APPENDIX O

Winter Construction Plan
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Enbridge Energy, Limited Partnership
Enbridge Pipelines (Southern Lights) L.L.C.

Winter Construction Plan

Alberta Clipper
and
Southern Lights Diluent
Pipeline Projects

March 20, 2009
1. INTRODUCTION

Enbridge conducted an assessment (Winter Constructability Review) of various wetland areas between Cass Lake, MN and Superior, WI to evaluate potential construction conditions that will likely be encountered along the Alberta Clipper and Southern Lights project route. The primary object of the assessment was to identify wetland areas where installation of the pipelines using winter construction techniques and methodologies is the preferred construction method to safely, effectively and efficiently construct the pipelines.

Summer construction of large diameter pipelines in saturated/standing water wetlands with unconsolidated soils can be difficult and potentially result in greater wetland disturbance including wider trench widths and extensive rutting/surface disturbance. Constructing across these types of wetlands in the winter can result in fewer impacts. Winter wetland construction is not a common practice in most parts of the United States; however, winter construction is used in Canada and certain northern areas of the U.S. when site conditions make this the preferred technique for the installation of pipelines in wetland areas. Heavy construction equipment use and travel along the ROW, which may not be possible in summer conditions due to saturated, unstable soil conditions, can be accomplished in the winter by establishing temporary winter frost/ice roads. These frost/ice roads protect underlying vegetation and upper layers of wetland surfaces from disturbance potentially created during summer construction.

2. ASSESSMENT RESULTS

Enbridge’s assessment included reviewing project route maps, conducting on the ground reconnaissance, and aerial reconnaissance to identify potential areas where the use of winter construction techniques could be used to install the pipelines and reduce potential wetland impacts. Enbridge identified two areas along the project route as being critical winter construction areas containing large, saturated wetlands with unconsolidated soils.

<table>
<thead>
<tr>
<th>Proposed Winter Construction Areas</th>
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<tbody>
<tr>
<td>Location</td>
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<tr>
<td>---------</td>
</tr>
<tr>
<td>1</td>
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<tr>
<td>2</td>
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<tr>
<td>TOTAL</td>
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3. **WINTER CONSTRUCTION RIGHT-OF-WAY CONFIGURATION**

Enbridge evaluated the right-of-way (ROW) workspace requirements needed to safely and efficiently construction through these wetland complexes during the winter, while maintaining the safety and integrity of the existing, adjacent pipelines. Based on this analysis Enbridge is proposing to use a 140-foot-wide construction ROW in the two identified winter construction areas. This increased ROW width would allow Enbridge to:

- Maintain a 40 foot spacing between the existing outermost pipeline and the 20-inch diameter Southern Lights pipeline (inside line)
- Maintain a 40 foot spacing between the 20-inch diameter Southern Lights pipeline and the 36-inch Alberta Clipper pipeline (outside line)
- Maintain a 60 foot spacing between the 36-inch diameter Alberta Clipper pipeline and the outside edge of the construction ROW boundary.
- The spacing from the existing outermost pipeline may need to vary in certain situations depending on specific site conditions at the time of construction.

Typical cross sections (Figures 1, 2, 2a, 3 and 3a) of the proposed 140-foot-wide construction ROW configuration and the permanent 105-foot-wide ROW are shown in Attachment A. Figure 1 depicts the 140-foot-wide construction ROW and the details of the frost/ice road needed to allow the construction equipment to work in the wetland areas and install the large diameter pipelines within the required spacing. Figure 2 depicts the initial installation of the first pipeline (20-inch-diameter Southern Lights pipeline) with details regarding construction workspace, temporary spoil storage area, and installation direction. Figure 2a depicts the same information as Figure 2 yet outlines additional organic soil/topsoil segregation if observations indicate this segregation is possible at the time of crossing. Figure 3 depicts the subsequent installation of the second pipeline (36 inch Alberta Clipper pipeline) with its respective workspace usage and final permanent 105-foot-wide ROW. This figure demonstrates the staged construction of the 2 pipelines working in the same lay direction along the ROW. Figure 3a depicts additional topsoil segregation during installation of the 36-inch pipe if observations indicate it is possible.

The proposed larger ROW configuration provides a frost/ice road on the working side for both the 20-inch and the 36-inch pipeline installations. A 125-foot-wide construction ROW configuration specifying one single frost road between the two pipeline installations was also assessed and subsequently dismissed since it is likely that the frost road could become unstable, creating unsafe conditions and difficulties during installation of the two pipelines. Maintaining the integrity of the frost/ice road for the installation of two pipelines is critical to completing construction of the two pipelines in a single winter season. Damage to and loss of the frost/ice road would dictate the need to construct any uncompleted wetland...
areas in non frozen conditions which would likely result in a more significant disruption to the wetland areas and a prolonged restoration period.

4. WINTER CONSTRUCTION PROCESS

Construction of Frost/Ice Roads

Winter construction will begin with the establishment of access via frost/ice roads made from compacted snow and ice. The construction of the frost/ice roads must be completed as quickly as possible to allow the excavation and installation equipment onto the ROW to commence work. Enbridge's contractor(s) will be mobilized with the proper equipment to begin construction and clearing of the frost/ice roads as soon as the weather conditions permit. Clearing is essentially completed as part of the frost road construction as not much woody vegetation is anticipated due to the high saturation of the wetlands. Low ground pressure equipment is mobilized to clear as soon as the frost road can support it.

Lightweight equipment such as snowmobiles are used to begin pushing/packing snow along the designated haul road path as soon as there is sufficient frost or snow to support the equipment. In the event of low or minimal snowfall during the winter season, it may be necessary to use snow making equipment and/or hauling snow to facilitate the construction of frost/ice roads. As the haul road begins to freeze, progressively larger and heavier equipment is brought in to continue to push/drive the frost deeper into the wetland subsurface material. Snow is pushed into low areas to level the frost/ice road surface of the ROW. Water trucks may also be used to spray the frost/ice road and build up the frozen layer. These activities are typically conducted 24 hours per day to maximize use of the coldest part of the day until such time as the frost/ice road is determined to be suitable for pipeline construction. Typically, a minimum of 30 inches of frost/ice is needed to support the size of equipment necessary for installation of the 36-inch pipeline.

Pipeline Stringing and Assembly

Once the frost/ice haul roads are established, two crews will be mobilized to each winter spread to assemble and install the 20-inch Southern Lights pipeline and the 36-inch Alberta Clipper pipeline separately. Assembly and installation of the 20-inch line will proceed first. The 20-inch pipe will be strung using specialized stringing equipment designed to minimize ground pressure. Once the pipe is strung, it will be assembled through the wetland area using conventional pipeline assembly techniques, lowered in and backfilled. After the 20-inch pipeline in installed through the winter segment, the construction crew will begin assembly of the 36-inch pipeline in a similar fashion.
Ditch Excavation, Lowering-in and Backfill

The trenchline will be excavated similar to typical summer saturated wetland construction. Excavation equipment (e.g., backhoes) will be used to dig the trench. Enbridge will attempt to segregate the top frozen layer of wetland soil (topsoil) during excavation. As shown on the attached figures, subsurface materials are expected to be unconsolidated and will likely not “stack” well when sidecast along the trench. To the extent practical, the segregated topsoil layer will be kept separate from lower, less cohesive subsoil material.

Once the ditch is excavated to the proper depth, the assembled pipeline sections will be lowered into the trench. Excavated subsoil material will be used to backfill the trench. After the trench is backfilled to the proper elevation, the segregated topsoil layer will be replaced over the trenchline.

Site Stabilization and Restoration

Installation of temporary sediment barriers (silt fence and staked straw bales) at wetland/upland boundaries in winter construction areas will be delayed until final grading and cleanup, unless snow melt and runoff are likely during construction. If final grading and/or cleanup is not completed until the following spring, temporary slope breakers and sediment barriers will be installed during rough grading and subject to the inspection and repair requirements contained in Enbridge’s Environmental Mitigation Plan and/or applicable permits.

Mulch will be applied and anchored to all upland slopes greater than 5 percent. The mulch will be applied as soon as practical after the last grading operation of winter construction. Mulch can be applied to snow-covered ground. Application of temporary mulch should not exceed 2 tons per acre if the area will be seeded the following spring. No mulch will be applied in wetlands unless requested by applicable agencies. Permanent revegetation of disturbed areas will be completed in accordance with Enbridge’s Revegetation and Restoration Monitoring Plan and/or applicable permit conditions.
ATTACHMENT A
EXISTING GRADE

SNOW

TEMPORARY SPOIL STORAGE

ORGANIC SOIL

20" SOUTHERN LIGHTS CONSTRUCTION SPREAD

LAY DIRECTION

PROPOSED WEIGHTED (CONTINUOUS CONCRETE) 20" SOUTHERN LIGHTS PIPELINE

FROST/ICE ROAD (UP TO 30"

EXISTING OUTERMOST 36"/48" PIPELINE

EXISTING GRADE

10'

40'

40'

60'

140'

CONSTRUCTION RIGHT OF WAY

105'

PERMANENT RIGHT OF WAY

SNOW

15'

8'

8'

PROPOSED WEIGHTED (SET-ON/SADELL) 36" ALBERTA CLIPPER PIPELINE

Scale: 1/1"=1'-0"

N.T.S. A-65/67-1.77-FIG02A-B

Gulf Interstate Engineering

Housto, Texas

Enbridge Energy

Limited Partnership

Dwg. No.

Figure 2A

Winter Non-Saturated Wetland Construction

20" Southern Lights Construction Right Of Way Configuration

Reuse Engr'd Rev. 10/23/07

Issued For Approval

GIE 11/15/07

Issued For Review

A

B

11/08

11/15/07

11/15/07

GIE

RH

RH

Pro. Eng.

Pro. Wkr.

Date

DC

N.T.S.

Client App.

Sigs.
EXISTING GRADE

SNOW

ORGANIC SOIL BACKFILLED

SPOIL BACKFILLED

EXISTING OUTER MOST 36”/48” PIPELINE

LAY DIRECTION

PROPOSED WEIGHTED (CONTINUOUS CONCRETE) 20” SOUTHERN LIGHTS PIPELINE

20” SOUTHERN LIGHTS CONSTRUCTION SPREAD

TEMPORARY SPOIL STORAGE

36” ALBERTA CLIPPER CONSTRUCTION SPREAD

FROST/ICE ROAD (UP TO 30”)

40’ 40’ 140’

CONSTRUCTION RIGHT OF WAY

105’ PERMANENT RIGHT OF WAY

GULF INTERSTATE ENGINEERING
HOUSTON, TEXAS

Enbridge Energy
Limited Partnership

WINTER NON-SATURATED WETLAND CONSTRUCTION
36” ALBERTA CLIPPER CONSTRUCTION
RIGHT OF WAY CONFIGURATION

FIGURE 3A

N.T.S.
A-65/67-1.77-FIG03A-B
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