

Information Documents are not authoritative. Information Documents are for information purposes only and are intended to provide guidance. In the event of any discrepancy between an Information Document and any Authoritative Document(s) in effect, the Authoritative Document(s) governs.

## 1 Purpose

This Information Document relates to the following Authoritative Document<sup>1</sup>:

- Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management* (“Section 302.1”).

The purpose of this Information Document is to provide additional information regarding the unique operating characteristics and resulting constraint conditions and limits in the Fort Saskatchewan area of the interconnected electric system. In this information document the AESO has defined the area cutplane<sup>2</sup> as the area illustrated by the map in Appendix 3.

Section 302.1 sets out the general transmission constraint management protocol steps the AESO uses to manage transmission constraints in real time on the interconnected electric system. These steps are referenced in Table 1 of this information document as they are applied to the Dow cutplane.

## 2 General

The Dow Chemical Site (the “Dow Site”) is located in the Fort Saskatchewan area. The Dow Site is serviced by 138 KV substations consisting of 166S Dow Chemical, 258S Dow Hydro Carbon, 906S and 218S Fort Saskatchewan Co-Gen.

Generation from the Dow Site is restricted by thermal limitation of the bulk transmission lines 707L, 787L and 862L connected to the 166S substation. The AESO has established a Dow cutplane with outflow limits which are currently determined by monitoring real time contingency analysis to ensure flows do not reach an unsafe level after N-1 events.

Two maps of the Fort Saskatchewan area are provided in Appendix 2 and 3 of this information document. Appendix 2 of this information document provides a detailed geographical map of the Fort Saskatchewan area indicating bulk transmission lines and substations. Appendix 3 provides a detailed schematic of the Dow cutplane including the generating unit effective in managing the transmission constraint.

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<sup>1</sup> “Authoritative Documents” is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and regulations, and that contain binding legal requirements for either market participants or the AESO, or both. AESO Authoritative Documents include: the ISO rules, the Alberta reliability standards, and the ISO tariff.

<sup>2</sup> A cutplane is a common term used in engineering studies and is a theoretical boundary or plane crossing two (2) or more bulk transmission lines or electrical paths. The cumulative power flow across the cutplane is measured and can be utilized to determine flow limits that approximate conditions that would allow safe, reliable operation of the interconnected system.

### 3 Constraint Conditions and Limits

When managing a transmission constraint on the Dow cutplane which results from bulk transmission line flows over the cutplane being above reliable system operating limits, the AESO calculates the cutplane flow limits for the Dow cutplane and uses those cutplane flow limits in a manner that protects transmission facilities and ensures the continued reliable operation of the interconnected electric system.

#### 3.1 Non-Studied Constraint Conditions and Limits

For system conditions that have not been pre-studied, the AESO uses the resultant limits from the energy management system voltage stability analysis and the contingency analysis tools to determine real time system operating limits when limits are related to voltage or thermal concerns. The AESO uses Dynamic analysis software to determine the real time system operating limits when limits are related to dynamic stability concerns.

Where studies are not possible, Table 1 of Appendix 4 is used to determine the seasonal Dow Site cutplane limits.

#### 3.2 Studied Constraints and Limits

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

The Dow cutplane is defined as the MVA outflow measured on 707L, 787L and 862L at 166S. It is determined by algebraically adding MW and MVAR on each of these bulk transmission lines. When 787L is open-ended or out of service, 787L MVA flow is assumed to be zero (0). Also, when 861L is open-ended or out of service, 862L MVA flow is assumed to be zero (0). The line ratings of 707L, 787L and 862L are provided in Table 2 of Appendix 4.

##### *Dow Outflow Limits and Real Time Contingency Analysis*

In accordance with subsection 2(1) of Section 302.1 the AESO follows the transmission constraint management procedures and applies the procedures to the Fort Saskatchewan area as outlined in Section 5 of this information document to ensure the interconnected electric system is operated in a safe and reliable manner. Transmission constraint management procedures are employed when the Dow outflow contributes to voltage instability, or when the Dow outflow exceeds the limit determined by the real time contingency analysis.

### 4 Application of Transmission Constraint Management Procedures

The AESO manages transmission constraints in all areas of Alberta in accordance with the provisions of Section 302.1. However, not all of those provisions are effective in the Dow Site area due to certain operating conditions that exist in that area. This information document represents the application of the general provisions of Section 302.1 to the Dow Site area, and provides additional clarifying steps as required to effectively manage transmission constraints in that area.

The protocol steps which are effective in managing transmission constraints are outlined in Table 1 below.



**Table 1**  
**Transmission Constraint Management**  
**Sequential Procedures for Fort Saskatchewan area**

| <b>Section 302.1 of the ISO rules, subsection 2(1) protocol steps</b>  | <b>Applicable to the Dow cutplane?</b> |
|--|--|
| (a) Determine effective pool assets  | Yes                                    |
| (b) Ensure maximum capability not exceeded   | Yes                                    |
| (c) Curtail effective downstream constraint side export service and upstream constraint side import service      | No                                     |
| (d) Curtail effective demand opportunity service on the downstream constraint side                               | No                                     |
| (e)(i) Issue a dispatch for effective contracted transmission must-run   | No                                     |
| (e)(ii) Issue a directive for effective non-contracted transmission must-run                                     | No                                     |
| (f) Curtail effective pool assets in reverse energy market merit order followed by pro-rata curtailment          | Yes                                    |
| (g) Curtail effective loads with bids in reverse energy market merit order followed by pro-rata load curtailment | No                                     |

**Applicable Protocol Steps**

The first step in managing a transmission constraint in any area is to identify those generating units effective in managing a transmission constraint. All of the generating units and loads operating in the Fort Saskatchewan area are shown in Appendix 3 (single line diagram) and the generating units effective in managing a transmission constraint are identified in Appendix 1.

Step (a) in Table 1

The effective pool assets are as shown in Appendix 1

Step (b) in Table 1

Ensuring maximum capabilities are not exceeded is applicable to the area as more generation can be produced than can be handled by the transmission lines referred to earlier. However, as there is only (1) effective pool asset, this step is automatically enforced when that pool asset is curtailed under step (f).

Step (c) in Table 1

There are no interties in the Fort Saskatchewan area and curtailing import or export flows elsewhere on the system is not effective in managing a transmission constraint.

Step (d) in Table 1

There is no demand opportunity service load in the area to curtail.

Step (e)(i) and (ii) in Table 1

There are no transmission must-run contracts in the area and using transmission must-run is not effective in managing constraints in the Fort Saskatchewan area.

Step (f) in Table 1

Curtailing effective pool assets using reverse energy market merit order followed by pro-rata curtailment is effective in managing a Fort Saskatchewan area transmission constraint. However as there is only one (1) effective pool asset, therefore pro-rata curtailment is not necessary.

Step (g) in Table 1

Curtailing load is not effective in managing Dow Site transmission constraints. Curtailing load may exacerbate a constraint where there is an abundance of generation in relation to load and transmission capacity.

## 5 Project Updates

As necessary, the AESO intends to provide information in this section about projects underway in the Fort Saskatchewan area that are known to have an impact on the information contained in this information document.

## 6 Appendices

Appendix 1 – Effective Pool Assets

Appendix 2 – Geographical Map of the Fort Saskatchewan Area

Appendix 3 – Dow Cutplane Single Line Diagram

Appendix 4 – Tables

## Revision History

| Posting Date | Description of Changes  |
|--------------|---|
| 2019-07-11   | Appendix 2 Map update and Appendix 4, Table 1 Dow Outflow cutplane limits updates.                            |
| 2016-09-28   | Administrative amendments   |
| 2013-02-01   | Geographical map and Dow cutplane single line updated to reflect new transmission facilities within the area. |
| 2012-11-27   | Initial Release   |

**Appendix 1**

**Effective Pool Assets**

The effective pool asset for the Dow cutplane, is:

DOW1



# Information Document

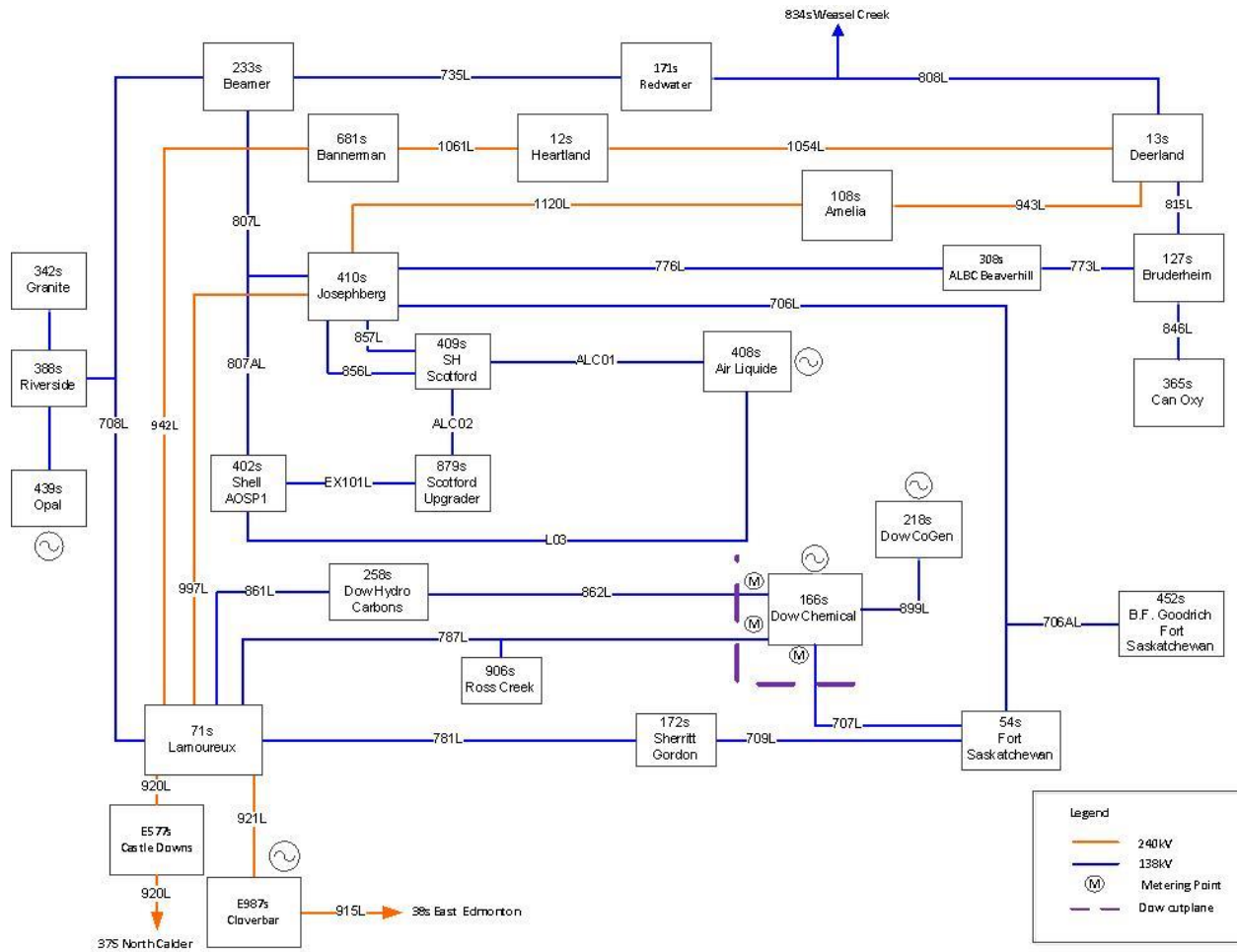
## Fort Saskatchewan Area Transmission

### Constraint Management

#### ID #2012-016R



### Appendix 3 – Dow Cutplane Single Line Diagram





Appendix 4 – Tables

Table 1: Dow Cutplane Limits

| System Contingency  |                   | Dow Outflow Limit (MVA)  |                          |
|---------------------|-------------------|--------------------------|--------------------------|
|                     |                   | Summer<br>May 1 - Oct 31 | Winter<br>Nov 1 - Apr 30 |
| System Normal (N-0) |                   | 200                      | 267                      |
| N-1                 | 707L              | 190                      | 215                      |
|                     | 787L <sup>1</sup> | 130                      | 160                      |
|                     | 861L <sup>2</sup> | 130                      | 160                      |
|                     | 862L              | 130                      | 160                      |

**Note:**

1. When 787L is open-ended from 71s Lamoureux, MW and MVAR flows on 787L from 166s Dow Chemical are calculated as zero.
2. When 861L is open-ended from 71s Lamoureux, MW and MVAR flows on 862L are calculated as zero.





**Table 2: AltaLink Bulk Transmission Line Ratings**

| Transmission Line | Summer<br>(May 1 – Oct 31) |                      | Winter<br>(Nov 1 – Apr 30) |                      |
|-------------------|----------------------------|----------------------|----------------------------|----------------------|
|                   | 100% Line Rating MVA       | 110% Line Rating MVA | 100% Line Rating MVA       | 110% Line Rating MVA |
| 707L              | 119                        | 131                  | 146                        | 161                  |
| 787L              | 167                        | 184                  | 201                        | 221                  |
| 862L              | 167                        | 184                  | 201                        | 221                  |