Environment and Climate Change Canada | Environnement et Changement climatique Canada

NOVA Gas Transmission Ltd. – 2017 NGTL System Expansion Project

Review of Related Upstream Greenhouse Gas Emissions Estimates

Draft for Public Comments

June 1, 2016

Canada

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Contents

Executive Summary

This document provides an estimate of the upstream greenhouse gas (GHG) emissions potentially associated with the 2017 NOVA Gas Transmission Ltd. (NGTL) System Expansion Project (the Project).

NGTL proposes to construct and operate new natural gas pipeline facilities in northern Alberta to expand the NGTL System by 2017. This expansion would increase the capacity to receive gas in the *Upstream of James River Area* on the northwest edge of the NGTL System, as well as increase the capacity to deliver gas to meet the increasing market demand in the *North of Bens Lake Area* on the northeast edge of the NGTL System. The expansion would include five new and separate pipeline section loops, totaling 230 kilometers, and two additional compressor units at existing compressor station facilities. Over 90% of the Project would parallel existing linear disturbances, such as pipelines and roads. The Project is required to meet additional design flow requirements of 443 million cubic feet per day.

Environment and Climate Change Canada (ECCC) estimated the upstream GHG emissions in Canada potentially associated with the production, gathering and processing of the additional volume of natural gas to be transported by the NGTL System due to the Project. The GHG emissions and natural gas production projections used by ECCC for this assessment take into account the estimated impacts of the policies and measures put in place as of September 2015. A number of important measures to reduce GHG emissions from the oil and gas sector have been announced since September 2015, such as initiatives to reduce methane emissions, but are not reflected. As measures are defined and take effect, they will be incorporated into future emissions projections and future upstream GHG assessments.

The upstream GHG emissions potentially associated with the Project are estimated to be between 1.2 and 1.4 megatonnes of carbon dioxide equivalent per year. For the purposes of this assessment, *upstream* is defined as all natural gas sector stages before the gas transmission system – that is, natural gas production, gathering and processing. This assessment does not try to determine whether there is any incremental natural gas production that would result from the Project. This assessment accounts for all GHG emissions including fugitives, venting, flaring, and combustion.

Introduction

As part of its January 27, 2016 announcement of interim principles, the Government of Canada has committed to undertake an assessment of upstream greenhouse gas (GHG) emissions associated with projects undergoing an environmental assessment[1]. Environmental assessments of projects already include an assessment of the direct emissions caused by a project.

This assessment provides a project description and a quantitative estimation of the GHG emissions that may be released as a result of upstream gas production associated with the 2017 NOVA Gas Transmission Ltd. (NGTL) System Expansion Project (the Project).

On March 19, 2016, Environment and Climate Change Canada published its proposed methodology to estimate upstream GHG emissions associated with major oil and gas projects undergoing federal environmental assessments in the *Canada Gazette*, Part I[2]. Part A of this proposed methodology is applied in this assessment.

Project Description[3,4]

NGTL, a subsidiary of TransCanada PipeLines Limited, owns and operates the NGTL System, an integrated natural gas pipeline system comprised of approximately 24,544 kilometers (km) of pipelines and other associated facilities, located in Alberta and northeastern British Columbia. The NGTL System transports natural gas to markets in the two provinces and connects to other pipelines that deliver natural gas to markets across North America, including the TransCanada *Canadian Mainline* at Empress, Alberta and the TransCanada *Foothills System* at Caroline, Crowsnest, and McNeill, Alberta.

NGTL proposes to construct and operate five new gas pipeline sections, totaling 230 km, and two compressor units at existing facilities in northern Alberta to expand the existing NGTL System (See map in Appendix 1). The expansion would increase the capacity to receive gas in the *Upstream of James River Area* on the northwest edge of the NGTL System, as well as increase the capacity to deliver gas to meet the increasing market demand in the *North of Bens Lake Area* on the northeast edge of the NGTL System. Approximately 90% of the Project would parallel existing linear disturbances, such as pipelines and roads. The new facilities would consist of:

- Northwest Mainline Loop - Boundary Lake Section (approximately 91 km)
- Northwest Mainline Loop - Bear Canyon Section (approximately 27 km)
- Grande Prairie Mainline Loop No. 2 - McLeod River Section (approximately 36 km)
- Liege Lateral Loop No. 2 - Pelican Lake Section (approximately 56 km)
- Kettle River Lateral Loop - Christina River Section (approximately 20 km)

- Alces River Compressor Station Unit Addition
- Otter lake Compressor Station Unit Addition

The Project is required to meet additional design flow requirements of 443 million cubic feet per day (MMcf/d).

Estimation of Upstream GHG Emissions

This assessment provides quantitative estimates of the GHG emissions released as a result of the extraction, gathering and processing of the volume of natural gas associated with the additional design flow for the *Upstream of James River Area* of the NGTL System. This volume is estimated to be 443 MMcf/day.

The GHG emissions estimates include emissions from combustion, industrial processes, flaring, venting, and fugitive sources. The GHG emissions contain carbon dioxide, methane and nitrous oxide. These constituents of GHG emissions were combined taking into account their respective global warming potentials. The scope of this assessment does not extend to *indirect* upstream emissions, such as those related to land-use changes and those generated during the production of purchased inputs including equipment, grid electricity and fuels. Those emissions have only been considered if they are not distinguishable from the direct upstream emissions.

GHG emissions associated with the extraction, gathering and processing of natural gas vary with the basin and processes involved. The gas mix that could enter the pipeline will change during its operational life to reflect operational requirements and market demand. Due to the potential variability associated with the gas transported by the expanded NGTL System, emissions estimates are presented for three different scenarios.

ECCC estimated emissions for three different product scenarios to assess a range of upstream GHG emissions that could be associated with the additional capacity of the NGTL System: one hundred percent of the gas coming from Alberta sources, one hundred percent of the gas coming from British Columbia sources, and an equal mix of British Columbia and Alberta sources (see Table 1).

Table 1 - Gas Mix Scenario

Product Category	Scenario		
	1	2	3
Alberta-Sourced Natural Gas	100%	0%	50%
British Columbia-Sourced Natural Gas	0%	100%	50%

The resulting range of estimated upstream GHG emissions associated with the additional capacity, in megatonnes of carbon dioxide equivalent (Mt of CO_2 eq) per year, is presented below in Table 2 for the three scenarios described above.

ECCC projects that the upstream GHG emissions in Canada resulting from the production, gathering and processing of the additional natural gas volume to be transported by the NGTL System due to the Project could range from 1.2 to 1.4 Mt of CO_2 eq per year.

Table 2 - Upstream Emissions Estimates for the Three Scenarios (Mt of CO_2 eq)

Year	Scenario 1	Scenario 2	Scenario 3
2018	1.412	1.156	1.284
2019	1.412	1.154	1.284
2020	1.414	1.154	1.284
2021	1.414	1.152	1.284
2022	1.414	1.152	1.284
2023	1.416	1.152	1.284
2024	1.416	1.152	1.284
2025	1.418	1.152	1.284
2026	1.418	1.152	1.286
2027	1.420	1.152	1.286
2028	1.422	1.152	1.288
2029	1.422	1.154	1.288
2030	1.424	1.154	1.288

As illustrated in Table 2, the estimates of upstream GHG emissions are influenced by the assumed gas mix that will be transported by the expanded NGTL System. There is uncertainty in the actual gas mix that will be transported by the expanded NGTL System and therefore, the actual associated upstream GHG emissions. As well, the assessment does not consider whether these emissions would occur in the absence of the Project.

GHG Forecast Approach

The estimates were calculated using GHG emission projections from ECCC's recently published *Canada's Second Biennial Report on Climate Change* submitted to the United Nations Framework Convention on Climate Change (UNFCCC)[5] and the National Energy Board (NEB)'s production projections from the report entitled *Canada's Energy Future 2016 – Energy Supply and Demand Projections to 2014*[6]. ECCC used the details of the projected GHG emissions and productions that were specific to the *with current measures* reference scenario[5]. This reference scenario reflects the combined impacts of actions taken by governments, consumers and businesses up to 2013, as well as the future impacts of existing policies and measures that have been put in place as of September 2015.

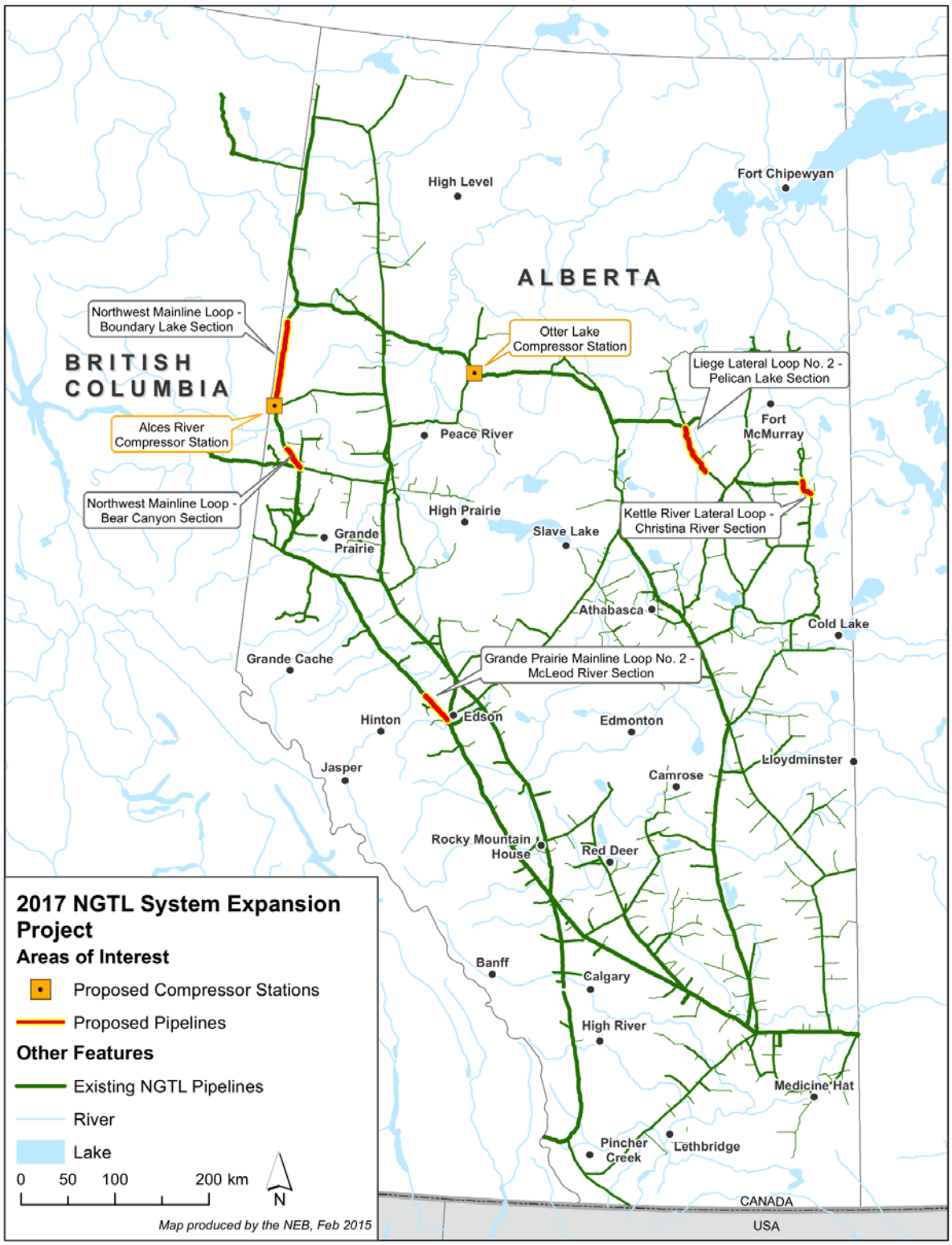
The projections do not reflect the impact of additional federal, provincial or territorial measures that were announced since September 2015 or that are still under development. A number of recently announced provincial government policies, such as those outlined in Alberta's *Climate Leadership Plan*[7], will have an impact on Canadian GHG emissions, but were not reflected in *Canada's Second Biennial Report on Climate Change* as the details of these policies were not available at the time of publication. Alberta's *Climate Leadership Plan* includes a commitment to cap emissions from oil sands facilities at 100 Mt in any year, reduce methane emissions from oil and gas operations by 45% by 2025, set performance standards for large industrial emitters, and apply a carbon levy to fuels. British Columbia has announced that it will be updating its *Climate Leadership Plan* and has recently concluded public consultations[8]. Other provinces are also planning new actions that will have implications for oil and gas sector emissions. In addition, on March 3, 2016, First Ministers adopted the *Vancouver Declaration on Clean Growth and Climate Change*, in which they commit to develop a concrete plan to achieve Canada's international climate commitments and become a leader in the global clean growth economy[9]. As these plans get defined and take effect, they will be incorporated in future emissions projections and future upstream GHG assessments. As outlined in the proposed methodology published March 19, 2016[2], ECCC will be examining other data sets, such as data reported for regulatory purposes, and incorporating them into the final assessment, as appropriate.

For the purposes of this assessment, ECCC developed emission factors representing the relative upstream emissions contributions per unit volume of gas. Each category of gas that may enter the expanded NGTL System has an associated specific emission factor that depends on the emissions generated during its production, gathering and processing. In order to develop emission factors, ECCC divided projected GHG emissions as published in the *Canada's Second Biennial Report on Climate Change*[5], by the respective production projection obtained from the NEB[6]. The resulting emission factors are presented in Table 3.

Table 3 - GHG Emission Factors

Year	Emission Factor (tonnes of CO_2 eq/MMcf)			
	Alberta		British Columbia	
	Production	Processing	Production	Processing
2018	4.96	3.77	3.13	4.02
2019	4.96	3.77	3.13	4.01
2020	4.96	3.78	3.13	4.01
2021	4.96	3.78	3.13	4.00
2022	4.96	3.79	3.13	4.00
2023	4.96	3.79	3.13	3.99
2024	4.96	3.80	3.13	3.99
2025	4.96	3.80	3.13	3.99
2026	4.96	3.81	3.13	4.00
2027	4.96	3.82	3.13	4.00
2028	4.96	3.83	3.13	4.00
2029	4.96	3.84	3.13	4.00
2030	4.96	3.84	3.13	4.01

Appendix 1: 2017 NGTL System Expansion Project Map



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