32**	**1.32**	**2.49**
PSD Significant Emissions Increase Threshold[6]	40	100	40	25	15	10 (direct)	40

Emissions/Thresholds (TPY)	NO_x	CO	VOC	PM	PM_{10}	$PM_{2.5}$	SO_2
PSD Permit Required?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Notes:
1. Step 1 PSD Permit applicability is conducted in accordance with 40 C.F.R. 52.21(a)(2)(iv)(c).
2. Per 40 C.F.R. 52.21(b)(48)(ii), the BAE for the proposed project include combined emissions from existing EU IDs 6, 7, 8, and 9 based on the average rate, in tons per year (TPY), at which the emissions units actually emitted the pollutant during any consecutive 24-month period (May 2020 to April 2022) selected by Hilcorp.
3. Per 40 C.F.R. 52.21(b)(41)(ii)(a), the PAE are based on the historical operational data for the existing EUs, expected business activity, and highest projections of business activity. The PAE are also based on the ORLs that have been requested.
4. The PAE for the upgraded Solar Mars SoLoNOx combustion turbines are equal to PTE[17], per 40 C.F.R. 52.21(b)(41)(ii)(d), based on the assumption that the operating load of the EU is above 50% (Condition 10) and the operational hours of the upgraded EUs is at least 75% of the LPC power plant generation hours (Condition 11).
5. The PAE Total reflects the worst-case scenario with all three EUs (EU IDs 6A or 7A, 8, and 9) operating concurrently: one of the upgraded turbines (EU IDs 6A or 7A) operating in load sharing mode with one or two of the GSC T-12000 turbines (EU IDs 8 and/or 9) when it operates to account for the increased LPC power demand after the connection of the rich gas compressor to the LPC internal power bus.
6. PSD significant emissions increase thresholds are listed in 40 C.F.R. 52.21(b)(23)(i).

Table 4 below shows a summary of the stationary source's PTE and the assessable PTE. There is no change in the stationary source's potential emissions due to this permit action because the combined cap ORLs for the affected EUs are retained.

Table 4 – Stationary Source's PTE and Assessable Emissions Summary

Parameter	PTE (TPY)						
	NO_x	CO	VOC	$PM_{2.5}$[1]	PM_{10}[1]	PM[1]	SO_2
PTE	2,249.14	734.99	76.89	57.52	57.52	57.52	273.32
Assessable Emissions	2,249.14	734.99	76.89	57.52	57.52	57.52	273.32
Total Assessable Emissions	3,391.87						

Notes:
1. $PM_{2.5}$ emissions are part of and conservatively assumed equal to PM_{10} emissions. PM_{10} and $PM_{2.5}$ emissions are part of Total PM emissions. Therefore, $PM_{2.5}$ and PM_{10} are not counted in total assessable emissions to avoid double counting.

7. PERMIT ADMINISTRATION

Minor Permit AQ0272MSS03 does not contradict any conditions in the shielded Title V operating permit AQ0272TVP02 Revision 3 issued to the LPC. However, the Department will issue an administrative amendment (AQ0272TVP02 Rev. 4) to incorporate Minor Permit AQ0272MSS03 conditions and NSPS Subpart KKKK requirements by reference, in accordance with 18 AAC 50.542(e). Hilcorp may operate in accordance with Minor Permit AQ0272MSS03 upon issuance. The Department expects that Hilcorp will provide an addendum to the application for Title V permit renewal AQ0272TVP03, to include the provisions of this minor permit.

[17] As defined in 40 C.F.R. 52.21(b)(4), *Potential to Emit* means the maximum capacity of a stationary source to emit a pollutant under its physical or operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. Secondary emissions do not count in determining the potential to emit of a stationary source.

8. PERMIT CONDITIONS

The bases for the standard and general conditions imposed in Minor Permit AQ0272MSS03 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 an upgraded EU.

Section 2: Fee Requirements

Conditions 3 through 5

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 AQ0272MSS03, except as follows: The Department has modified Condition 4 by deleting the phase "in quantities of 10 tons per year or greater" to match the revision made in 18 AAC 50.410 effective September 7, 2022. Beyond as noted, the Department has determined that the standard conditions adequately meet the requirements of 40 C.F.R. 71.6(a)(3).

Section 3: State Emission Standards

Condition 6, 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).

For gas-fired emissions units (EU IDs 6A and 7A), the monitoring for visible emissions is waived; i.e., no Method 9 or Smoke/No Smoke Observations is required. The Department has found that natural gas fuel burning equipment inherently has negligible visible emissions. However, the Department can request a source test for visible emissions from any smoking equipment.

The Permittee must state in each operating report whether only gas was used in the equipment during the period covered by the report.

Condition 7, 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).

Experience has shown there is a correlation between opacity and particulate matter. Twenty 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.

For gas-fired emissions units (EU IDs 6A and 7A), the monitoring for PM emissions is waived, i.e., no source testing is required. The Department has found that natural gas fuel burning equipment inherently has negligible PM emissions. However, the Department can request a source test for PM emissions from any smoking equipment.

The Permittee must state in each operating report whether only gas was used in the equipment during the period covered by the report.

Condition 8, 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 oil with sulfur content less than 0.74 percent by weight will comply with the state emissions standard. Calculations show that fuel gas with sulfur content less than 4,000 parts per million by volume will comply with the state standards.

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

Conditions 9 through 13, Requirements to avoid PSD Review under 18 AAC 50.306 for NO_x

18 AAC 50.544(h) describes the requirements for a permit classified under 18 AAC 50.508(5). This permit describes the ORLs and corresponding monitoring, recordkeeping, and reporting (MR&R) requirements. It lists all equipment covered by the ORLs and describes the classification that the limit allows the applicant to avoid.

The permit contains ORLs to require an upgrade of EU IDs 6 and 7 with Solar Mars 90-13000S SoLoNOx units (EU ID 6A and 7A), to maintain the SoLoNOx turbine load over 50% at all times during normal operations (Condition 10), and to ensure that the SoLoNOx combustion turbine operates for at least 75% of the LPC power plant generation hours on an annual basis (Condition 11). In doing so, the Permittee avoids PSD permitting under 18 AAC 50.306 for NO_x.

Condition 12 requires EU IDs 6A and 7A to not operate concurrently, including transitional periods between the two EUs for the PAE to remain valid. The transition between EU IDs 6A and 7A can only occur when the LPC is load sharing between EU IDs 8 and 9 or load sharing between EU IDs 6A or 7A and EU IDs 8 or 9. MR&R requirements are included in Conditions 12.1 through 12.3 to ensure that the start and stop times for transitioning between EU IDs 6A and 7A do not overlap. This condition will sunset upon issuance of the minor permit for the Power Export Project (AQ0272MSS04).

Condition 13 requires continuous compliance with the existing emissions limits, operating restrictions, and associated MR&R requirements the upgraded turbines are subject to before the modification, and incorporated in the Title V Permit AQ0272TVP02 Revision 3.

Section 5: Federal Requirements

Conditions 14 through 27, NSPS Subparts A and KKKK, EU IDs 6A and 7A

Conditions 14 and 23 state that the applicable requirements for EU IDs 6 and 7 under NSPS Subparts A and GG will sunset after the completion of the SoLoNOx upgrade on each of EU IDs 6A and 7A. The applicable requirements specified in Conditions 15 through 22 and 24 through 27 for NSPS Subparts A and KKKK, respectively, will apply to EU IDs 6A and 7A.

Conditions 15 through 22 incorporates applicable 40 C.F.R. 60 Subpart A requirements. General provisions of 40 C.F.R. 60, Subpart A apply to owners or operators who are subject to a relevant subpart under Part 60, except when otherwise specified in an applicable subpart or relevant standard. In general, the intent of Subpart A is to eliminate the repetition of requirements applicable to all owners or operators affected by NSPS. At the LPC, upon completion of the SoLoNOx upgrade, EU IDs 6A and 7A become subject to NSPS Subpart KKKK and therefore subject to Subpart A.

Conditions 24 through 27 incorporate the NSPS Subpart KKKK emission standards (NO_x and SO_2) and MR&R requirements for combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005. EU IDs 6A and 7A commenced construction on May 6, 2015. EU IDs 6A and 7A meet each of these criteria and are, therefore, subject to certain requirements of NSPS Subpart KKKK.

Condition 25.1 prescribes the "good air pollution control practices" requirements for the affected emissions unit. Conditions 26 and 27 incorporate the NSPS Subpart KKKK NO_x and SO_2 emissions standards, as specified in 40 C.F.R. 60.4320(a) for NO_x and 40 C.F.R. 60.4330 for SO_2. The Permittee may not cause or allow EU IDs 6A or 7A to violate these standards. Conditions 26.3, 26.4b, and 27.3 are gap-fill recordkeeping and reporting requirements under this subpart.

The requirements for an initial performance test for NO_x for EU IDs 6A or 7A in Condition 26.1 is included because EU IDs 6A or 7A has not yet been installed as of issuance of this permit.

For compliance demonstration with the SO_2 standard in Condition 27, the Permittee is required to monitor the content of the gaseous fuel using the methods described in 40 C.F.R. 60.4415, in accordance with 40 C.F.R. 60.4360. The Permittee may elect not to monitor the total sulfur content of the fuel combusted in EU ID 7A, if the fuel is demonstrated not to exceed potential sulfur emissions of 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input (Condition 27.1b).

The provisions of NSPS Subpart KKKK listed in Conditions 24 through 27 are current as amended through December 7, 2020. Should EPA promulgate revisions to this subpart, the Permittee shall be subject to the revised final provisions as promulgated and not the superseded provisions summarized in these conditions.

Section 6: General Recordkeeping, Reporting, and Certification Requirements

Condition 28, 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 29, Submittals

Condition 29 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 30 and Section 9, Excess Emissions 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 30.3 and the Notification Form in Section 9 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 31, Operating Reports

The Department mostly used the language in SPC VII (18 AAC 50.346(b)(6)) 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 32, Emission Inventory Reporting

Except as noted in the last paragraph, the Department used the language in SPC XV, as adopted by reference under 18 AAC 50.346(b)(8), for the permit condition. 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.

To ensure that the Department's electronic system reports complete information to the National Emissions Inventory (NEI), stationary sources with air quality permits are required to submit which each 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, as applicable to EPA.

As of the issue date of this permit, the Lisburne Production Center (LPC) is required to report under Condition 32.1.

The Department modified the triennial reporting requirements under Condition 32.2 by including stationary sources' PTEs that are below the thresholds for annual reporting in Condition 32.1, instead of pollutant-specific thresholds for attainment and non-attainment areas. Thus, all stationary sources regardless of permit classification (excluding ORL's and preapproved emission limits (PAELs)) are covered under this condition, to capture the new requirements found in 18 AAC 50.275, effective September 7, 2022.

Condition 33, Consistency of Reporting Methodologies

Condition 33 is from 18 AAC 50.275(a) and requires all stationary sources, regardless of permit classification (with the exception of ORLs issued under 18 AAC 50.225 and PAELs issued in 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 33.1 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 so as to include all stationary sources required to report actual emissions for the purpose of federal emissions inventory and to avoid inconsistencies in actual emissions report submitted. When reporting actual emissions under Condition 32 or assessable emissions under Condition 4.1, consistent emission factors and calculation methods shall be used for all reporting requirements for the stationary source.

Condition 34, 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 Standard Permit Condition II (18 AAC 50.346(a)).

Section 7: Standard Permit Conditions

Conditions 35 – 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 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 AQ0272MSS03. The Department incorporated these standard conditions as follows:

1. 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 35 of Section 7 (Standard Permit Conditions);

2. 18 AAC 50.345(d) through (h) is incorporated as Conditions 36 through 40, respectively, of Section 7 (Standard Permit Conditions); and
3. 18 AAC 50.345(j) is incorporated as Condition 28 of Section 6 (Recordkeeping, Reporting, and Certification Requirements).

APPENDIX A: BAE and PAE for the LPC Rich Gas Compressor Project

Tables A-1 through A-3 present details of the calculations basis for baseline actual emissions and projected emissions as provided in the minor permit application.

Table A-1 – BAE Summary, in Tons Per Year (TPY)[1]

EU IDs	Description	NO_x[2,7]	CO[3,7]	SO_2[4]	VOC[5]	$PM_{10}/PM_{2.5}$[5, 6]
6 through 9	Solar Mars GSC T-12000	269.43	7.99	8.17	1.38	4.34

Notes:

1. BAE for existing equipment were calculated using EFs generated from source tests and hourly operational data corresponding to twenty-six temperature bins from the LPC data acquisition system for a 24-month period between May 2020 to April 2022.
2. NO_x BAE at each temperature bin was calculated using the NO_x volume concentration (in parts per million by volume on a dry basis (ppmv)) at site conditions (15% O_2), the emission factor at site conditions (EINOx in lb/MMBtu) multiplied by input heat consumption on a lower heating value (LHV in Btu/scf) basis to get emission factor (EF in lb/hr), and the hours of operation of the turbine. NO_x ISO concentration is derived from provided air fuel ratio (AFR) correlation curve (best fit representing 97.5% confidence interval). The emissions from operation in each of the temperature bins were then summed together to get the total emissions for a given year.
3. CO BAE at each temperature bin was calculated using the CO volume concentration (ppmv) at site conditions (15% O_2), the emission factor at site concentrations (EICO in lb/MMBtu), multiplied by input heat consumption on a LHV (Btu/scf) basis to get EF (lb/hr), and the hours of operation of the turbine. CO ISO concentration is derived from provided AFR correlation curve (best fit representing 97.5% confidence interval). The emissions from operation in each of the temperature bins were then summed together to get the total emissions for a given year.
4. SO_2 BAE at each temperature bin was calculated using mass balance, the monthly average H_2S concentration (75 ppmv), the hourly average fuel consumption for the LPC power plant, and total aggregate hours operated by all turbines. The emissions from operation in each of the temperature bins were then summed together to get the total emissions for a given year.
5. VOC BAE and $PM_{10}/PM_{2.5}$ BAE at each temperature bin were determined from EPA AP-42 EFs (Table 3.1-2a, April 2000), the hourly average fuel consumption of the LPC power plant, and total aggregated hours operated by all turbines. The emissions from operation in each of the temperature bins were then summed together to get the total emissions for a given year.
6. PM emissions performance is assumed to be the same regardless of control or combustion technology, and all PM is less than PM_{10} and all PM_{10} is less than $PM_{2.5}$.
7. LHV is assumed to be 921 Btu/scf. The calculated volume of dry combustion products per unit of heat content at stoichiometric conditions based on LPC fuel composition and LHV (F_d) is assumed to be 9,708 dscf/MMBtu, as determined from EPA Method 19, Equation 19-13.

Table A-2 – PAE Summary (Without ORLs), in TPY[1,5]

EU IDs	Description	NO_x	CO	SO_2	VOC	$PM_{10}/PM_{2.5}$[2]
8 and 9	Solar Mars GSC T-12000	241.75	3.02	6.34	1.07	3.37
6A and 7A	Solar Mars 90-13000S Without ORLs[4]	241.75	3.02	6.34	1.07	3.37
Total		483.50	6.04	12.68	2.14	6.74

Notes:

1. PAE for the unmodified GSC T-12000 turbines were calculated using the projected performance data from Table B-1 in Appendix B of the application and the same methodologies used to calculate BAE for each of the criteria pollutants.

2. PM emissions performance is assumed to be the same regardless of control or combustion technology, and all PM is less than PM_{10} and all PM_{10} is less than $PM_{2.5}$.
3. The PAEs for the turbine without controls is assumed to equal the GSC T-12000 turbine PAE.
4. LHV is assumed to be 921 Btu/scf. LHV (F_d) is assumed to be 9,708 dscf/MMBtu, as determined from EPA Method 19, Equation 19-13.
5. PAE accounting assumes the LPC will operate EU IDs 6A or 7A sharing the load demand with one or both of EU IDs 8 and 9, the worst-case scenario being that the three EUs (EU IDs 6A or 7A, and EU IDs 8 and 9) operate concurrently.

Table A-3 – PAE Summary (With ORLs), in TPY[1,9]

EU IDs	Description	NO_x[8]	CO[8]	SO_2	VOC	$PM_{10}/PM_{2.5}$[7]
8 and 9	Solar Mars GSC T-12000[2]	241.75	3.02	6.34	1.07	3.37
6A and 7A	Solar Mars 90-13000S SoLoNOx	46.62[3,6]	31.56[3,6]	4.32[4]	0.73[5,6]	2.29[5]
Total		288.37	34.58	10.66	1.80	5.66
Threshold to Trigger 40 C.F.R. 52.21(r)(6)		289.43[10]				
Threshold to Trigger PSD Review		309.43[11]				

Notes:

1. The PAE is the scenario with the SoLoNOx turbine sharing the load demand with one or two of the three remaining GSC T-12000 turbines to account for the increased LPC power demand after the connection of the rich gas compressor to the LPC internal power bus.
2. PAE for the unmodified GSC T-12000 turbines were calculated using the projected performance data from Table B-1 in Appendix B of the application and the same methodologies used to calculate BAE for each of the criteria pollutants.
3. NO_x and CO PAE at each temperature bin were determined using the same equations that were used to determine the emission factor at site concentrations (lb/MMBtu), multiplied by the vendor input heat consumption on a LHV (Btu/scf) basis to get EF (lb/hr), and the hours of operation of the turbine. The emissions from operation in each of the temperature bins were then summed together to get the total emissions for a calendar year.
4. SO_2 PAE at each temperature bin was determined using projected fuel consumption and mass balance (assumes same value, 75 ppmv, used for BAE). The emissions from operation in each of the temperature bins were then summed together to get the total emissions for a calendar year.
5. VOC and $PM_{10}/PM_{2.5}$ PAE at each temperature bin were determined using the projected fuel consumption and EPA AP-42 emission factors (Table 3.1-2a, April 2000). The emissions from operation in each of the temperature bins were then summed together to get the total emissions for a calendar year.
6. NO_x and CO emissions performance at 15% O_2 were provided by the vendor because AFR and source test data correlations are not available for the turbine. The emissions provided are valid only if the turbine operates above 50% load during normal operations and operates for at least 75% of the LPC power plant generation hours on an annual basis.
7. PM emissions performance is assumed to be the same regardless of control or combustion technology, and all PM is less than PM_{10} and all PM_{10} is less than $PM_{2.5}$.
8. LHV is assumed to be 921 Btu/scf. LHV (F_d) is assumed to be 9,708 dscf/MMBtu, as determined from EPA Method 19, Equation 19-13.
9. PAE accounting assumes the LPC will operate EU IDs 6A or 7A sharing the load demand with one or both of EU IDs 8 and 9, the worst-case scenario being that the three EUs (EU IDs 6A or 7A, and EU IDs 8 and 9) operate concurrently.
10. Threshold for 40 C.F.R. 52.21(r)(6) requirements was determined from half of the NO_x SER (20 TPY). The number is derived from given BAE of 269.43 + 20 = 289.43 TPY.
11. Threshold for PSD review was determined from NO_x SER of 40 TPY. The number is derived from given BAE of 269.43 + 40 = 309.43 TPY.

ATTACHMENT A

FIGURE 1--SUMMARY REPORT--GASEOUS AND OPACITY EXCESS EMISSION AND MONITORING SYSTEM PERFORMANCE

[Note: This form is referenced in 40 C.F.R. 60.7, Subpart A-General Provisions]

Pollutant *(Circle One)*: SO_2 NO_X TRS H_2S CO Opacity

Reporting period dates: From _____ to _____

Company:
Emission Limitation: _____

Address: _____

Monitor Manufacturer: _____

Model No.: _____

Date of Latest CMS Certification or Audit: _____

Process Unit(s) Description: _____

Total source operating time in reporting period [1]: _____

Emission Data Summary [1]	**CMS Performance Summary** [1]
1. Duration of excess emissions in reporting period due to:	1. CMS downtime in reporting period due to:
a. Startup/shutdown ..... ____	a. Monitor equipment malfunctions ..... ____
b. Control equipment problems ..... ____	b. Non-Monitor equipment malfunctions ..... ____
c. Process problems ..... ____	c. Quality assurance calibration ..... ____
d. Other known causes ..... ____	d. Other known causes ..... ____
e. Unknown causes ..... ____	e. Unknown causes ..... ____
2. Total duration of excess emissions ..... ____	2. Total CMS Downtime ..... ____
3. Total duration of excess emissions x (100) / [Total source operating time] ..... ____ % [2]	3. [Total CMS Downtime] x (100) / [Total source operating time] ..... ____ % [2]

[1] For opacity, record all times in minutes. For gases, record all times in hours.

[2] For the reporting period: If the total duration of excess emissions is 1 percent or greater of the total operating time or the total CMS downtime is 5 percent or greater of the total operating time, both the summary report form and the excess emission report described in 40 C.F.R. 60.7(c) shall be submitted.

Note: On a separate page, describe any changes since last quarter in CMS, process or controls.

I certify that the information contained in this report is true, accurate, and complete.

Name: _____

Signature: _____ *Date*: _____

Title: _____