CN Milton Logistics Hub – Using Natural Gas Switch Heaters Instead of Propane

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1.0 INTRODUCTION

As part of the Canadian National Railway Company's (CN) Milton Logistics Hub (the Project), CN is proposing to revise the fuel source for switch heaters from propane to natural gas. The use of propane as a fuel source for switch heaters was described in Section 3.3.1 and 3.4.1 of the Environmental Impact Statement (EIS) submitted to the Canadian Environmental Assessment Agency (now Impact Assessment Agency of Canada) pursuant to the ***Canadian Environmental Assessment Act, 2012*** and ultimately approved through issuance of the Decision Statement by the Minister of the Environment and Climate Change on January 21, 2021 (as amended on July 26, 2022).

In accordance with Condition 2.16 of the Decision Statement, CN is providing a description of the proposed fuel switch, the environmental effects that may result, including how these may differ from the environmental effects of the Designated Project identified during the environmental assessment, and the mitigation measures and follow-up programs to be implemented by CN in relation to the predicted adverse environmental effects. This submission also considers the need for any modified or additional measures to mitigate any environmental effect that may result from the proposal and any modified or additional follow-up requirements.

Details regarding this proposal are provided in Section 2.0. A description of the existing environmental conditions within the area is provided in Section 3.0. A description of the potential environmental effects, proposed mitigation measures, and follow-up programs associated with the proposed fuel switch is provided in Section 4.0.

In short, the transition to natural gas from propane is a design improvement that would reduce potential adverse environmental effects associated with air emissions from the Project.

2.0 PROPOSED FUEL SWITCH

The Project will have six yard tracks, consisting of three service tracks and three pad tracks parallel to the mainline. As described in Section 3.3.1 of the EIS, track switches will be installed where the tracks connect. These switches will allow for railcars or groups of railcars to be repositioned from one track to another. The switches will be equipped with heaters for winter maintenance to prevent ice and snow build-up. As noted in Section 3.4.1 of the EIS, this switching equipment (switches and switch heaters) will be installed during construction, as required. The switch heaters were originally proposed to be fueled by propane. Emissions from the operation of the switch heaters (i.e., burning of propane) were identified in the EIS (Section 3.4.3.1).

Based on the design of the terminal tracks, there will be a total of 27 track switches required, each equipped with a heater. CN is proposing to switch from propane to natural gas as a fuel source for the heaters.

Regardless of fuel source, the switch heaters would be supplied through a series of small (up to 100mm diameter) underground lines within the PDA. These underground lines will be located in the north and south portions of the PDA in proximity to the switches. The first section would be located along the track mainline between Britannia Road and CN's truck access road overpass, and the second section will be located along the mainline on either side of Lower Base Line.

The majority of the line routes will remain the same for natural gas as they would have been for propane, with some minor variations. In the case of propane, switch heaters would have been supplied by centralized propane tanks at the north and south of the PDA boundaries that would have been constructed on concrete slabs surrounded by bollards and refilled by propane delivery trucks on a regular basis. The propane lines would have been connected to these centralized propane tanks.

In the case of natural gas, switch heaters will be supplied by new connections to the existing natural gas system owned and operated by Enbridge Gas that is located along Britannia Road and Lower Base Line. A new connection and meter station will be established at Britannia Road adjacent to the mainline and at Lower Base Line at the eastern limit of the PDA. Two schematics comparing the extent of the line routes and surface components necessary to provide fuel to the switch heaters under both scenarios are provided in Appendix A. As shown, the line in the north portion of the PDA would be slightly shorter to accommodate natural gas than it would have been for propane, while the line in the south portion of the PDA, extending to the eastern limit of the PDA, would be slightly longer. The total length of lines to accommodate natural gas would be slightly longer (approx. 400 m) than for propane. However, no new ground disturbance is proposed as the lands where the lines will be located (shown in Figure 2 of Appendix A) were already proposed to be disturbed during the construction of the Project or in areas that would otherwise be impacted by construction of the Project.

Installation methods for both fuel sources would include a combination of trenching, open cut, and horizontal directional drilling (HDD), the depth of which will not differ between scenarios. The lines would be installed to a minimum depth of 1.83 m, with a minimum depth of 1.52 m beneath any ditches. One watercourse crossing will be required under both scenarios, where the line will be installed above Culvert 7 on Tributary C within a steel encasement pipe for additional protection. No in-water work is required to install the lines.

A comparison of the characteristics of the propane and natural gas components is provided in Table 1.

Table 1: Summary of Characteristics for Propane and Natural Gas

Components	**Originally Proposed Propane**	**Proposed Natural Gas**
Line Size	• 32-100mm	• 32-100mm
Line Depth	• Where not crossing tracks, minimum depth of 1.83 metres ground cover over line • Where crossing tracks, cased line minimum depth:1.68m from top of tie to top of casing • The minimum depth of burial below ditch bottom to top of casing is 1.52 metres	• Where not crossing tracks, minimum depth of 1.83 metres ground cover over line • Where crossing tracks, cased line minimum depth:1.68m from top of tie to top of casing • The minimum depth of burial below ditch bottom to top of casing is 1.52 metres
Line Length	• 4220m (approx.)	• 4620m (approx.)
Construction Method	• 2100m – in trench • 1400m – open cut • 720m – directional bore	• 2500m – in trench • 1400m – open cut • 719m – directional bore
Use of Concrete	• 25 m^3 concrete foundations • 70 bollards	• 0.5 m^3 concrete foundations • 12 bollards

The switch to natural gas would require less concrete and fewer bollards than would be required for a system using propane. For propane use, approximately 25 cubic metres of concrete would have been required to construct the structural foundations on which the propane tanks would be placed, which would have been surrounded by approximately 70 bollards for protection. For natural gas, only 0.5 cubic metres of concrete will be required for structural foundations to accommodate meter stations, which will be surrounded by approximately 12 bollards.

3.0 EXISTING CONDITIONS

The environmental conditions that existed within and adjacent to the PDA prior to Project construction were described in the EIS. As noted above, no new ground disturbance that was not already previously considered in the EIS is proposed. The lands that would be affected by construction of the natural gas lines have already been disturbed by ongoing Project construction activities.

4.0 POTENTIAL FOR ENVIRONMENTAL EFFECTS FROM THE FUEL SWITCH

Switching from propane to natural gas as the fuel source for the switch heaters, and construction and operation of the infrastructure required to accommodate this change, will have no new environmental effects during construction; however, it will lead to reduced air emissions during operations, and therefore reduced environmental effects on air quality, as described further below.

During construction, the routes for the lines will remain largely the same as originally planned, with a slight reduction of overall line length near Britannia Road in the north section of the PDA and a slight addition to the eastern extent of line within the PDA at Lower Base Line. The line installation method will be the same, the line will be installed to similar depths, and the line diameter will remain the same.

As shown in Figure 2 in Appendix A, the natural gas lines and associated infrastructure would be located within existing disturbed lands within the PDA. Once the natural gas line installation and other construction activities in these areas have been completed, the disturbed areas will be restored and stabilized, as was originally planned.

Construction

No change in effects to archaeological resources are predicted and no additional assessment of archaeological potential is required since the entirety of the PDA was covered in support of the EIS.

The fuel switch will not affect fish or fish habitat, as the single line crossing of Tributary C at Culvert 7 required in either scenario will be installed below the culvert conveying intermittent flow.

No work will occur in or within proximity to the habitat of any species at risk (SAR). Areas previously identified as habitat for Bobolink and Eastern Meadowlark no longer exist within the footprint of the Project and have already been compensated for through the creation of offsite grassland habitat targeting these species. No additional migratory bird habitat or SAR habitat would be affected. Further, there are no woodlands or wetlands that would be affected.

Effects to groundwater flow and patterns are not predicted to change since the diameter and depth of line will remain the same to accommodate natural gas. Similarly, effects on surface water flow (quantity) and quality are not predicted to change since all work will occur within the PDA and no new crossings of existing watercourses are required to implement this switch.

Construction activities and equipment used to install the lines and switch heaters will be the same for natural gas as for propane. Therefore, no change in air emissions or noise generated during construction activities are predicted. The use of natural gas also results in a reduction in the concrete foundations and protective bollards that would have been needed to accommodate the at-grade propane storage tanks. The reduction in concrete and hardened surfaces is an environmental benefit.

Operations

During operations, substituting propane for natural gas as a fuel source will reduce air emissions, specifically for NO_x. The products of combustion resulting from natural gas are approximately 30% lower for NO_x based on the same heating value of fuel when using propane, and approximately the same for other emission elements, as illustrated in Table 2. As a result, emissions from project activities will be reduced and the potential adverse effect of the Project on air quality will also be reduced.

Table 2: Comparison of Propane vs Natural Gas Products of Combustion for a Nominal 0.4 MMBtu/hr heating burner

Contaminant	Propane	Natural Gas
	Max 1-hr emission rate (g/s)	Max 1-hr emission rate (g/s)
PM	3.95E-04	3.76E-04
SO_2	3.04E-05	2.97E-05
NO_x	7.34E-03	4.95E-03
CO	4.24E-03	4.15E-03
TOC	5.65E-04	5.44E-04
CH_4	1.13E-04	1.14E-04
VOC	2.79E-04	2.72E-04

Source: USEPA AP-42 Compilation of Air Emissions Factors from Stationary Sources for both natural gas (Chapter 1.4 – Natural Gas Combustion) and propane (Chapter 1.5 – Liquified Petroleum Gas Combustion)

With the switch to natural gas from propane, a reduction of NOx emissions from the Project is anticipated. According to Table 7.10 of the Air Technical Data Report (Appendix E.1 of the EIS), the off-site maximum 1-hour, 24-hour and annual NO_2 concentrations for the Project alone were predicted to be below the relevant National Ambient Air Quality Objectives (NAAQO) maximum acceptable criteria and referenced provincial criteria. The estimated maximum ground level concentrations (GLC) for these various averaging times were about 33%, 46% and 51% of their relevant criteria, respectively, with higher NO_2 GLCs predicted to occur near the Project property line relative to distances further away from the PDA. The predicted maximum NO_2 concentrations at the special receptors were all below the relevant NAAQO standards and referenced provincial criteria for hourly (22% of the standard), daily (23% of standard) and annual (13% of standard) averaging time, as shown in Table 7.11 of Appendix E.1. The proposed fuel switch would reduce NO_2 concentrations attributable to the Project even further. The proposed switch to natural gas would also reduce the need for fuel truck deliveries of propane, further reducing diesel exhaust emissions.

An improvement in safety will be achieved by removing the at-grade propane storage tanks constructed on concrete slabs surrounded by bollards within the PDA and by reducing the frequency of propane truck deliveries and movements around the Project site.

Summary

The switch to natural gas will result in similar environmental effects during construction as were previously contemplated during the environmental assessment and reduced environmental effects during operations as a result of the switch from propane to natural gas as the fuel source for the switch heaters, with associated reductions of NO_x and other emissions, resulting in reduced environmental effects on air quality.

4.1 MITIGATION

Since effects will be similar or in some cases reduced, no new mitigation measures are warranted. The already planned mitigation measures to address potential effects on the environment that may arise from the installation of the lines and associated switch heaters include:

- Erosion and sediment controls in all areas where ground disturbance is required for the installation of the natural gas lines and associated infrastructure
- Maintaining construction activity within the limits of the PDA
- Completion of construction during day-time hours
- Continued implementation of the Environmental Protection Plan

Additional mitigation measures generally implemented during construction of the Project will further serve to mitigate potential effects associated with construction of the gas line and associated switch heaters.

Further, the Decision Statement for the Project already includes conditions that address the mitigation measures that would be necessary and appropriate for the gas line installation. Relevant conditions include but are not limited to, conditions pertaining to erosion and sediment control (5.4), dewatering (5.11, 5.12), delineation of the construction area (6.5), soil management (6.6 to 6.9), emissions controls (4.11, 4.13), noise (4.6, 4.8), grassland habitat offset (8.12), procedures for protection of archaeological and cultural resources (including human remains) (11.8 to 11.10), and several others.

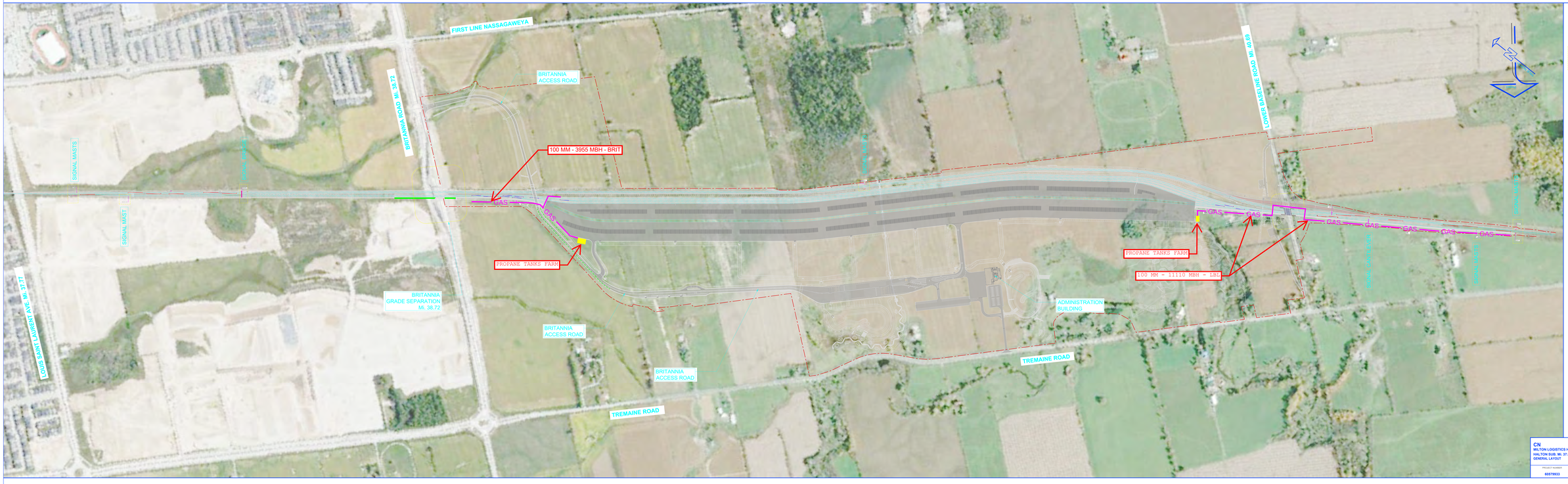
4.2 FOLLOW-UP MONITORING

No new follow-up programs or changes to the existing follow-up programs are warranted. Monitoring associated with the existing follow-up programs is sufficient to verify the accuracy of the environmental assessment and determine the effectiveness of mitigation measures.

5.0 CONCLUSION

Based on the existing environmental conditions within the areas affected by the proposed fuel switch, and with the implementation of existing mitigation measures, no new environmental effects are expected, except for positive effects associated with a reduction in NO_x and other air emissions during operation.

APPENDIX A
FIGURES



For Propane, the following items will need to be included:

-Approx. 25 cubic metres of concrete for structural slabs to support the propane tanks. Rebar and excavation also required for the structural slabs.

-Approx. 70 bollards total to surround both tank farms.

Fg.1. Propane Line Route

CN
MILTON LOGISTICS HUB
HALTON SUB. Mi. 37.50 to Mi. 41.26
GENERAL LAYOUT

PROJECT NUMBER	DRAWING NUMBER	REVISION
60078933	01-SK-101	ESTIMATE #2

Fg.2. Natural Gas Line Route

CN
MILTON LOGISTICS HUB
HALTON SUB. Mi. 37.30 to Mi. 41.26
GENERAL LAYOUT

PROJECT NUMBER	DRAWING NUMBER	REVISION NO.
60078933	01-SK-100	ESTIMATE #1