Air Quality

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Table of Contents

List of Tables

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Air Quality

1 Introduction

This appendix provides tabular data to support the findings in Section 4.2.2, a more detailed description of volatile organic compounds (VOC) dispersion modeling, and a detailed explanation of rate of change in pollution concentrations by distance in relation to the two proposed LDPI alternatives at substantially differing distances from shore.

Table 1.1 Description of Air Quality Impact Criteria

Impact Category	Magnitude	Definition
Intensity	High	Causing modeled pollutant concentrations of greater than or equal to the NAAQS/AAAQS
Intensity	Medium	Causing modeled pollutant concentrations of >50% but <100% of the NAAQS/AAAQS
Intensity	Low	Causing modeled pollutant concentrations of <50% of the NAAQS/AAAQS
Duration	Long Term	Impacts to air quality that extend beyond the life of the project
Duration	Interim	Impacts last longer that 24 montsh through the life of the project
Duration	Temporary	Temporary
Potential to Occur	Probable	Unavoidable
Potential to Occur	Possible	Potential to occur
Potential to Occur	Unlikely	May occur, but unlikel to occur
Geographic Extent	Statewide	Project area and beyond
Geographic Extent	Local	Within the project areas modeled domain
Geographic Extent	Limited	Within project facillity

2 Background Concentrations

In 2010, as a part of Shell's Beaufort Sea OCS Prevention of Significant Deterioration (PSD) permit, support documentation, Statement of Basis, Sec. 5.6 (EPA, 2010c), the EPA reviewed the quarterly reports from the Badami, CCP and SDI monitors and analyzed the data from the collection period November 8, 2008 through October 31, 2009 for consistency with the monitoring plan and 40 CFR Section 52.21. EPA concluded that the data collected from March 6, 2009 until October 31, 2009 was appropriate for use as representative background air quality levels for the Beaufort Sea (EPA, 2010c, Table 4). Due to the lack of long-term data ambient air monitoring stations in the region surrounding the Beaufort Sea, EPA used alternative means to determine suitable background concentrations given the limited measurement period. The following is an excerpt from the aforementioned Statement of Basis (EPA, 2010c) detailing their method:

> For the annual NO_2 and SO_2 standards, the background value is the highest calendar year average from the relevant monitoring site. For the 24-hour PM_{10}, 3-hour and 24-hour SO_2, and 1-hour and 8-hour CO standards, Region 10 is using the highest value for either of the possible 5-month drill seasons at the appropriate monitoring sites.
>
> For the 24-hour $PM_{2.5}$ standard, Region 10 calculated the 98thpercentiles for each available 5-month drill season and averaged those values over the available drill seasons at each monitoring site… For the annual $PM_{2.5}$ standard, Region 10 calculated the annual average for each calendar year of data available for the four $PM_{2.5}$ monitoring sites and averaged them over available years.
>
> Note that the Wainwright Permanent and Point Lay $PM_{2.5}$ sites were potentially impacted by wildfires on 6 days during the 2010 drilling season. Region 10 has not excluded any of those potentially impacted days from the determination of $PM_{2.5}$ background values and has included them in the 98th percentile calculations, although

it is possible they could be excluded from consideration with appropriate documentation. Excluding these wildfire days from consideration would result in a background concentration of 5 micrograms per cubic meter (µg/m^3).

For the 1-hour SO_2 standard, Region 10 selected the highest 1-hour value from any available 5-month drilling season… Region 10 has not calculated a single 1-hour NO_2 background value for the modeling of maximum offshore impacts…

BOEM also considered the methods and procedures used by Hilcorp to develop additional background concentrations (2015 Liberty EIA, Attachment 1, Air Quality Impact Analysis, Table 3-4). Background concentrations are used in conjunction with the computer-simulated predicted impacts to determine if emissions from the Proposed Action would cause or contribute to violations of the national ambient air quality standards (NAAQS).

3 NAAQS Impact Tables

3.1 Alternative 1: Proposed Action

Table 3.1 Pollutant Impacts during Proposed LDPI Construction

Pollutant	Averaging Period	Max Project Only Concentration[1] (µg/m^3)	EPA Approved Background Concentrations (µg/m^3)	Design Concentrations[2] (µg/m^3)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	73.2	80.7	153.9	81.9%
NO_2	Annual	4.4	5	9.4	9.4%
CO	1-Hour	564.3	1,742	2306.3	5.8%
CO	8-Hour	162.3	1,094	1256.3	12.6%
SO_2	1-Hour	1	11.3	12.3	6.3%
SO_2	3-Hour	1.2	7.9	9.1	0.7%
SO_2	24-Hour	0.3	7.3	7.6	2.1%
SO_2	Annual	0.02	1.7	1.72	2.2%
PM_{10}	24-Hour	11.2	49.0	60.2	40.1%
PM_{10}	Annual	0.7	NA	NA	NA
$PM_{2.5}$	24-Hour	5.9	7.9	13.8	39.4%
$PM_{2.5}$	Annual	0.7	2.9	3.6	24.0%

Notes: Maximum Modeled Pollutant Impacts during Proposed LDPI Construction.
[1] Modeled impact from only Liberty DPP activities without addition of the ambient background level.
[2] Modeled impact from Liberty DPP activities added to the ambient background level.

Table 3.2 Pollutant Impacts for Pipeline Construction and Facility Installation

Pollutant	Averaging Period	Max Project Only Concentration[1] (µg/m^3)	EPA Approved Background Concentrations (µg/m^3)	Design Concentrations[2] (µg/m^3)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	60.7	80.7	141.4	75.2%
NO_2	Annual	4.8	5	9.8	9.8%
CO	1-Hour	257.8	1,742	1999.8	5.0%
CO	8-Hour	106.7	1,094	1200.7	12.0%
SO_2	1-Hour	0.7	11.3	12	6.1%
SO_2	3-Hour	0.5	7.9	8.4	0.6%
SO_2	24-Hour	0.2	7.3	7.5	2.1%
SO_2	Annual	0.02	1.7	1.72	2.2%
PM_{10}	24-Hour	6.1	49.0	55.1	36.7%
PM_{10}	Annual	0.6	NA	NA	NA
$PM_{2.5}$	24-Hour	3.9	7.9	11.8	33.7%

Pollutant	Averaging Period	Max Project Only Concentration[1] (µg/m³)	EPA Approved Background Concentrations (µg/m³)	Design Concentrations[2] (µg/m³)	Ratio of Design Concentrations to NAAQS
$PM_{2.5}$	Annual	0.6	2.9	3.5	23.3%

Notes: Maximum Modeled Pollutant Impacts for Pipeline Construction and Facility Installation.
[1] Modeled impact from only Liberty DPP activities without addition of the ambient background level.
[2] Modeled impact from Liberty DPP activities added to the ambient background level.

Table 3.3 Pollutant Impacts during Facility Installation

Pollutant	Averaging Period	Max Project Only Concentration[1] (µg/m³)	EPA Approved Background Concentrations (µg/m³)	Design Concentrations[2] (µg/m³)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	81.6	80.7	162.3	86.3%
NO_2	Annual	7.7	5	12.7	12.7%
CO	1-Hour	902.8	1,742	2644.8	6.6%
CO	8-Hour	434.3	1,094	1528.3	15.3%
SO_2	1-Hour	31.7	11.3	43	21.9%
SO_2	3-Hour	33.4	7.9	41.3	3.2%
SO_2	24-Hour	16	7.3	23.3	6.4%
SO_2	Annual	0.4	1.7	2.1	2.6%
PM_{10}	24-Hour	9.2	49.0	58.2	38.8%
PM_{10}	Annual	1.1	NA	NA	NA
$PM_{2.5}$	24-Hour	6.5	7.9	14.4	41.1%
$PM_{2.5}$	Annual	1	2.9	3.9	26.0%

Notes: Maximum Modeled Pollutant Impacts during Facility Installation.
[1] Modeled impact from only Liberty DPP activities without addition of the ambient background level.
[2] Modeled impact from Liberty DPP activities added to the ambient background level.

Table 3.4 Pollutant Impacts - Drilling, Development, Production Operations

Pollutant	Averaging Period	Max Project Only Concentration[1] (µg/m³)	EPA Approved Background Concentrations (µg/m³)	Design Concentrations[2] (µg/m³)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	83.5	80.7	164.2	87.3%
NO_2	Annual	6.9	5	11.9	11.9%
CO	1-Hour	1,229.00	1,742	2971	7.4%
CO	8-Hour	571.2	1,094	1665.2	16.7%
SO_2	1-Hour	44.6	11.3	55.9	28.5%
SO_2	3-Hour	49.8	7.9	57.7	4.4%
SO_2	24-Hour	19.1	7.3	26.4	7.2%
SO_2	Annual	1.54	1.7	3.24	4.1%
PM_{10}	24-Hour	9.6	49.0	58.6	39.1%
PM_{10}	Annual	0.9	NA	NA	NA
$PM_{2.5}$	24-Hour	5.8	7.9	13.7	39.1%
$PM_{2.5}$	Annual	0.9	2.9	3.8	25.3%

Notes: Maximum Modeled Pollutant Impacts - Drilling, Development, Production Operations.
[1] Modeled impact from only Liberty DPP activities without addition of the ambient background level.
[2] Modeled impact from Liberty DPP activities added to the ambient background level.

3.2 Alternative 3A: Relocate LDPI Approximately One Mile to the East

Table 3.5 Estimated Pollutant Impacts during LDPI Construction-Alternative 3A

Pollutant	Averaging Period	Proposed Action Concentrations ($\mu g/m^3$)	Change due to Alternative 3A ($\mu g/m^3$)	Alternative 3a Design Concentrations ($\mu g/m^3$)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	153.9	4.9	158.8	84.5%
NO_2	Annual	9.4	0.3	9.7	9.7%
CO	1-Hour	2306.3	37.6	2343.9	5.9%
CO	8-Hour	1256.3	10.8	1267.1	12.7%
SO_2	1-Hour	12.3	0.1	12.4	6.3%
SO_2	3-Hour	9.1	0.1	9.2	0.7%
SO_2	24-Hour	7.6	0.0	7.6	2.1%
SO_2	Annual	1.7	0.0	1.7	2.2%
PM_{10}	24-Hour	60.2	0.7	60.9	40.6%
PM_{10}	Annual	NA	0.0	NA	NA
$PM_{2.5}$	24-Hour	13.8	0.4	14.2	40.6%
$PM_{2.5}$	Annual	3.6	0.0	3.6	24.3%

Table 3.6 Estimated Pollutant Impacts during Pipeline Construction Alternative 3A

Pollutant	Averaging Period	Proposed Action Concentrations ($\mu g/m^3$)	Change due to Alternative 3A ($\mu g/m^3$)	Alternative 3A Design Concentrations ($\mu g/m^3$)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	141.4	4.9	146.3	77.80%
NO_2	Annual	9.8	0.4	10.2	10.18%
CO	1-Hour	1999.8	20.6	2020.4	5.05%
CO	8-Hour	1200.7	8.5	1209.2	12.09%
SO_2	1-Hour	12	0.1	12.1	6.15%
SO_2	3-Hour	8.4	0.0	8.4	0.65%
SO_2	24-Hour	7.5	0.0	7.5	2.06%
SO_2	Annual	1.72	0.0	1.7	2.15%
PM_{10}	24-Hour	55.1	0.5	55.6	37.06%
PM_{10}	Annual	NA	NA	NA	NA
$PM_{2.5}$	24-Hour	11.8	0.3	12.1	34.61%
$PM_{2.5}$	Annual	3.5	0.0	3.5	23.65%

Table 3.7 Estimated Pollutant Impacts during Drilling and Development Alternative 3A

Pollutant	Averaging Period	Proposed Action Concentrations ($\mu g/m^3$)	Change due to Alternative 3A ($\mu g/m^3$)	Alternative 3A Design Concentrations ($\mu g/m^3$)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	164.2	8.1	172.3	91.66%
NO_2	Annual	11.9	0.7	12.6	12.57%
CO	1-Hour	2971	119.5	3090.5	7.73%
CO	8-Hour	1665.2	55.5	1720.7	17.21%
SO_2	1-Hour	55.9	4.3	60.2	30.73%
SO_2	3-Hour	57.7	4.8	62.5	4.81%
SO_2	24-Hour	26.4	1.9	28.3	7.74%
SO_2	Annual	3.24	0.1	3.4	4.24%
PM_{10}	24-Hour	58.6	0.9	59.5	39.69%
PM_{10}	Annual	NA	0.1	NA	NA
$PM_{2.5}$	24-Hour	13.7	0.6	14.3	40.75%
$PM_{2.5}$	Annual	3.8	0.1	3.9	25.92%

3.3 Alternative 3B: Relocate LDPI Approximately 1.5 Miles to the Southwest

Table 3.8 Estimated Pollutant Impacts during LDPI Construction Alternative 3B

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m^3)	Influence of Plan Change (μg/m^3)	Design Concentrations (μg/m^3)	Ratio Design Concentrations to NAAQS
NO_2	1-Hour	153.9	-2.9	151.0	80.30%
NO_2	Annual	9.4	-0.2	9.2	9.22%
CO	1-Hour	2306.3	-22.6	2283.7	5.71%
CO	8-Hour	1256.3	-6.5	1249.8	12.50%
SO_2	1-Hour	12.3	0.0	12.3	6.26%
SO_2	3-Hour	9.1	0.0	9.1	0.70%
SO_2	24-Hour	7.6	0.0	7.6	2.08%
SO_2	Annual	1.72	0.0	1.7	2.15%
PM_{10}	24-Hour	60.2	-0.4	59.8	39.83%
PM_{10}	Annual	NA	NA	NA	NA
$PM_{2.5}$	24-Hour	13.8	-0.2	13.6	38.75%
$PM_{2.5}$	Annual	3.6	0.0	3.6	23.81%

Table 3.9 Estimated Pollutant Impacts during Pipeline Construction Alternative 3B

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m^3)	Influence of Plan Change (μg/m^3)	Alternative 3B Design Concentrations (μg/m^3)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	141.4	-12.1	129.3	68.76%
NO_2	Annual	9.8	-1.0	8.8	8.84%
CO	1-Hour	1999.8	-51.6	1948.2	4.87%
CO	8-Hour	1200.7	-21.3	1179.4	11.79%
SO_2	1-Hour	12	-0.1	11.9	6.05%
SO_2	3-Hour	8.4	-0.1	8.3	0.64%
SO_2	24-Hour	7.5	0.0	7.5	2.04%
SO_2	Annual	1.72	0.0	1.7	2.15%
PM_{10}	24-Hour	55.1	-1.2	53.9	35.92%
PM_{10}	Annual	NA	-0.1	NA	NA
$PM_{2.5}$	24-Hour	11.8	-0.8	11.0	31.49%
$PM_{2.5}$	Annual	3.5	-0.1	3.4	22.53%

Table 3.10 Estimated Pollutant Impacts during Drilling and Development Alternative 3B

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m^3)	Influence of Plan Change (μg/m^3)	Alternative 3B Design Concentrations (μg/m^3)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	164.2	23.6	187.8	99.91%
NO_2	Annual	11.9	2.0	13.9	13.85%
CO	1-Hour	2971	347.8	3318.8	8.30%
CO	8-Hour	1665.2	161.6	1826.8	18.27%
SO_2	1-Hour	55.9	12.6	68.5	34.96%
SO_2	3-Hour	57.7	14.1	71.8	5.52%
SO_2	24-Hour	26.4	5.4	31.8	8.71%
SO_2	Annual	3.24	0.4	3.7	4.59%
PM_{10}	24-Hour	58.6	2.7	61.3	40.88%
PM_{10}	Annual	NA	0.3	NA	NA
$PM_{2.5}$	24-Hour	13.7	1.6	15.3	43.83%

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m³)	Influence of Plan Change (μg/m³)	Alternative 3B Design Concentrations (μg/m³)	Ratio of Design Concentrations to NAAQS
$PM_{2.5}$	Annual	3.8	0.3	4.1	27.03%

3.4 Alternative 4A: Relocate Oil and Gas Processing to Endicott

Table 3.11 Estimated Pollutant Impacts during LDPI Construction Alternative 4A

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m³)	Change due to Alternative 4A (μg/m³)	Alternative 4A Design Concentrations (μg/m³)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	153.9	-9.7	144.2	76.68%
NO_2	Annual	9.4	-0.6	8.8	8.81%
CO	1-Hour	2306.3	-75.1	2231.2	5.58%
CO	8-Hour	1256.3	-21.6	1234.7	12.35%
SO_2	1-Hour	12.3	-0.1	12.2	6.21%
SO_2	3-Hour	9.1	-0.2	8.9	0.69%
SO_2	24-Hour	7.6	0.0	7.6	2.07%
SO_2	Annual	1.72	0.0	1.7	2.15%
PM_{10}	24-Hour	60.2	-1.5	58.7	39.14%
PM_{10}	Annual	NA	-0.1	NA	NA
$PM_{2.5}$	24-Hour	13.8	-0.8	13.0	37.19%
$PM_{2.5}$	Annual	3.6	-0.1	3.5	23.38%

Table 3.12 Estimated Pollutant Impacts during Pipeline Construction Alternative 4A

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m³)	Change due to Alternative 4A (μg/m³)	Alternative 4A Design Concentrations (μg/m³)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	141.4	17.0	158.4	84.25%
NO_2	Annual	9.8	1.3	11.1	11.14%
CO	1-Hour	1999.8	72.2	2072.0	5.18%
CO	8-Hour	1200.7	29.9	1230.6	12.31%
SO_2	1-Hour	12	0.2	12.2	6.22%
SO_2	3-Hour	8.4	0.1	8.5	0.66%
SO_2	24-Hour	7.5	0.1	7.6	2.07%
SO_2	Annual	1.72	0.0	1.7	2.16%
PM_{10}	24-Hour	55.1	1.7	56.8	37.87%
PM_{10}	Annual	NA	NA	NA	NA
$PM_{2.5}$	24-Hour	11.8	1.1	12.9	36.83%
$PM_{2.5}$	Annual	3.5	0.2	3.7	24.45%

3.5 Alternative 4B: Relocate Oil and Gas Processing to a New Onshore Facility

Table 3.13 Estimated Pollutant Impacts during LDPI Construction Alternative 4B

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m^3)	Change due to Alternative 4B (μg/m^3)	Alternative 4B Design Concentrations (μg/m^3)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	153.9	-3.9	150.0	79.80%
NO_2	Annual	9.4	-0.2	9.2	9.17%
CO	1-Hour	2306.3	-29.9	2276.4	5.69%
CO	8-Hour	1256.3	-8.6	1247.7	12.48%
SO_2	1-Hour	12.3	-0.1	12.2	6.25%
SO_2	3-Hour	9.1	-0.1	9.0	0.70%
SO_2	24-Hour	7.6	0.0	7.6	2.08%
SO_2	Annual	1.72	0.0	1.7	2.15%
PM_{10}	24-Hour	60.2	-0.6	59.6	39.74%
PM_{10}	Annual	NA	NA	NA	NA
$PM_{2.5}$	24-Hour	13.8	-0.3	13.5	38.54%
$PM_{2.5}$	Annual	3.6	0.0	3.6	23.75%

Table 3.14 Estimated Pollutant Impacts during Pipeline Construction Alternative 4B

Pollutant	Averaging Period	Proposed Action Concentrations (μg/m^3)	Change due to Alternative 4B (μg/m^3)	Alternative 4B Design Concentrations (μg/m^3)	Ratio of Design Concentrations to NAAQS
NO_2	1-Hour	141.4	5.0	146.4	77.89%
NO_2	Annual	9.8	0.4	10.2	10.20%
CO	1-Hour	1999.8	21.4	2021.2	5.05%
CO	8-Hour	1200.7	8.9	1209.6	12.10%
SO_2	1-Hour	12	0.1	12.1	6.15%
SO_2	3-Hour	8.4	0.0	8.4	0.65%
SO_2	24-Hour	7.5	0.0	7.5	2.06%
SO_2	Annual	1.72	0.0	1.7	2.15%
PM_{10}	24-Hour	55.1	0.5	55.6	37.07%
PM_{10}	Annual	NA	NA	NA	NA
$PM_{2.5}$	24-Hour	11.8	0.3	12.1	34.64%
$PM_{2.5}$	Annual	3.5	0.0	3.5	23.67%

4 VOC Analysis

Estimating emissions of VOC from evaporation of hydrocarbons (HCs) contained in an oil spill is complex because the HCs in oil are numerous, varied, and abundant. In addition, the oil contains many elements other than HCs, including impurities that vary from source to source, and can also vary over time. As such, a pound of oil will not evaporate to create a pound of VOC because of the other compounds and impurities in the oil. Rather, the weight of the evaporated VOC is likely to be some value less than a pound.

The oil spill contains lighter "fractions" of HCs, similar to gasoline, and heavier fractions similar to tars and wax-like hydrocarbons. Alaska North Slope Oil (ANSO) is a medium grade crude oil, and according to the NOAA Office of Response and Restoration:

> ANS[O] crude blends tend to emulsify quickly, forming a stable emulsion (or mousse). The rate of emulsification, while difficult to model, is known to be accelerated by wind mixing, and is thought to be related to the blend's wax content…
>
> From 15-20% of this product evaporates in the first 24 hours of a spill, depending on the wind and sea conditions, and very little oil is dispersed into the water column. The weathered oil then starts to form a stable mousse with up to 75% water content (thereby increasing the slick volume four-fold), and it undergoes dramatic changes in its physical characteristics.
>
> The viscosity of the oil-in-water mixture increases rapidly and the color usually turns from a dark brown/black to lighter browns and rust colors. As the water content of the emulsion increases, weathering processes (e.g., dissolution and evaporation) slow down. (NOAA, 2015).

With increased time, the oil degrades to a "sticky mousse" consistency, creating a non-homogenous material with a "crust of slightly more weathered mousse surrounding a less-weathered core" (NOAA, 2015). This weathering causes the evaporation rate to steadily decrease.

Air quality impacts from an oil spill are measured by the volume of VOCs that may be released into the lower atmosphere due to evaporation of the oil, relative to the reaction of these VOCs with other elements in the atmosphere to form ozone.

Estimations for the rate of evaporation for the summer and meltout spill scenarios were produced using the weathering model described in Appendix A. The evaporation rates for each of the scenarios from day 1 to day 30 are summarized in Tables A.1-2 through A.1-8 of Appendix A. In keeping with the conservative nature of this NEPA anlysis, the 30-day (or maximum) evaporation rates are used to estimate the potential VOC emissions for each spill scenario.

The analysis of a large oil spill, and the impact to air quality, assumes a single spill of one of five types during summer or meltout seasons:

1. A spill of up to 5,100 bbl of crude oil from the proposed LDPI;
2. A spill of up to 5,100 bbl of diesel from the proposed LDPI;
3. An offshore pipeline rupture of up to 4,000 bbl of crude oil;
4. An offshore pipeline leak of up to 1,700 bbl of crude oil; or
5. An onshore pipeline spill of up to 2,500 bbl of crude oil.

The analysis of a small oil spill, and the impact to air quality, assumes a single spill of one of two types:

1. A spill of up to 200 bbl of diesel from operational spills during summer and meltout, or
2. A spill of up to 5 bbl of diesel from operational spills during the summer.

BOEM has utilized a crude API gravity of 24-27; a density of crude at 901.4 kg/m^3; and a density of diesel fuel at 885 $kg/m^3$for this analysis. The results of the analysis are shown in Table 3.11.

Table 4.1 VOCs Released During Various Spill Scenarios

Type	Barrels Spilled	Max Summer Oil Evaporated[3]	VOCs Released in Summer Spill (short tons)[4]	Max Meltout Oil Evaporated[3]	VOCs Released in Meltout Spill (short tons)[4]
Crude[1]	5,100	17%	138.6	17%	132.9
Diesel[1]	5,100	32%	249.2	59%	462.7
Crude[1]	4,000	17%	108.7	17%	104.3
Crude[1]	1,700	17%	46.5	17%	44.3
Crude[1]	2,500	40%	158.0	40%	158.0
Diesel[2]	200	32%	9.8	59%	18.1
Diesel[2]	5	31%	0.2	NA[5]	NA[5]

Notes: [1] Large spill scenario
[2] Small spill scenario
[3] Evaporation rates provided from weathering model in Tables A.1-2 through A.1-8, Appendix A.
[4] Assuming all the barrels available for evaporation is evaporated as VOC.
[5] Not Analyzed

5 Additional information on MAI/PSD Increments

* When would increment analysis be required?

The PSD increment is the amount of air pollution degradation an area is allowed to experience over a baseline concentration, as specified in the Clean Air Act. Significant deterioration occurs when air pollutant concentrations exceed the applicable PSD increment. Although all increases in emissions from domestic, non-temporary sources of air pollution can contribute to consumption of the increment, evaluation of increment consumption generally occurs during evaluation of new or modified major sources of air pollution. PSD increment consumption analysis is required for permitting of new major sources or major modifications of existing sources. Since the Proposed Action is under BOEM jurisdiction and will not be a major source, PSD increment consumption analysis will not be required under ADEC's air permitting program (baseline dates and PSD increments promulgated in 18 AAC 50.020). However, actual emissions from the project will consume some portion of the PSD increment for pollutants whose baseline dates have been triggered (NO_2, SO_2, and PM_{-10} for the Northern Alaska Intrastate air quality control region). The consumption of increment by the Proposed Action would be assessed in the case a new major source or major modification of an existing source occurred in the vicinity of the Liberty project. In this case, the actual emissions associated with the Proposed Action would be considered in an increment consumption analysis.

* What does the MAI compare to the actual PSD increment?

The MAI applied in the analysis acts as a conservative estimate of the maximum PSD increment consumption that could occur if the project was constructed and actually emitted at the projected emission rates. A true increment analysis would require an account of both creditable emission increases and decreases for each triggered pollutant after the baseline date. Exceedance of the MAI by the Proposed Action does not necessarily mean the project would violate the PSD increment or would result in a significant impact to air quality. Instead, the MAI analysis provides a cursory look at the possible magnitude of increment consumption attributable to the source. A formal increment consumption analysis is a modeling exercise that is conducted as part of major source PSD permitting.

* What and when do sources consume increment?

Only certain emissions apply to increment consumption. First, temporary emissions from a source do not contribute to increment consumption. Increment consumption is also only determined by an air quality modeling analysis. Increment consumption is considered on a spatial and temporal basis, not determined across an entire air quality control region as a whole. For example, if 80 percent of the increment is consumed at a receptor for a given major source project, this does not mean 80 percent of the increment is consumed for any new project in the air quality control region, and two sources can both consume 80 percent of the increment at the same location as long as it occurs on different days, the increment consumption is always considered on a per model receptor basis.

* What does increment consumption mean for future development?

Increment consumption by the Proposed Action could possibly be a factor in future development of major sources near the Liberty project. In the case where a nearby new major source or major modification of an existing source was proposed, emissions from the Proposed Action would be considered in the air quality analysis of increment consumption. In the case where Liberty emissions and emissions from the other major projects resulted in consumption of increment at a receptor, the combined consumption from the two sources would not be allowed to exceed the PSD increment.