

# Draft Information Document

## Northeast Area Transmission Constraint Management

ID # 2011-008(R)



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### 1 Purpose

This Information Documents supports new ISO rules section 302.5, *Northeast Area Transmission Constraint Management* and provides additional information regarding the unique operating characteristics and resulting constraint conditions and limits in the northeast area of the interconnected electric system.

### 2 Related Authoritative Documents

The AESO's authoritative documents consist of the ISO rules, the ISO tariff and the reliability standards. Authoritative documents contain binding rights, requirements and obligations for market participants and the AESO. Market participants and the AESO are required to comply with provisions set out in authoritative documents.

Market participants are encouraged to review the authoritative documents related to this information document which include:

- (1) [Section 302.5 of the ISO rules, \*Northeast Area Transmission Constraint Management\*](#)

This section of the ISO rules definethe northeast area, describe cutplanes in the identified regions, identify the effective assets used to manage a transmission constraint, and sets out the transmission constraint management protocol steps for the area.

- (2) [Section 302.1 of the ISO rules, \*Real Time Transmission Constraint Management\*](#)

This section of the ISO rules sets out the general transmission constraint management protocol steps the ISO uses to mange constraints in real time on the interconnected electric system. These steps are referenced in Table 1 of section 302.5 as they are applied to the northeast area.

### 3 General

The northeast area is connected to the interconnected electric system by three (3) long 240 kV bulk transmission lines.

Loss of a second 240 kV bulk transmission line with one other 240 kV line out of service can cause generation instability, voltage instability or unacceptable low voltage excursions under high transfer-out condition.

Loss of all three (3) 240 kV bulk transmission lines can result in extreme voltage and frequency excursions in the northeast area causing generating unit tripping, load loss, and the area separating into electrical islands as well as a power outage to the Fort McMurray and Fort MacKay town sites.

Two maps of the northwest area are provided in Appendix 1 to this Information Document. Figure 1 of this Information Document provides a detailed geographical map of the northeast area indicating bulk transmission lines, substations and cut planes. Figures 2 and 3 provide a detailed schematic of the northeast area cutplanes transfer-out and transfer-in conditions respectively including the generating units effective in managing a regional transmission constraint.

#### **4 Constraint Conditions and Limits**

Subsection 2 of section 302.5 contains provisions related to how the AESO must calculate and use cutplane flow limits for the two cutplanes in the northeast area; the Ruth Lake cutplane and the Leismer cutplane. A further description of those limits is set out below.

##### ***Transfer-In Limits at the Ruth Lake Cutplane***

The AESO establishes transfer-in limits at the Ruth Lake cutplane to avoid voltage instability in the event of certain contingency conditions. The specific contingency conditions and the inflow limits are set out in Appendix 2 of this Information Document.

##### ***Transfer-Out Limits at the Ruth Lake Cutplane***

The AESO establishes transfer-out limits at the Ruth Lake cutplane to avoid bulk transmission line overloads or unacceptable low voltage excursions in the event of certain contingency conditions. The specific contingency conditions and the inflow limits are set out in Appendix 3 of this Information Document.

##### ***Transfer-Out Limits at the Leismer Cutplane***

The AESO establishes transfer-in limits and transfer-out limits at the Leismer cutplane to avoid transmission line overloads or unacceptable low voltage excursions. The specific contingency conditions and the associated inflow and outflow limits are set out in Appendix 4 of this Information Document.

#### **5 Transmission Constraint Management**

While the AESO generally manages transmission constraints in all areas of Alberta in accordance with the provisions of section 302.1 of the ISO rules, not all of those provisions are effective in the northeast area due to certain unique operating conditions that exist in that area. Because of those unique operating conditions, section 302.5 represents the application of the general provisions of section 302.1 to the northeast area, and provides additional clarifying steps are required to effectively manage transmission constraints in that area.

The protocol steps which are effective in managing transmission constraints are outlined in subsection 3(1) of section 302.5. Other additional steps required are outlined in subsections 3(3) through 3(5) of section 302.5. All of which are further described below.

##### ***Applicable Protocol Steps***

The first step in managing a transmission constraint is to identify those generating units and loads

effective in mitigating the transmission constraint. While all of the generating units and loads operating in the northeast area are indicated on the schematic in Appendix 1 of section 302.5, for various reasons, not all of them are effective in mitigating a transmission constraint in all conditions. A list of the generating units and loads that are effective in managing a transmission constraint is set out in Appendix 1 of section 302.5.

Of the remaining section 302.1 protocol steps the AESO can use to manage constraints in real time, some are not applicable in the northeast area. Subsection 3(1) of section 302.5 sets out the protocol steps which are applicable in the northeast area.

With respect to step (c) in Table 1 in subsection 3(1), there are no interties in the northeast area and import and export flows on the system are not effective in managing a transmission constraint. With respect to steps (e)(i) and (ii), there are no transmission must-run contracts in the northeast area and transmission must-run is not effective in managing a transmission constraint.

With respect to steps (b) and (f), curtailing effective generating units to their maximum capability levels and further in reverse energy market merit order followed by pro-rata curtailment is only effective when outflow limits are exceeded.

With respect to step (d), curtailing effective demand opportunity service on the downstream constraint side is only effective when inflow limits are exceeded.

Due to the bulk transmission line configuration in the northeast area, certain conditions require additional procedural clarification.

As outlined in subsection 3(5) of section 302.5, in the northeast area circumstances may require the AESO to take steps to manage overloads in a specific order so as to protect facilities and ensure reliable system operation.

Under certain conditions, the effective pool assets used to mitigate an overload on a cutplane may change. As set out in subsection 3(4) of section 302.5:

3(4) In the case of a substation which is directly connected to the **transmission system** by a single bulk transmission line, if the flow:

- (a) to such substation from a flow measurement point is not contributing to an outflow overload; or
- (b) from such substation to a flow measurement point is not contributing to an inflow overload,

the **ISO** must deem any **pool asset** situated behind the substation to be not effective in managing the **transmission constraint** being monitored at the flow measurement point and exclude that **pool asset** from the curtailment procedures under this section 302.5.

For example, at the Lesimer substation (T72S) if the power flows in the direction from the Christina Lake substation (T723S) to the Lesimer substation on 957L when an inflow limit is exceeded, then the pool asset MEG1 would be excluded from the curtailment but the pool asset would be required to maintain the non-contributing power flow condition during the constraint period. The same situation could occur at the Kinosis substation (A856S) relative to the Kinosis T-tap which would impact the treatment of pool asset NX02.

## 6 Appendices to this Information Document

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**Figure 1 – Geographical Map of the Northeast Area**



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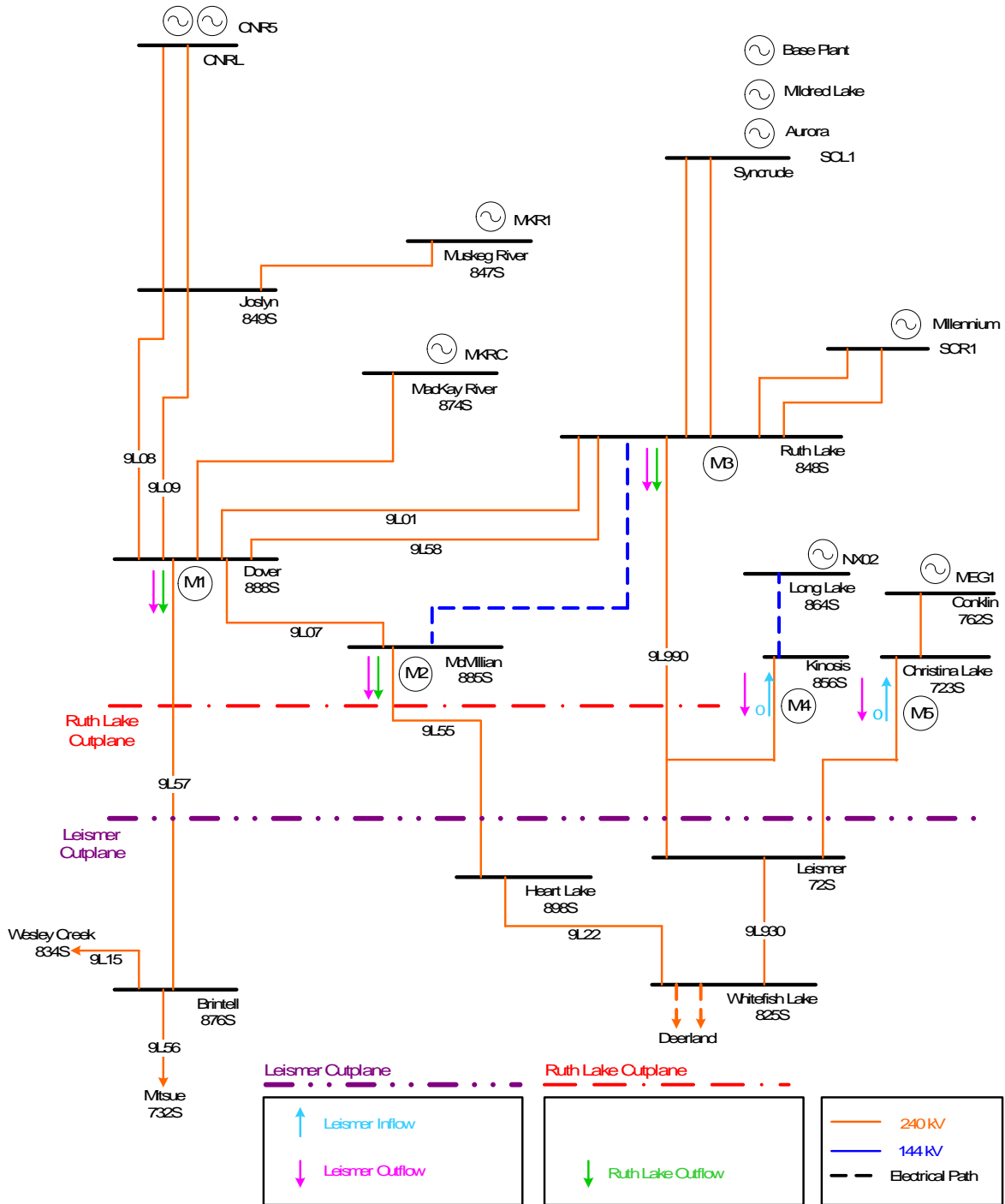
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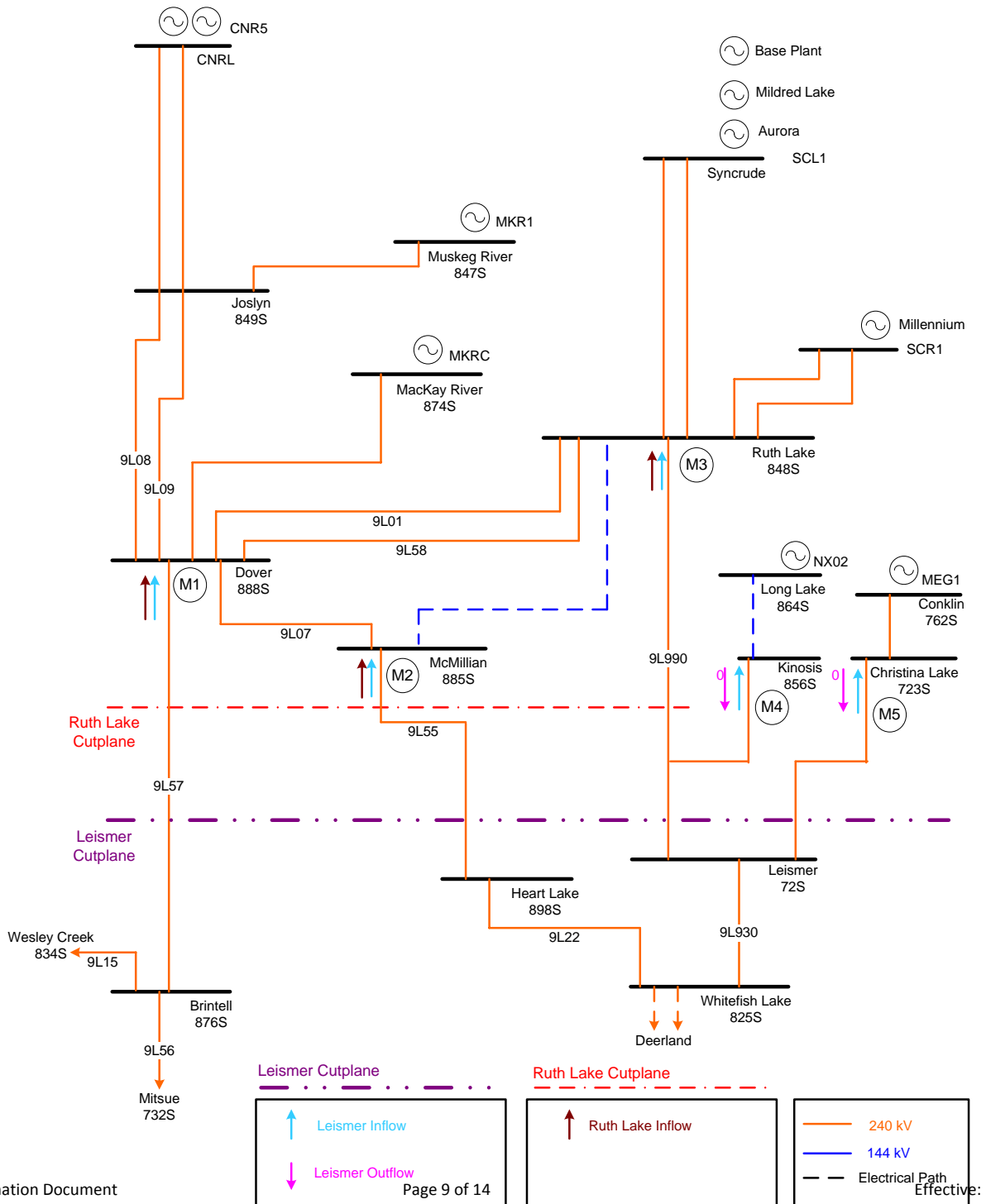


**Figure 3 –Northeast Area Cutplanes: Transfer-in Schematic**

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**Appendix 2 – Transfer-In Limits at the Ruth Lake Cutplane**

Table 1 below sets out the conditions and the transfer-in limits at the Ruth Lake cutplane:

**Table 1**  
**Ruth Lake Cutplane Conditions and Transfer-In Limits**

<b>Conditions</b>	<b>Ruth Lake Transfer-In Limit (MW)</b>
Lines 9L57 and 9L15 and 9L56 are in service	300
Any two of 9L57 and 9L15 and 9L56 are in service	160
9L990 out of service	160
Any one of the following lines is out of service in conjunction with 9L990 being out of service: <ul style="list-style-type: none"> <li>a. 9L57</li> <li>b. 9L15 and 9L56</li> <li>c. 9L07</li> <li>d. 9L55</li> <li>e. 9L22</li> </ul>	160 minus the single largest generating unit contingency in the Fort McMurray area

Example to assist with interpretation of Table 1:

1. If only 9L990 is out of service then the transfer-in limit is 160 MW.



**Appendix 3 – Transfer-Out Limits at the Ruth Lake Cutplane**

Table 2 sets out the conditions and the transfer-out limits at the Ruth Lake cutplane:

**Table 2**  
**Ruth Lake Conditions and Transfer-Out Limits**

<b>Transmission lines Status</b>	<b>System Conditions</b>	<b>Ruth Lake Transfer-Out Limit (MW)</b>
All of the following lines are in service: a. 9L15 b. 9L56 c. 9L57 d. 9L07 e. 9L55 f. 9L22 g. 9L930 h. 9L990	System normal	550
Any one of the following lines is out of service: i. 9L15 j. 9L56	System Abnormal	480
Any one of the following lines is out of service: k. 9L07 l. 9L55 m. 9L22	System Abnormal	340
Any one of the following lines is out of service: n. 9L57 or [9L56 and 9L15] o. 9L930 or 9L990	System Abnormal	320
Any two of the following paths are out of service: p. 9L57 or [9L56 and 9L15] q. 9L07 or 9L55 or 9L22 r. 9L930 or 9L990	System Abnormal	280

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## Appendix 4 – Transfer-In and Transfer-Out Limits at the Leismer Cutplane

Table 3 sets out the contingency conditions and the transfer-in limits at the Leismer cutplane:

**Table 3**

**Leismer Cutplane Conditions and Transfer-In Limits**

Conditions	System Conditions	Transfer-Out Limit (MW)	Transfer-In Limit (MW)
All of the following lines are in service: a. 9L15 b. 9L56 c. 9L57 d. 9L07 e. 9L55 f. 9L22 g. 9L930 h. 9L990	System normal	575	300
Any one of the following lines is out of service: i. 9L15 j. 9L56	System Abnormal	500	160
Any one of the following lines is out of service: k. 9L07 l. 9L55 m. 9L22	System Abnormal	370	
Any one of the following lines is out of service: n. 9L930 o. 9L990	System Abnormal	350	
Any one of the following lines is out of service: p. 9L57 q. 9L15 and 9L56	System Abnormal	340	

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Any two of the following paths are out of service: r. 9L57 or [9L56 and 9L15] s. 9L07 or 9L55 or 9L22 t. 9L930 or 9L990	N/A	280	160 minus the area single largest generating unit contingency
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## Revision History

Version	Effective Date	Description of Changes
1.0	2011-06-30	Initial Release