

# Information Document

## Central East Area Transmission Constraint Management

### ID #2012-018R



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 Central East area of the Alberta interconnected electric system.

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

#### 2 General

Appendix 1 lists the effective generation units for managing transmission constraints in the Central East area. Appendix 2 provides a detailed geographical map of the Central East area indicating [bulk transmission lines, substations and generating facilities]. Appendix 3 provides a single line diagram of the Central East area transmission facilities. AESO operational studies indicate that teleprotection failure on 953L or 1047L may cause transient stability concerns for Battle River units 4 and 5 (See Appendix 4, Table 1). Additionally, specific area line outage(s) may cause transient stability concerns for Battle River and Sheerness units see (See Appendix 4, Table 2 and Table 3).

Several remedial action schemes are in place in the Central East area to ensure system reliability. The remedial action schemes for the Central East area are provided in the list of Alberta Remedial Action Schemes which is available on the AESO website.

To ensure the safe and reliable operation of the Alberta interconnected electric system, the AESO has developed policies and procedures to manage Central East transmission constraints.

#### 3 Constraint Conditions and Limits

When managing a transmission constraint in the Central East area, the AESO ensures that bulk transmission line flows out of the area are managed in accordance with bulk transmission line ratings. These ratings are established by the legal owner of the transmission facility to protect transmission facilities, ensuring the continued reliable operation of the interconnected electric system.

##### 3.1 Non-Studied Constraints and Limits

For system conditions that have not been pre-studied, the AESO uses 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. For system conditions that have not been pre-studied, the AESO uses dynamic analysis software to determine the real-time system operating limits when limits are related to dynamic stability concerns.

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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.

### **3.2 Studied Constraints and Limits**

Remedial action schemes are utilized to manage several identified constraints in the Central East area. For more information on Central East remedial action schemes refer to the list of Alberta Remedial Action Schemes.

#### ***Battle River N-1 Stability Concerns***

Studies have identified transient concerns for the Battle River units (BR4/BR5). Specific area line outages (see Appendix 4, Table 2) or a teleprotection outage (See Appendix 4, Table 1) may cause transient stability concerns.

#### ***Sheerness N-1 Stability Concerns***

Studies have identified that specific area line outages (N-1), will cause Sheerness (SH1/SH2) transient stability concerns (see Appendix 4, Table 3).

#### 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 Central East 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 Central East 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 Central East Area**

Section 302.1 of the ISO rules, subsection 2(1) protocol steps	Applicable to a Central East Area transmission constraint?
(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 constraints is to identify those pool assets, both generating units and loads, effective in managing constraints. A list of the generating pool assets that are effective in managing constraints are identified in Appendix 1. As per section 2(4) of 302.1, when a transmission constraint has been or is expected by the AESO to activate a remedial action scheme, the AESO recommences the procedural sequence in Table 1 (above) once the AESO has ensured that the system is operating in a safe and reliable mode.

Step (a) in Table 1

The effective pool assets are as shown in Appendix 1.

Step (b) in Table 1

Ensuring maximum capability levels are not exceeded is effective in managing Central East area transmission constraints. The effective pool assets that the AESO may curtail are listed in Appendix 1.

Step (c) in Table 1

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

Step (d) in Table 1

Curtailing effective demand opportunity service on the downstream constraint side is not effective in managing Central East area constraints because there is no demand opportunity service in the area.

Step (e) in Table 1

With respect to steps (e)(i) and (ii), there are no transmission must-run contracts in the Central East area and using transmission must-run is not effective in managing a transmission constraint.

Step (f) in Table 1

Curtailing effective generating units in reverse energy market merit order followed by pro-rata curtailment is effective in managing Central East area transmission constraints. The effective pool assets that the AESO may curtail are listed in Appendix 1.

Step (g) in Table 1

Because of the configuration of the interconnected electrical system, curtailing load on the upstream side is not effective in managing Central East area constraints.

## 5 Project Updates

As necessary, the AESO intends to provide information in this section about projects underway in the Central East area that are known to have an impact on the information contained in this information document. Presently, there are no known projects underway that are known to have an impact.

## 6 Appendices

Appendix 1 – *Effective Pool Assets*

Appendix 2 – *Geographical Map of the Central East Area*

Appendix 3 – *Central East Area Single Line Diagram*

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#### Revision History

Posting Date	Description of Changes
2023-07-31	Addition to Appendix 4 Table 3: Battle River Transient Stability Limits for Teleprotection Outage Updates to Table 1: Battle River (BR4 / BR5) N-1 Transient Stability Limit Addition of Table 2: Sheerness (SH1/SH2) N-1 Transient Stability Limits
2019-03-19	Amendments to Section 2 to include 757s Battle River 240/138kV transformer and 766s Nevis 240/138kV transformer Addition of Appendix 4 Battle River Transient Stability Limits
2016-09-28	Administrative amendments
2014-10-21	Amendment to remedial action schemes
2012-10-11	Initial Release

#### Appendix 1 – Effective Pool Assets

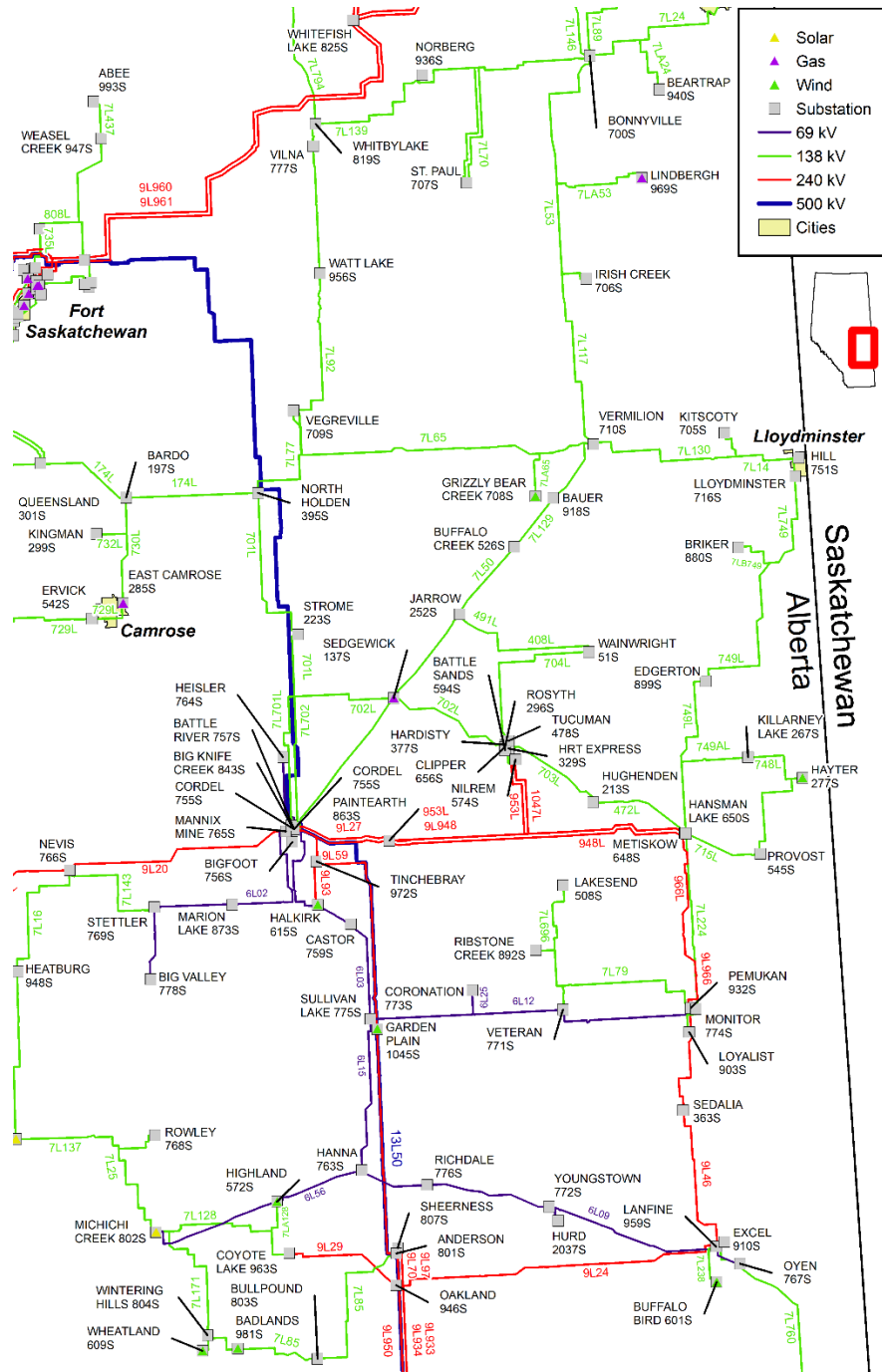
The effective pool assets for transmission constraints in the Central East area, listed alphabetically by their pool IDs, are:

- BR4
- BR5
- BUL1/2
- GDP1
- GRZ1
- HAL1
- HHW1
- LAN1
- MCH1
- MIC1
- NEP1
- SCR4
- SH1
- SH2
- TRH1
- WHE1

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## Appendix 2 – Geographical Map of the Central East Area



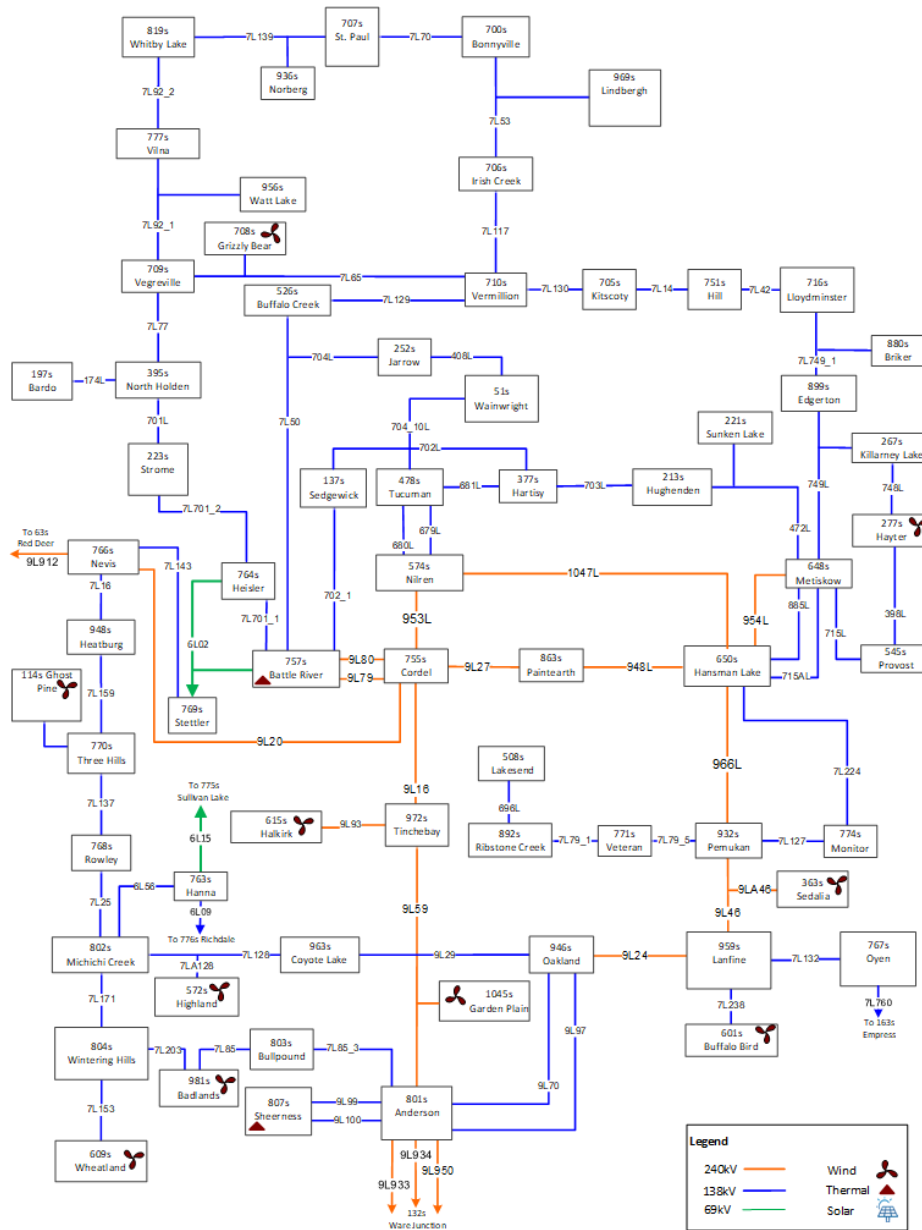
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#### Appendix 3 – Single Line Drawing Showing Central East Area Transmission





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#### Appendix 4

**Table 1: Battle River Transient Stability Limits for Teleprotection Outage**

Line Element	Teleprotection Status	953L Status	Battle River Max Generation (net MW)	
			BR4	BR5
953L 755s Cordel-574s Nilrem	In Service	N/A	No Limit	No Limit
1047L 650s Hansman Lake-574s Nilrem				
953L 755s Cordel-574s Nilrem	Out of Service	In Service	BR4	125
			BR5	250
	N/A <sup>1</sup>	Out of Service	BR4	No Limit
			BR5	
1047L 650s Hansman Lake-574s Nilrem	Out of service	In Service	BR4	125
			BR5	250
	N/A <sup>1</sup>	Out of Service	BR4	No Limit
			BR5	

**Note:** 1. If 953L is out of service, there are no transient stability limits on BR4 or BR5, regardless of the status of the teleprotection on 1047L.

**Table 2: Battle River (BR4 / BR5) N-1 Transient Stability Limit**

Outage	Limiting Element	Generator output limit (Net MW)	
		BR4	BR5
9L80 (755s Cordel – 757s Battle River)	Loss of 7L701	BR4	140
Battle River 757s912T (Transformer)		BR5	No Limit
912L (63s Red Deer - 766s Nevis)	Loss of 9L16	BR4	No Limit
		BR5	400
9L20 (766s Nevis - 755s Cordel)		BR4	No Limit
		BR5	390

**Table 3: Sheerness (SH1/SH2) N-1 Transient Stability Limits**

Outage <sup>1</sup>		Limiting Element	Transient Stability Limit (SH1/SH2 Combined Net MW)
N-1	9L59 801s Anderson – 972s Tinchebray	9L24	650
	9L16 972s Tinchebray – 755s Cordel		600
	9L24 946s Oakland – 959s Lanfine	Loss of 9L59	600
	9L46 959s Lanfine – 932s Pemukan		700
	9L966 932s Pemukan – 650s Hansman Lake		750
	9L97/9L70 801s Anderson – 946s Oakland		780