APPENDIX 5.2-5

Volatile Organic Compounds Model Predictions

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WOODFIBRE LNG LIMITED
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REPORT

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Golder Associates

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1.0 INTRODUCTION

Woodfibre LNG Limited (WLNG) has proposed to construct and operate a liquefied natural gas (LNG) production, storage, and marine carrier transfer facility (project) for the export of LNG on the west side of Howe Sound, British Columbia (BC). This report supplements Section 5.2 (Atmospheric Environment) of the Environmental Assessment. As a part of air assessment, the general approach used to evaluate the potential air quality effects of the project included the following steps. This appendix outlines the fifth steps (**bolded**), namely the analysis of the model predicted volatile organic compounds (VOCs) concentrations:

- Establish the existing air quality and meteorological conditions in the project study areas;
- Develop a representative site specific meteorological dataset for use in the dispersion modelling assessment;
- Quantify the air emissions from the project for the phase of activity (i.e.,, construction, operations, and decommissioning) likely to result in the highest overall changes to air quality;
- Predict the concentrations and deposition rates of indicator compounds released from the project phase that will likely result in the highest overall changes to air quality using dispersion modelling;
- **Use dispersion modelling to predict the concentrations and deposition rates of the other compounds required as inputs to other disciplines affected by changes in air quality (e.g., human health);** and
- Compare the predicted indicator compound concentrations to available criteria and standards, and assess the relevant significance of these effects.

To better understand the potential effects associated with the project's VOC emissions, the CALPUFF model VOC predictions were compared against Alberta's ambient air quality objectives (AAAQO) (Alberta Government 2013) as the federal government and government of BC do not have ambient air quality criteria for individual VOCs.

2.0 RESULTS

Project activities which result in VOCs emission are discussed in Appendix 5.2(b). Of the individual VOCs that can be expected to be emitted from the project under normal operation, only 15 VOCs have AAAQOs. CALPUFF model was used to predict the 15 VOCs concentrations. Details on the selection and execution of the dispersion model are discussed in Appendix 5.2(a). Table 1 summarizes the model predicted maximum concentrations for the 1 VOCs.

Table 1: Predicted Maximum VOCs Concentrations

Compound	Averaging Period	Alberta Ambient Air Quality Criteria (µg/m^3)[(a)]	Background Concentration (µg/m^3)[(b)]	Normal Operations	Normal Operations Including Background Operation
Acetaldehyde	1 hour	90	0.00	4.26	4.26
Acetone	1 hour	5,900	0.00	2.24	2.24
Acrolein	1 hour	4.5	0.00	0.35	0.35
	24 hour	0.40	0.00	0.10	0.10
Acrylonitrile	1 hour	43	0.00	0.23	0.23
	Annual	2	0.00	0.01	0.01
Benzene	1 hour	30	2.52	0.66	3.18
	Annual	3	0.20	0.06	0.26
Benzo[a]pyrene	Annual	0.0003	0.00000	0.00002	0.00002
Cumene	1 hour	500	0.27	0.04	0.31
Ethylbenzene	1 hour	2,000	1.62	0.34	1.96
Formaldehyde	1 hour	65	0.00	2.27	2.27
n-hexane	1 hour	21,000	2.39	0.06	2.45
	24 hour	7,000	0.98	0.02	1.00
Isopropanol	1 hour	7,850	0.00	2.08	2.08
Styrene	1 hour	215	0.49	0.00	0.49
Toluene	1 hour	1,880	19.03	10.85	29.88
	24 hour	400	7.81	2.60	10.42
Vinyl Chloride	1 hour	130	0.00	0.32	0.32
Xylenes	1 hour	2,300	7.43	11.22	18.66
	24 hour	700	3.05	2.73	5.79

Notes: (a) Alberta Government 2013; (b) Background concentrations of VOCs calculated based on data from National Air Pollution Surveillance Program (NAPS), see Appendix 5.2(d).

The results in table indicate that the maximum predicted maximum VOC concentrations are less than the AAAQO for the 15 VOCs evaluated.

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3.0 REFERENCES

Alberta Government, (2013); Alberta Ambient Air Quality Objectives and Guidelines Summary. Alberta Environment Air Policy.

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