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)[1] 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 information on the unique operating characteristics of the Alberta interconnected electric system (AIES) in the Central West area, including the area's constraint conditions and operating limits. The Central West area is depicted visually in Appendices 2, 3a, and 3b of this Information Document.

Section 302.1 sets out the general transmission constraint management procedures that the AESO uses to manage transmission constraints in real time on the AIES. Table 1 in this Information Document identifies which constraint management procedures are applicable to the Central West area.

2 General

Based on the Central West area's existing load, generation and transmission configuration, transient stability concerns may occur as identified in Appendices 4, 5, and 6.

A detailed geographical map of the Central West area's 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 are managed in accordance with bulk transmission line ratings established by the legal owner of the transmission facility. This protects transmission facilities and ensures the reliable operation of the AIES.

3.1 Non-Studied Constraints and Limits

For system conditions that are not pre-studied, the AESO uses energy management system tools and dynamic stability tools to assess unstudied system operating limits in real time. Real time system conditions and area transmission element outages not identified through engineering studies may require constraint mitigation actions by the effective pool assets listed in Appendix 1.

3.2 Studied Constraints and Limits

Studies by the AESO of the Central West area identified the following constraints and limits:

[1] "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.

Bighorn

With the loss of any one of 848L, 870L, 717L, 166L, or 719L, transient issues at the Bighorn generators occur. Where possible, transmission reconfiguration is the preferred method to eliminate the transient stability concerns. If transmission reconfiguration is not feasible due to system conditions, curtailment of Bighorn generation may be necessary. Refer to Appendix 4 Bighorn N-1 Transient Stability Limits.

Brazeau 62s Stability Concerns

The AESO monitors the Brazeau Generation Tripping Scheme (RAS 25) in the Central West area. When the Brazeau Generation Tripping Scheme is available, the AESO monitors the status of 995L and the output of the Brazeau units to protect against N-1 thermal overloads caused by Brazeau Unit 2 tripping.

Studies have indicated that when any of 995L, 202L, 672L, 673L, 801L, 828L, 834L, 836L, 841L, 844L, 320P Transformer 1, and/or the Brazeau Generation Tripping Scheme (RAS 25) are out of service, transient issues at Brazeau may occur for the next contingency.

Appendices 5 and 6 list the Brazeau Transient Stability Limits based on the status of RAS 25 i.e., armed or not armed. Appendices 7 and 8 indicate the Thermal Limits for the Brazeau Area Units 1 and 2 based on the status of RAS 25 and whether the total combined net to grid generation exceeds 190 MW.

Edson Area

The Cascade units are located at 1047s Whiskey Jack (CAS1, CAS2). There are no transient stability concerns with these units in service. Several remedial action schemes are employed to manage local area congestion.

For a planned or an unplanned outage to 973L/974L (310p Sundance-39s Bickerdike), curtailment of Cascade 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 Section 302.1 procedures. However, not all procedures are effective due to the Central West area's operating conditions. 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.

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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 activated a RAS 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.

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

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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

Curtailing load is not effective in managing Central West area 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.

Appendices

Appendix 1 – *Effective Pool Assets*

Appendix 2 – *Central West Geographic Map*

Appendix 3A – *Central West Area Single Line Diagram (256 Harmanton-178s Cynthia)*

Appendix 3B – *Central West Area Single Line Diagram (Edson Area)*

Appendix 4 – *Bighorn Transient N-1 Stability Limits*

Appendix 5 – *RAS 25 Armed (in-service) Brazeau Transient Stability Limits*

Appendix 6 – *RAS 25 Not Armed (Out of Service) Brazeau Transient Stability Limits*

Appendix 7 – *Brazeau Area Unit 1 and Unit 2 Thermal Limits with RAS 25 Out of Service or Total Combined Net to Grid Generation less than 190 MW*

Appendix 8 – *Brazeau Area Unit 1 and 2 Thermal Limits with RAS 25 In Service and Total Combined Net to Grid Generation greater than 190 MW*

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Revision History

Posting Date	Description of Changes
2026-03-17	Amended Section 3.1 Non-Studied Constraints and Limits and Section 3.2 Added 973L and 974L overloads. Amended Appendix 1, Appendix 2, Appendix 4, Appendix 7 and Appendix 8. General clarity related updates to the document were also made.
2024-09-03	Updated Section 3.2, Appendix 4, and Appendix 5.
2023-12-20	Updated Appendix 2 map, Appendix 5 and 6 tables.
2019-02-07	Administrative amendments to Section 3, title changes to Appendix 4, and Appendix 5, addition of Appendix 6.
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)

Cascade (CAS1 and CAS2)

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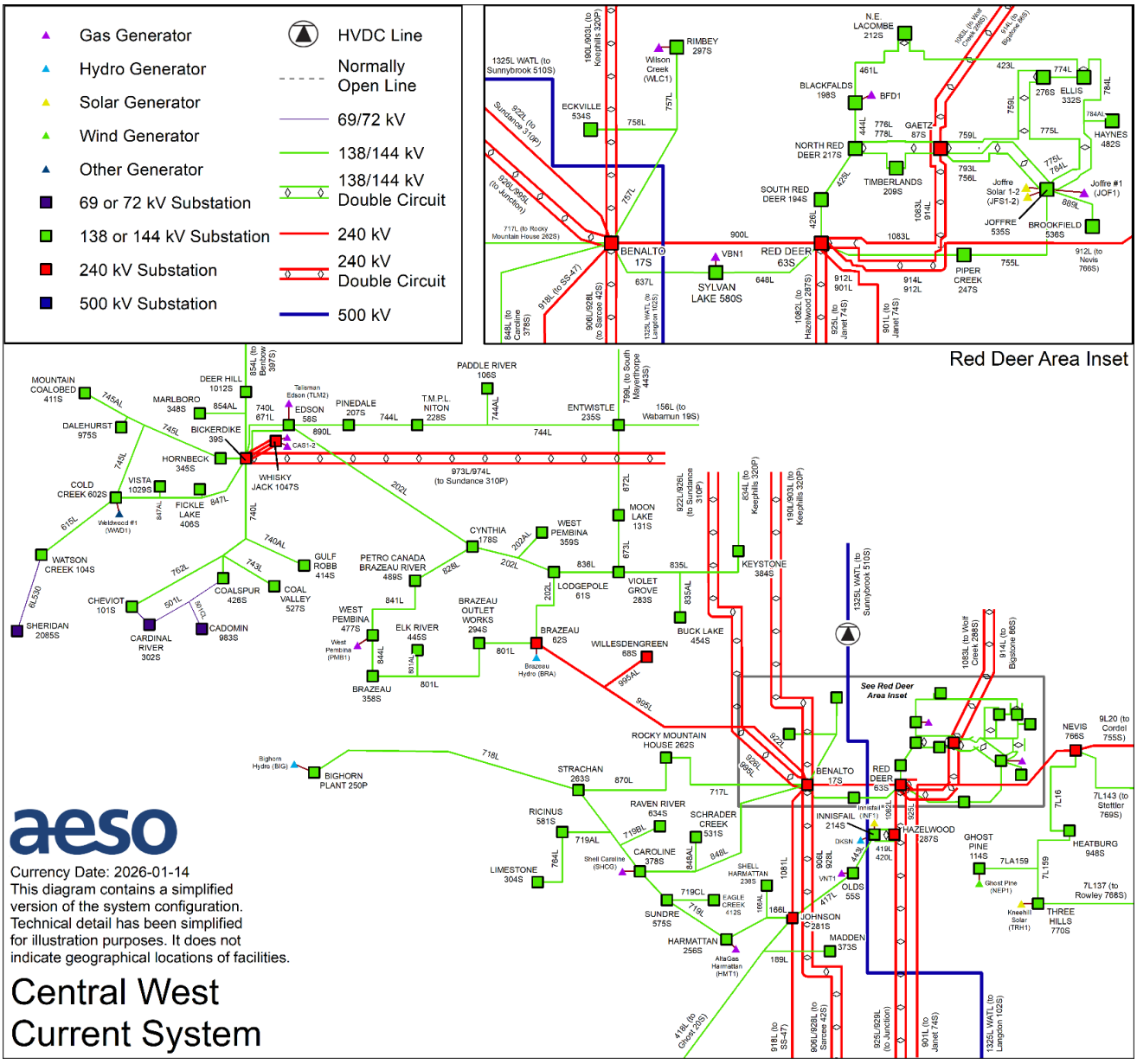
Appendix 2 – Central West Geographic Map



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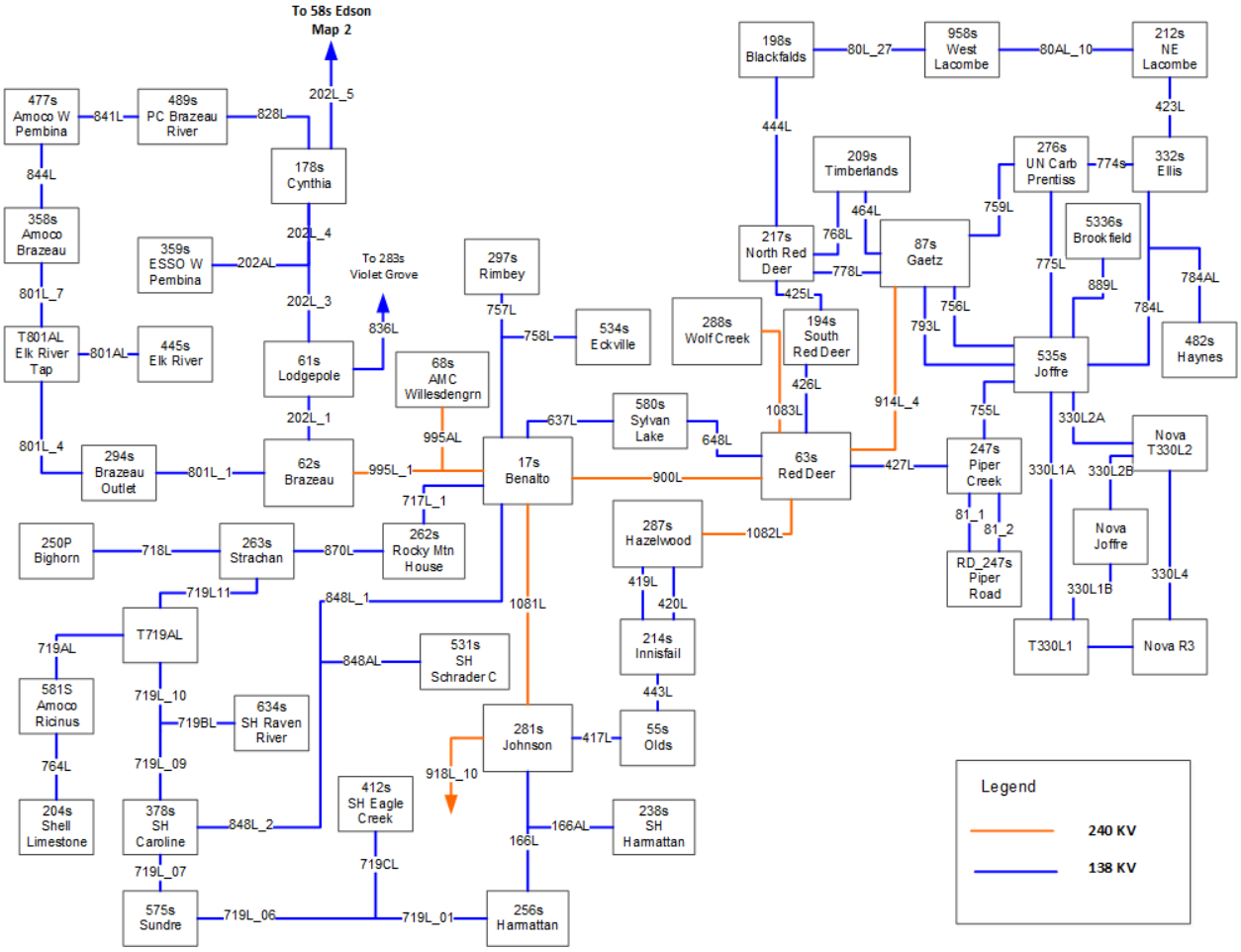
Appendix 3A – Central West Single Line Diagram (256 Harmanton-178s Cynthia)



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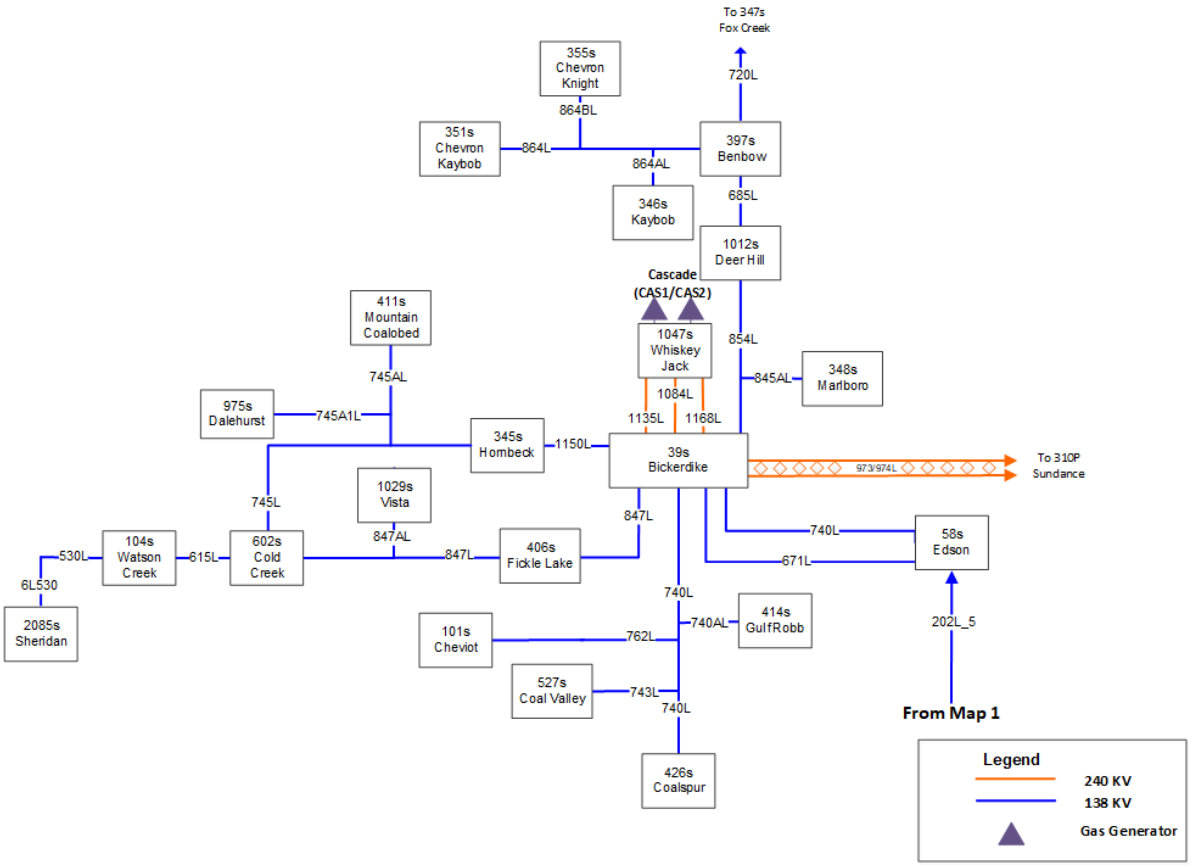
Appendix 3B – Central West Single Line Diagram (Edson Area)



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Appendix 4 – Bighorn N-1 Transient Stability Limits[1]

Outage		Bighorn Units Online	Transient Stability Limit (MW)		Possible Transient Stability Mitigation[2]
			G1	G2	
N-1	848L (17s Benalto- 378s Shell Caroline)	One unit	offline	40	Open 719L_09 (Shell Caroline 378s to 719BL Tap)[2]
			40	offline	
		Both units	70		
	166L (256s Harmattan -281s Johnson)	One unit	offline	40	
			40	offline	
		Both units	70		
	719L (575s Sundre- 378s Shell Caroline)	One unit	offline	40	
			40	offline	
		Both units	70		
	719L (575s Sundre- 256s Harmattan)	One unit	offline	40	
			40	offline	
		Both units	70		
	717L (262s Rocky Mountain House - 17s Benalto)	One unit	offline	46	Open 719L_07 (378s Shell Caroline to 575s Sundre)
			46	offline	
		Both units	70		
	870L (262s Rocky Mountain House - 263s Strachan)	One unit	offline	49	
			49	offline	
		Both units	70		

Note

1. Transmission reconfiguration may mitigate Big Horn Transient Stability concerns.
2. There are no transient stability concerns for the Bighorn unit(s) if the Bighorn Hydro plant is radially connected by 719L (575s Sundre-378s Caroline) or 719L (378s Shell Caroline- 719BL Tap).

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Appendix 5 – RAS 25 Armed (in-service) Brazeau Transient Stability Limits[1]

Outage		Brazeau Units Online	Transient Stability Limit (MW)	
N-0 System Normal	None	Both units online	No Limit	
		One unit online (G1 or G2)	170	
N-1	995L (62s Brazeau- T995AL- 17s Benalto)	Both units online	127	
		Only G1 online	89	
		Only G2 online	75	
	202L (61s Lodgepole - 62s Brazeau)[2]	Both units online	G1	137
			G2	No Limit
		Only G1 online	139	
		Only G2 online	126	
	202L (178s Cynthia -58s Edson)	Both units online	No Limit	
		One unit online (G1 or G2)	154	
	202L (61s Lodgepole- T202AL- 178s Cynthia)	Both units online	No limit	
		One unit online (G1 or G2)	168	
	672L (235s Entwistle- 131s Moon Lk)	Both units online	No Limit	
		One unit online (G1 or G2)	162	
	673L (131s Moon Lk- 283s Violet Grove)	Both units online	No Limit	
		One unit online (G1 or G2)	162	
	801L (62s Brazeau- 294s Brazeau Outlet Works)	Both units online	No Limit	
		One unit online (G1 or G2)	163	
	801L (294s Outlet Works- T801AL- 358s Amoco Brazeau)	Both units online	No Limit	
		One unit online (G1 or G2)	162	
		Both units online	No Limit	

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Outage		Brazeau Units Online	Transient Stability Limit (MW)
	828L (489s P.C. Brazeau River - 178s Cynthia)	One unit online (G1 or G2)	164
	834L (320P Keephills - 384s Keystone)	Both units online	No Limit
		One unit online (G1 or G2)	162
	835L (384s Keystone– 283s Violet Grove)	Both units online	No Limit
		One unit online (G1 or G2)	162
	836L (283s Violet Grove - 61s Lodgepole)	Both units online	No Limit
		One unit online (G1 or G2)	143
	841L (477s West Pembina – 178s Cynthia)	Both units online	No Limit
		One unit online (G1 or G2)	164
	844L (358s Amoco Brazeau- 477s West Pembina)	Both units online	No Limit
		One unit online (G1 or G2)	164
	320P Keephills T1	Both units online	No Limit
		One unit online (G1 or G2)	162

Note

1. RAS 25 trips BRA Unit 2 when 995L trips at 62S995X and BRA NTG exceeds190 MW.
2. There are no transient stability concerns for Brazeau 62s 138 kV bus outages that affect both 202L (62s Brazeau -61s Lodgepole) and 801L (62s Brazeau-294s Brazeau Outlet W).

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Appendix 6 – RAS 25 Not Armed (Out of Service) Brazeau Transient Stability Limits

Outage		Brazeau Output Limit (MW)	
N-0 System Normal	None	Both units online	250
		One unit online (G1 or G2)	175
N-1	995L (62s Brazeau -T995AL- 17s Benalto)	Both units online	132
		Only G1 online	89
		Only G2 online	75
	202L (61s Lodgepole - 62s Brazeau)[1]	Both units online	130
		Only G1 online	139
		Only G2 online	126
	202L (178s Cynthia -58s Edson)	Both units online	217
		One unit online (G1 or G2)	159
	202L (61s Lodgepole-T202AL- 178s Cynthia)	Both units online	247
		One unit online (G1 or G2)	173
	672L (235s Entwistle - 131s Moon Lake)	Both units online	230
		One unit online (G1 or G2)	167
	673L (131s Moon Lake - 283s Violet Grove)	Both units online	229
		One unit online (G1 or G2)	167
	801L (62s Brazeau - 294s Brazeau Outlet Works)	Both units online	229
		One unit online (G1 or G2)	168
		Both units online	232

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Outage		Brazeau Output Limit (MW)	
	801L (294s Brazeau Outlet Works -T801AL- 358s Amoco Brazeau)	One unit online (G1 or G2)	167
	828L (489s P.C. Brazeau River - 178s Cynthia)	Both units online	237
		One unit online (G1 or G2)	169
	834L (320P Keephills - 384s Keystone)	Both units online	232
		One unit online (G1 or G2)	167
	835L (384s Keystone -T835AL- 283s Violet Grove)	Both units online	232
		One unit online (G1 or G2)	167
	836L (283s Violet Grove - 61s Lodgepole)	Both units online	184
		One unit online (G1 or G2)	148
	841L (477s West Pembina - 489s P.C. Brazeau- 178s Cynthia)	Both units online	235
		One unit online (G1 or G2)	169
	844L (358s Amoco Brazeau-477s West Pembina)	Both units online	235
		One unit online (G1 or G2)	169
	320P Keephills T1	Both units online	233
		One unit online (G1 or G2)	167

Note

1. There are no transient stability concerns for Brazeau 62s 138 kV bus outages that affect both 202L (62s Brazeau -61s Lodgepole) and 801L (62s Brazeau-294s Brazeau Outlet W).

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Appendix 7 – Brazeau Area G1 and G2 Combined Thermal Limits if RAS 25 Out of Service or Total Net to Grid Generation is less than 190 MW[1]

Outage (N-1)	RAS 25 Out of service OR Total NTG Generation is less than 190 MW	
	Brazeau G1 and G2 Output Limit Summer (May 1-Oct 31)	**Brazeau G1 and G2 Output Limit Winter** (Nov 1-April 30)
202L (61s Lodgepole - 62s Brazeau)	140	170
801L (62s Brazeau - 294s Brazeau Outlet Works)	140	170
801L (294s Brazeau Outlet Works - 358s Amoco Brazeau)	145	175
828L (489s P.C. Brazeau River - 178s Cynthia)	165	195[2]
836L (283s Violet Grove - 61s Lodgepole)	155	160
841L (477s West Pembina - 489s P.C. Brazeau River)	160	190
844L (477s West Pembina - 489s P.C. Brazeau River)	155	185
995L (17s Benalto – 68s Willesdengreen)	150	170
995L (62s Brazeau – 68s Willesdengreen)	140	160
62sT5	300[2]	300[2]
17s13 or 17s 12	205[2]	235[2]
61s 138kV Bus 1	145	175

Note

1. If real time contingency analysis indicates a higher thermal limit for the contingencies listed in the table, the AESO operates to the higher limit.

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Appendix 8 – Brazeau Area Unit #1 Thermal Limits When RAS 25 In Service and Total Combined Net to Grid Generation Greater than 190 MW

Outage (N-1)	RAS 25 in service and Total Net to Grid Generation greater than 190 MW	
	Unit #1 Output Limit (MW) Summer (May 1-Oct 31)	**Unit #1 Output Limit (MW) Winter** (Nov 1-April 30)
202L (61s Lodgepole - 62s Brazeau)	140	No limit
801L (62s Brazeau - 294s Brazeau Outlet Works)	140	No limit
801L (294s Brazeau Outlet Works - 358s Amoco Brazeau)	145	No limit
828L (489s P.C. Brazeau River - 178s Cynthia)	No limit	No limit
836L (283s Violet Grove - 61s Lodgepole)	155	No limit
841L (477s West Pembina - 489s P.C. Brazeau River)	No limit	No limit
844L (477s West Pembina - 489s P.C. Brazeau River)	155	No limit
995L (17s Benalto – 68s Willesdengreen)	150	No limit
995L (62s Brazeau – 68s Willesdengreen)	140	No limit
61s 138kV Bus 1	145	No limit