

# Information Document

## Central West Area Transmission Constraint Management

### ID #2018-005R



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)<sup>1</sup> in effect, the Authoritative Document(s) governs.

## 1 Purpose

This Information Document relates to the following Authoritative Document:

- 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 West area of the Alberta interconnected electric system (AIES). For the purposes of this Information Document, the Central West area is the area illustrated by the maps in Appendix 2 and 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 AIES. These steps are referenced in Table 1 of this Information Document as they are applied to the Central West area.

## 2 General

Given the existing load, generation and transmission system configuration in the Central West area, with the loss of certain transmission lines or the Brazeau Generation Tripping Scheme (Remedial Action Scheme ("RAS") 25) being out of service, transient issues may occur for the next contingency.

A detailed geographical map of the Central West area indicating bulk transmission lines and substations is provided in Appendix 2 of this Information Document.

## 3 Constraint Conditions and Limits

When managing a transmission constraint in the Central West area, the AESO ensures that bulk transmission line flows out of the area are managed in accordance with bulk transmission line ratings established by the legal owner of the transmission facility to protect transmission facilities and ensure the continued reliable operation of the AIES.

### 3.1 Non-Studied Constraints and Limits

For system conditions that have not been pre-studied, the AESO uses energy management system tools and dynamic stability tools to assess unstudied system operating limits in real time. The limits are determined by monitoring Real Time Contingency Analysis to ensure flows do not reach an unsafe level after N-1 events.

### 3.2 Studied Constraints and Limits

The AESO's study of the Central West area identified the following constraints and limits:

#### Brazeau 62s Stability Concerns

The AESO monitors the Brazeau Generation Tripping Scheme (RAS 25) that is in place in the CentralWest area. When the Brazeau Generation Tripping Scheme is available, it monitors the status of 995L and the Brazeau units output to protect against N-1 thermal overloads by tripping Brazeau Unit 2 under certain conditions.

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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 associated 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.

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Studies have indicated that with 995L, 202L or the Brazeau Generation Tripping Scheme (RAS 25) out of service, transient issues at Brazeau may occur for the next contingency. Refer to Appendix 4 for Brazeau N-1 Transient Stability Limits with the Brazeau Generation Tripping Scheme (RAS 25) in service. With the Brazeau Generation Tripping Scheme (RAS 25) out of service, refer to Appendix 5 for N-1 Transient Stability Limits.

#### Bighorn

With the loss of 848L, 870L, 717L, 166L, or 719L, transient issues at Bighorn generators occur when Bighorn generation is greater than 70MW and the next contingency occurs. Transmission reconfiguration is the preferred method to eliminate the transient stability concerns; however, depending on system conditions this may not be possible and curtailing Bighorn generation may be necessary.

#### 4 Application of Transmission Constraint Management Procedures

The AESO manages transmission constraints in all areas of the AIES in accordance with the provisions of Section 302.1. However, not all of those provisions are effective in the Central West area due to certain operating conditions that exist in that area. Table 1 below describes the applicability of subsection 2(1) of Section 302.1 to the Central West area, and additional clarifying steps required to effectively manage transmission constraints in the area.

**Table 1**  
**Transmission Constraint Management**  
**Sequential Procedures for the Central West Area**

Section 302.1 of the ISO rules, subsection 2(1) protocol steps	Applicable to the Central West area?
(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 in Alberta is to identify those generating units effective in managing a constraint. All of the generating units and loads operating in the Central West area are indicated in the single line diagram in Appendix 3 and the generating units effective in managing a transmission constraint in the Central West area are identified in Appendix 1. Pursuant to subsection 2(4) of Section 302.1, when a transmission constraint has been or is expected by the AESO to activate a RAS, the AESO recommences the procedural sequence in Table 1 (above) once the AESO ensures that the system is operating in a safe and reliable mode.

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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 effective in managing Central West area transmission constraints.

Step (c) in Table 1

There are no interties in the Central West 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 transmission constraints in the Central West area because there is no demand opportunity service.

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

There are no transmission must-run contracts in the Central West area and using transmission must-run is not effective in managing a transmission constraint.

Step (f) in Table 1

Curtailing effective pool assets using reverse energy market merit order followed by pro-rata curtailment is effective in managing Central West area transmission constraints.

Step (g) in Table 1

When the local voltage RAS is not available, curtailing load is not effective in managing Central West transmission constraints.

## 5 Project Updates

As necessary, the AESO intends to provide information in this section about projects underway in the Central West 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 Central West area*

Appendix 3 – *Central West Area Single Line Diagram*

Appendix 4 – *Brazeau N-1 Transient Stability Limits with Brazeau Generation Tripping Scheme (RAS 25) in service*

Appendix 5 – *Brazeau N-1 Transient Stability Limits with Brazeau Generation Tripping Scheme (RAS 25) out of service*

## Revision History

Posting Date	Description of Changes
2018-09-19	Administrative amendments to Section 3. Table layout and title changes to Appendix 4, and Appendix 5. Removal of Appendix 6.
2018-04-25	Initial release

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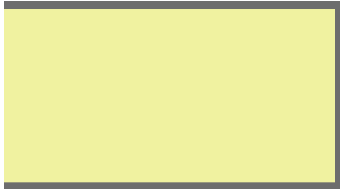
## Appendix 1 – Effective Pool Assets

The effective pool assets for the Central West area, listed alphabetically by their pool IDs, are:

**Big Horn (BIG)**

**Brazeau (BRA)**

Appendix 2 – Central West Geographic Map





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#### Appendix 4 – Brazeau N-1 Transient Stability Limits with Brazeau Generation Tripping Scheme (RAS 25) in service

Outage		Brazeau Units on line	Transient Stability Limit (MW)	
N-1	202L  61s Lodgepole - 62s Brazeau	both units online	G1	150
			G2	No Limit
		only G1 online	150	
		only G2 online	135	
	995L  62s Brazeau - 17s Benalto <sup>1</sup>	both units online	130	
		only G1 online	95	
		only G2 online	75	

#### Note

1. Includes outages on either section of 995L.

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#### Appendix 4 – Brazeau N-1 Transient Stability Limits with Brazeau Generation Tripping Scheme (RAS 25) out of service

Outage		Brazeau Output Limit (MW)	
N-0 System Normal	None	Any combination of Brazeau Units	255
N-1	995L  62s Brazeau - 17s Benalto	both units online	130
		only G1 online	95
		only G2 online	75
	202L  61s Lodgepole - 62s Brazeau	both units on line	170
		only G1 online	150
		only G2 online	135
	202L 61s Lodgepole- 178s Cynthia	255	
	672L 235s Entwistle - Moon Lake 131s	235	
	673L 131s Moon Lake - 283s Violet Grove	235	
	801L 62s Brazeau - 294s Brazeau Outlet Works	240	
	801L 294s Brazeau Outlet Works - 358s Amoco Brazeau	242	
	828L 489s P.C. Brazeau River - 178s Cynthia	245	
	834L 320P Keephills - 384s Keystone	250	
	835L 384s Keystone - 283s Violet Grove	250	



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Outage		Brazeau Output Limit (MW)
	836L 283s Violet Grove - 61s Lodgepole	200
	841L 477s West Pembina - 489s P.C. Brazeau River	245
	844L 358s Amoco Brazeau - 477s West Pembina	242

Element Out of Service	Brazeau Units line	Transient Stability Limit (MW)		Limiting Contingency
RAS 25	Any combination	255 MW		995L 62s Brazeau -17s Benalto <sup>1</sup>
202L 61s Lodgepole - 62s Brazeau	both units online	G1	150	
		G2	No Limit	
	only G1 online	150		
	only G2 online	135		
995L 62s Brazeau - 17s Benalto	both units online	130		202L 61s Lodgepole--62s Brazeau
	only G1 online	95		
	only G2 online	75		

**Note<sup>1</sup>:** This is for an outage of either section of 995L.

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#### Appendix – Brazeau N-1-1 Transient Stability Limits

Used when RAS 25 and any of the listed elements are out of service.

RAS 25 Out of Service AND:	Brazeau Output Limit (MW)		Limiting Contingency
202L 61s Lodgepole - 62s Brazeau	both units on line	170	995L 62S Brazeau - 17S Benalto
	only G1 online	150	
	only G2 online	135	
202L 178s Cynthia- 58s Edson	225		
202L 61s Lodgepole- 178s Cynthia	255		
672L 235s Entwistle - Moon Lake 131s	235		
673L 131s Moon Lake - 283s Violet Grove	235		
801L 62s Brazeau - 294s Brazeau Outlet Works	240		
801L 294s Brazeau Outlet Works - 358s Armadillo Brazeau	242		
828L 489s P.C. Brazeau River - 178s Cynthia	245		
834L 320P Keephills - 384s Keystone	250		

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<b>RAS 25 Out of Service AND:</b>	<b>Brazeau Output Limit (MW)</b>	<b>Limiting Contingency</b>
<b>835L 384s Keystone - 283s Violet Grove</b>	<b>250</b>	
<b>836L 283s Violet Grove - 61s Lodgepole</b>	<b>200</b>	
<b>841L 477s West Pembina - 489s P.C. Brazeau River</b>	<b>245</b>	
<b>844L 358s Amoco Brazeau - 477s West Pembina</b>	<b>242</b>	