

Information Document

Available Transfer Capability and Transfer Path Management

ID #2011-001R

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 document¹ in effect, the authoritative document governs.

1 Purpose

This information document relates to the following authoritative documents:

- Section 203.6 of the ISO rules, *Available Transfer Capability and Transfer Path Management* (“Section 203.6”);
- Section 303.1 of the ISO rules, *Load Shed Service* (“Section 303.1”); and
- reliability standard IRO-006-WECC-AB-2, *Qualified Transfer Path Unscheduled Flow Relief* (“IRO-006-WECC-AB-2”).

The purpose of this information document is to provide information on the limits and calculations related to the import and export of energy in interchange transactions. This information document is likely of most interest to market participants who import and export energy to and from Alberta.

2 Tables

The tables set out in this information document are intended to reflect the total transfer capabilities under various Alberta internal load levels and transmission element outage conditions.

3 AESO Determinations of Capability Limits

This section provides information on subsection 2 of Section 203.6. Figure 1 below illustrates the available transfer capability on the interties as limited by individual line total transfer capabilities, system operating limits, and transmission reliability margin.

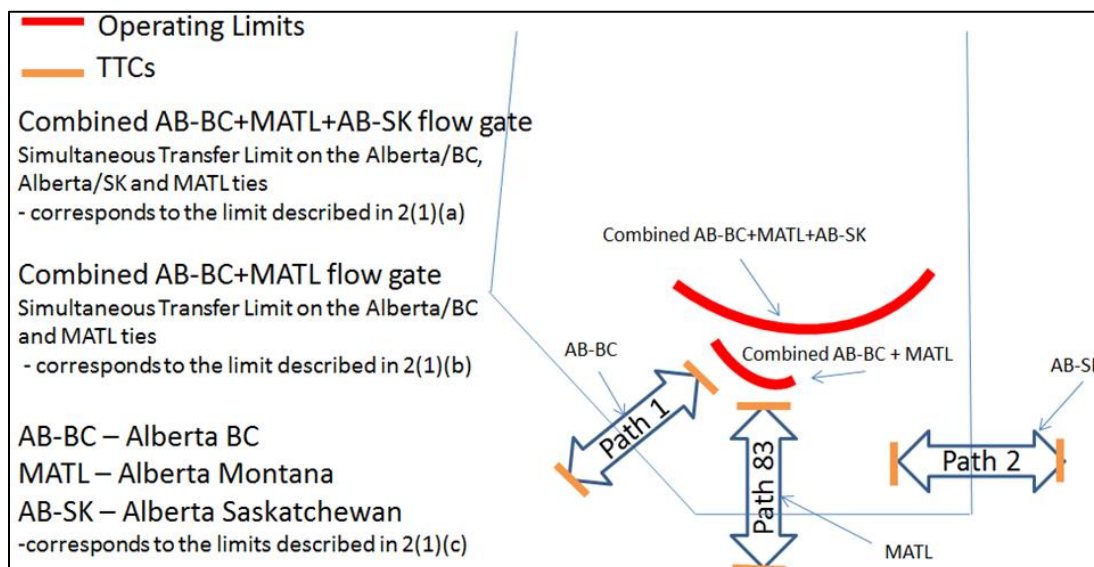


Figure 1: Alberta Capability Levels

Figure Note: References to 2(1)(a),(b), and (c) correspond to the subsection 2(1)(a), (b), and (c) in Section 203.6.

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 regulations, and that contain binding legal requirements for either market participants or the AESO, or both. Authoritative documents include: the ISO rules, the reliability standards, and the ISO tariff.

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4 AESO Determinations of Total Transfer Capability

This section provides information on subsection 3 of Section 203.6.

The calculation of total transfer capability and available transmission capability in Section 203.6 is based upon requirements established in the NERC's reliability standards MOD-001-1a, *Available Transmission System Capability* and MOD-029-1a, *Rated System Path Methodology*.

In general, when determining Alberta's total transfer capability, the AESO considers factors such as:

- a) Alberta internal load levels;
- b) any interconnected electric system forecast or real time conditions, including outages of bulk transmission lines and generating units; and
- c) other conditions, including any seasonal restrictions based on Alberta internal load.

4.1 Alberta-British Columbia Transfer Path Import Total Transfer Capability Determinations

The Alberta-British Columbia transfer path import total transfer capability varies based on Alberta internal load system normal conditions and transmission element outage conditions. Tables 1(a) and 1(b) below set out the total transfer capability under these various conditions.

**Table 1(a): British Columbia to Alberta Import Total Transfer Capability (MW)
Summer Season (May 1 to October 31)**

Montana-Alberta Intertie Status	System Normal ¹		1201L ¹ Out of Service	Path 1 Out of Service
	In	Out	Out	
Alberta Internal Load	800	700	65	0

Table Notes:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

**Table 1(b): British Columbia to Alberta Import Total Transfer Capability (MW)
Winter Season (November 1 to April 30)**

Montana-Alberta Intertie Status	System Normal		1201L ¹ Out of Service	Path 1 Out of Service
	In	Out	Out	
All Alberta Internal Load	800	780	65	0

Table Note:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

4.2 Alberta-British Columbia Transfer Path Export Total Transfer Capability Determinations

For any given system condition, the export total transfer capability will not exceed the maximum export total transfer capability as specified in Table 2(a) and Table 2(b) below.

For multiple outages to more than one transmission element, or for accumulated capacitor bank unavailability in the Calgary area greater than 395 MVar, the AESO determines the maximum export total transfer capability limits by studies based on the specific system conditions at the time of the multiple outages or unavailability. If such studies are not available, the export total transfer capability is reduced to 50 MW if the Montana-Alberta intertie is in service, or 65 MW if it is out of service.

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**Table 2(a): Alberta to British Columbia Export Total Transfer Capability (MW)
Summer Season (May 1 to October 31)**

	System Normal		1201L ¹ Out of Service	Path 1 Out of Service
	In	Out	Out	
Alberta Internal Load	1000	1000	80	0

Table Note:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

**Table 2(b): Alberta to British Columbia Export Total Transfer Capability (MW)
Winter Season (November 1 to April 30)**

	System Normal		1201L ¹ Out of Service	Path 1 Out of Service
	In	Out	Out	
Alberta Internal Load	1000	1000	105	0

4.3 Alberta-Montana Transfer Path Import Total Transfer Capability Determinations

The Alberta-Montana transfer path import total transfer capability varies based on Alberta internal load system normal conditions and transmission element outage conditions. Table 3(a) below sets out the total transfer capability under these various conditions.

Table 3(a): Montana to Alberta Import Total Transfer Capability¹ (MW)

	System Normal	1201L out of service ^{2,3} or 1201L Direct Transfer Trip is out of service or Montana-Alberta intertie local remedial action scheme is out of service or interconnected electric system islanded from the Western Interconnection through BC Hydro ⁴
Alberta Internal Load	310	0

Table Notes:

1. The interconnected electric system is also referred to as the AIES.
2. If the high speed communication equipment used for orderly shutdown and line protection schemes is out of service, Path 83 (Montana-Alberta intertie 240/230 kV line) will be removed from service.
3. A 1201L outage in real time results in a direct transfer trip to the Montana Alberta intertie, also referred to as MATL. For a planned outage to 1201L, the AESO takes Path 83 (Montana-Alberta intertie 240/230 kV line) out of service prior to removing 1201L.
4. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.
5. The AESO takes Path 83 (Montana-Alberta intertie 240/230 kV line) out of service for any outage in British Columbia that causes the interconnected electric system to be islanded from the WECC.

4.4 Alberta-Montana Transfer Path Export Total Transfer Capability Determinations

The AESO determines the Alberta-Montana transfer path export total transfer capability at the Alberta-Montana border as specified in Table 3(b) below.

Table 3(b): Alberta to Montana Export Total Transfer Capability¹ (MW)

	System Normal	1201L out of service^{2,3} or 1201L Direct Transfer Trip is out of service or Montana-Alberta intertie local remedial action scheme is out of service or interconnected electric system islanded from the Western Interconnection through BC Hydro⁴
Alberta Internal Load	315	0

Table Notes:

1. If the high speed communication equipment used for orderly shutdown and line protection schemes is out of service, Path 83 (MATL 240/230 kV line) will be removed from service.
2. A 1201L outage in real time results in a direct transfer trip to the Montana-Alberta intertie, also referred to as MATL. For a planned outage to 1201L, the AESO takes Path 83 (Montana-Alberta intertie 240/230 kV line) out of service prior to removing 1201L.
3. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.
4. The AESO takes Path 83 (Montana-Alberta intertie 240/230 kV line) out of service for any outage in British Columbia that causes the interconnected electric system to be islanded from the WECC.

4.5 Alberta-Saskatchewan Transfer Path Import Total Transfer Capability

Table 4(a): Saskatchewan to Alberta Import Total Transfer Capability (MW)

	Import Total Transfer Capability	
	Winter	Summer
For any Alberta Internal Load	153	153

4.6 Alberta-Saskatchewan Transfer Path Export Total Transfer Capability

Table 4(b): Alberta to Saskatchewan Export Total Transfer Capability (MW)

	Export Total Transfer Capability		
	System Normal	One McNeill capacitor unavailable	Two McNeill capacitors unavailable
For any Alberta Internal Load	153	130	90

5 Available Transfer Capability Determinations by the AESO for a Transfer Path

This section provides information on subsection 4 of Section 203.6.

The AESO calculates both the import available transfer capability and the export available transfer path capability for each transfer path according to the formula below:

- the total transfer capability; *minus*
- the transmission reliability margin;

where the transmission reliability margin is:

that amount of transfer capability the AESO determines is necessary to ensure the reliable operation of the Alberta interconnected electric system taking into account uncertainties in system conditions and the need for operating flexibility; and

the transmission reliability margin is composed of the system transmission reliability margin (TRM_S) for variations due to balancing of generation and load on the interconnected electric system

plus

the allocation transmission reliability margin (TRM_A) associated with joint operation of the transfer paths in the presence of a combined system operating limit.

Or simply: $ATC = TTC - (TRM_S + TRM_A)$

Refer to section 5.3 of this information document for further information regarding the determination of system transmission reliability margin and section 5.4 of this information document for the determination of allocation transmission reliability margin.

5.1 Reliability Factor Affecting the Combined British Columbia and Montana to Alberta Operating Limit for Import Available Transfer Capability

(a) Inertia

The AESO monitors real-time system inertia and may reduce the combined British Columbia and Montana to Alberta operating limit for import available transfer capability if a particular threshold is exceeded.

The real-time inertia based available intertie capability reduction formula (“inertia formula”) calculates a ratio based on the real-time system inertia, the amount of load shed service for import (LSSi) for which dispatches have been issued, and the British Columbia/Montana (BC/MT) net schedule. If the ratio exceeds an established threshold value, the import available transfer capability may be reduced and a new available transfer capability may be calculated to ensure that the threshold is not exceeded.

Inertia formula = (BC/MT net schedule – dispatches issued for LSSi) / real-time system inertia

The inertia formula ratio should be less than or equal to the threshold of 0.0135. If the ratio is higher than 0.0135, the AESO reduces the available transfer capability in order to meet the threshold. The amount of load shed service for import for which dispatches have been issued prior to the available transfer capability reduction will remain the same.

5.2 Posting the Available Transfer Capability

The AESO posts available transfer capability for 24 hour periods on the AESO website in the *Real-time ATC Allocation Report*. The posting automatically updates at 85 minutes in advance of the settlement interval, at 15 minutes in advance of the settlement interval if required, and in real-time if system operating limits change in the current settlement interval. In addition to the *Real-time ATC Allocation Report*, the AESO provides forward looking intertie capability reports, and historical intertie capability reports.

At 25 minutes prior to each settlement interval, the AESO updates the *Real-time ATC Allocation Report* for the next settlement interval plus one settlement interval and beyond as follows:

- (a) the AESO recalculates total transfer capabilities and system transmission reliability margin based on forecast system conditions according to the tables described within this information document; and
- (b) the AESO calculates allocation transmission reliability margin as described in section 5.4 below.

Within 15 minutes prior to the start of the settlement interval, if the operating limit on any given path changes, and the sum of the e-tags violates a path limit, the AESO will curtail e-tags as per subsection 11

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of Section 203.6. As soon as practicable, the AESO will update the *Real-time ATC Allocation Report* for the next settlement interval, due to any one or more of system operating limit, total transfer capability, and transmission reliability margin changes since the last update.

During the settlement interval, the AESO updates the *Real-time ATC Allocation Report* and recalculates the transfer path scheduling parameters, if required, due to real-time changes to any one or more of total transfer capability, system operating limits, and transmission reliability margin.

5.3 Determination of System Transmission Reliability Margin

5.3.1 System Transmission Reliability Margin for the Alberta-British Columbia and Alberta-Montana Transfer Paths

For other system conditions that are not listed below, the AESO may change the transmission reliability margin if it is required to ensure system reliability.

Table 5(a): Import Transmission Reliability Margin for the Alberta-British Columbia and Alberta-Montana transfer paths under various system conditions (MW)

System Conditions	Import Transmission Reliability Margin				
	British Columbia		Montana	British Columbia /Montana	System
	Montana-Alberta Intertie in service	Montana-Alberta Intertie out of service	Montana-Alberta Intertie in service	Connected to WECC	British Columbia/Montana/Saskatchewan
System Normal (N-0)	50	65	15	65	65
1201L Out of Service ¹	n/a	65	n/a		
1201L in service with insufficient contingency reserves	50	65	15	Higher value of 65 or TRM=TTC-Calculated ATC	65
Path 1 Out of Service	0	0	0	0	0
1201L In Service; and any BC Hydro transmission outages result in BC Hydro area load being serviced by or potentially being served by Alberta.					
2L113 outage	50; plus MW flow on 887L and 786L	65; plus MW flow on 887L and 786L	15	Higher value of 65 or TRM=TTC-Calculated ATC ²	65
5L92 outage	50	65	15	Higher value of 65 or TRM=TTC-Calculated ATC ³	65
2L294 outage	50	65	15	Higher value of 65 or TRM=TTC-	65

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System Conditions		Import Transmission Reliability Margin				
		British Columbia		Montana	British Columbia /Montana	System
		Montana-Alberta Intertie in service	Montana-Alberta Intertie out of service	Montana-Alberta Intertie in service	Connected to WECC	British Columbia/Montana/Saskatchewan
					Calculated ATC ⁴	
1L274/L274 Any section between Natal and Fording Coal Britt Creek	50; plus MW flow on 887L	65; plus MW flow on 887L	15		Higher value of 65 or TRM=TTC-Calculated ATC ⁵	65

Table Notes:

1. TRM refers to transmission reliability margin. ATC refers to available transfer capability.
2. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.
3. Calculation for British Columbia/Montana import available transfer capability = calculated available transfer capability minus the flow on 887L and 786L into BC.
4. Calculation for British Columbia/Montana import available transfer capability = calculated available transfer capability – most severe single contingency.
5. Calculation for British Columbia/Montana import available transfer capability = calculated available transfer capability minus British Columbia island load.
6. Calculation for British Columbia/Montana import available transfer capability = calculated available transfer capability minus the flow on 887L into British Columbia.

Table 5(b): Export Transmission Reliability Margin for the Alberta-British Columbia and Alberta-Montana transfer paths under various system conditions (MW)

System Conditions		Export Transmission Reliability Margin				
		British Columbia		Montana	British Columbia/ Montana	System ¹
		Montana-Alberta Intertie in service	Montana-Alberta Intertie out of service		Connected to WECC	British Columbia/Montana/Saskatchewan
System Normal (N-0)	50	65	15	65	65	
1201L Out of Service ¹	N/A	65	N/A			
Path 1 Out of Service	0	0	0	0	0	

Table Note:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

5.3.2 System Transmission Reliability Margin for the Alberta-Saskatchewan Transfer Path

Because the Alberta-Saskatchewan intertie is a direct current connection and controls to a set point with no variance, the system transmission reliability margin equals 0.

The minimum flow over the McNeill back-to-back direct current converter is 15 MW in either direction due to technical limitations and, therefore, the net interchange schedule over the converter cannot be less than 15 MW (other than 0) in either direction.

If the minimum flow limit is not met, the AESO curtails the net interchange schedule to plus 15 MW, 0 MW, or minus 15 MW, whichever is the least.

5.4 Determination of Allocation Transmission Reliability Margin

Allocation transmission reliability margins are required to reflect the system limitations associated with joint operation of the transfer paths. Engineering studies determine system operating limits for the interconnected electric system which may apply to combinations of transfer paths to ensure that the interconnected electric system is operated in a reliable state. If the operating limits described in this subsection 5.4 of this information document are less than the sum of the total transfer capability of the affected transfer paths, and are expected to be binding based on energy offers received, then the AESO reduces the available transfer capability of each applicable transfer path. This is done by increasing allocation transmission reliability margins such that the final sum of available transfer capabilities equals the operating limit adjusted for a transmission reliability margin. To determine the available transfer capability limit which applies to the transfer path combination, or maximum volume which can be scheduled across the transfer path combination, the AESO subtracts a transmission reliability margin, generally composed of the sum of the individual transfer path system transmission reliability margin values, from the operating limit.

The AESO determines the allocation transmission reliability margin for a transfer path as follows:

- (a) if the volume of offers and bids for a transfer path combination is greater than the relevant operating limit then the AESO calculates the allocation transmission reliability margin for each transfer path based on the results of the available transfer capability allocation protocol defined in subsection 10 of Section 203.6 where

$$TRM_a = TTC - TRM_s - ATC; \text{ or}$$

- (b) if the volume of offers and bids for a transfer path combination is not greater than the relevant operating limits then the AESO sets the allocation transmission reliability margin to 0. This indicates there were not enough offers or bids to require an available transfer capability allocation. Even though an allocation is not required, the operating limit is still the constraining factor on the transfer path, or combinations of transfer paths.

The AESO identified operating limits for the following intertie combinations:

- (a) combined British Columbia/Montana to Alberta as per subsection 2(1)(b) of Section 203.6;
- (b) Alberta to combined British Columbia/Montana as per subsection 2(1)(b) of Section 203.6;
- (c) combined British Columbia/Montana and Saskatchewan to Alberta as per subsection 2(1)(c) of Section 203.6; and
- (d) Alberta to Combined British Columbia, Montana and Saskatchewan as per subsection 2(1)(c) of Section 203.6.

5.4.1 The Combined British Columbia and Montana to Alberta Operating Limit for Import

The British Columbia and Montana to Alberta system operating limit for import under various system conditions is provided in Tables 6(a) and 6(b) below.

The transmission reliability margin applied to the combined British Columbia and Montana to Alberta cutplane is normally the sum of the individual transmission reliability margins for each of the British Columbia and Montana interties. The AESO may also increase the combined British Columbia and

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Montana to Alberta transmission reliability margin during normal operating conditions if the available load under load shed service for import is insufficient, as shown in Table 7 below. Further details on load shed service for import can be found in Section 303.1.

Table 6(a): Combined British Columbia and Montana to Alberta Operating Limit for Import (MW) Summer Season (May 1 to October 31)

	System Normal Import Limit	1201L¹ Out of Service	Path 1 Out of Service
Alberta Internal Load	1110	65	0

Table Notes:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

Table 6(b): Combined British Columbia and Montana to Alberta Operating Limit for Import (MW) Winter Season (November 1 to April 30)

	System Normal Import Limit	1201L¹ Out of Service	Path 1 Out of Service
Alberta Internal Load	1110	65	0

Table Notes:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

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Table 7a: Minimum Amount of Load Shed Service for Import Load Requirement (MW)

Minimum amount of load shed service for import load requirement is based on the combined British Columbia/Montana net import schedule and the Alberta internal load during normal weather conditions.

BC/MT Available Transfer Capacity Import ^{2,3}	Alberta Internal Load ¹											
	7000 to 7499	7500 to 7999	8000 to 8499	8500 to 8999	9000 to 9499	9500 to 9999	10000 to 10499	10500 to 10999	11000 to 11499	11500 to 11999	12000 to 12499	12500 and above
Below 450	0	0	0	0	0	0	0	0	0	0	0	0
451 to 500	22	22	10	0	0	0	0	0	0	0	0	0
501 to 550	73	73	60	21	27	10	10	0	0	0	0	0
551 to 600	122	122	105	74	74	60	50	45	25	10	0	0
601 to 650	170	170	155	122	122	100	97	93	76	60	43	43
651 to 700	222	220	206	174	166	150	143	139	124	101	93	91
701 to 750	269	269	257	225	217	197	190	184	166	153	139	136
751 to 800	320	318	307	275	268	243	237	232	215	200	185	178
801 to 850	371	367	357	325	312	293	285	279	264	246	231	225
851 to 900	423	415	408	375	360	342	332	326	313	293	277	272
901 to 950	468	463	458	426	410	389	378	373	362	339	323	318
951 to 1000	527	517	507	477	461	437	425	420	412	386	371	365
1001 to 1050	585	570	556	528	501	487	471	466	459	432	421	412
1051 to 1100	645	630	616	583	551	538	520	511	507	479	469	458
1101 to 1150	700	685	671	634	601	588	566	558	557	528	518	503
1151 to 1200	764	741	720	699	641	635	613	608	604	576	564	549
1201 to 1250	828	802	777	754	691	685	658	655	650	625	609	594

Table Notes:

1. If the Alberta internal load falls on or very close to a boundary of Table 1 ranges, the AESO uses the lower Alberta internal load range to determine the amount of load shed service for imports to arm.
2. When 5L92 is out of service, the AESO uses the total net combined British Columbia/Montana import plus the Alberta interconnected electric system most severe single contingency to determine the import level when applying this table.
3. When 2L294, 2L113, 1L274/L274 or the Natal transformers are out of service, the AESO uses the total net combined British Columbia/Montana import and the AES load plus the British Columbia load served from Alberta via the 138 kV system to determine the LSSi required level.

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Table 7 (b): Minimum Amount of Load Shed Service for Import Load Requirement for Severe Weather Conditions along the Alberta-British Columbia intertie transmission corridor (MW)

Minimum amount of load shed service for import load requirement when severe weather conditions, such as lightning activity occur along the Alberta-British Columbia intertie transmission corridor.

BC/MT Available Transfer Capability Import ^{2,3}	Alberta Internal Load ¹											
	7000 to 7499	7500 to 7999	8000 to 8499	8500 to 8999	9000 to 9499	9500 to 9999	10000 to 10499	10500 to 10999	11000 to 11499	11500 to 11999	12000 to 12499	12500 and above
466 and Below	0	0	0	0	0	0	0	0	0	0	0	0
467 to 500	126	126	106	93	80	69	57	55	36	12	10	10
501 to 550	175	175	156	142	128	104	104	101	83	60	58	56
551 to 600	224	224	207	192	176	153	151	148	131	108	101	101
601 to 650	272	272	257	223	223	201	198	194	178	155	147	147
651 to 700	324	322	308	276	268	252	245	241	226	203	194	192
701 to 750	371	371	359	327	319	299	292	286	268	255	241	238
751 to 800	422	420	409	377	370	345	339	334	317	302	287	280
801 to 850	473	469	459	427	414	395	387	381	366	348	333	327
851 to 900	525	517	510	477	462	444	434	428	415	395	379	374
901 to 950	570	565	560	528	512	491	480	475	464	441	425	420
951 to 1000	631	621	611	579	563	539	527	522	514	488	473	467
1001 to 1050	693	678	663	630	603	589	573	568	561	534	523	514
1051 to 1100	755	740	726	685	653	640	622	613	609	581	571	560
1101 to 1150	808	793	779	736	703	690	668	660	659	630	620	605
1151 to 1200	867	837	832	796	743	737	715	710	706	678	666	651
1201 to 1250	935	894	884	856	793	787	760	757	752	727	711	696

Table Notes:

1. If the Alberta internal load falls on or very close to a boundary of Table 1 ranges, the AESO uses the lower Alberta internal load range to determine the amount of load shed service for imports to arm.
2. When 5L92 is out of service, the AESO uses the total net combined British Columbia/Montana import plus the Alberta interconnected electric system most severe single contingency to determine the import level when applying this table.
3. When 2L294, 2L113, 1L274/L274 or the Natal transformers are out of service, the AESO uses the total net combined British Columbia/Montana import and the Alberta interconnected electric system load plus the British Columbia load served from Alberta via the 138 kV system to determine the LSSI required level.

5.4.2 The Alberta to the combined British Columbia and Montana operating limit for export

The British Columbia and Montana to Alberta system operating limits for export under various system conditions are given in Table 8(a) and Table 8(b) below.

Table 8(a): Alberta to Combined British Columbia and Montana Operating Limit for Export Summer Season (May 1– October 31) (MW)

	System Normal Export Limit	1201L¹ Out of Service	Path 1 Out of Service
Alberta Internal Load	1000	80	0

Table Note:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

Table 8(b): Alberta to Combined British Columbia and Montana Operating Limit for Export Winter Season (November 1 – April 30) (MW)

	System Normal Export Limit	1201L¹ Out of Service	Path 1 Out of Service
Alberta Internal Load	1000	80	0

Table Note:

1. When 1114L (102S Langdon-520S Bennet) or Bennett 520S 500 kV / 240 kV transformer is out of service, 1201L is also out of service.

5.4.3 The Alberta (British Columbia/Montana/Saskatchewan) Operating Limit for Export

The AESO calculates the summer system operating limit for export from Alberta by adding the results derived from Table 4(b), which describes the Alberta to Saskatchewan total transfer capability for export, to the results of Table 8(a), which defines the maximum summer export system operating limits affecting the combination of the British Columbia and Montana transfer paths.

The AESO calculates the winter system operating limit for export from Alberta by adding the results derived from Table 4(b), which describes the Alberta to Saskatchewan total transfer capability for export, to the results of Table 8(b), which defines the maximum winter export system operating limits affecting the combination of the British Columbia and Montana transfer paths.

5.4.4 The Alberta (British Columbia/Montana/Saskatchewan) Operating limit for Import

The AESO calculates the system operating limit for import into Alberta by adding the results derived from Table 4(a), which describes the Alberta to Saskatchewan total transfer capability for import, to the results of Tables 6(a) and 6(b), which defines the maximum import system operating limits affecting the combination of the British Columbia and Montana transfer paths.

6 Submission of Interchange Transaction Bids and Offers by Pool Participants

This section provides information on subsection 5 of Section 203.6.

Subsection 5 of Section 203.6 may be read together with other general bid, offer and dispatch provisions contained in Division 203, Energy Market, of the existing ISO rules. In this regard, the AESO encourages Section 203.3 of the ISO rules, *Energy Restatements* to be read in concert with Section 203.6 and that an importing pool participant must continue to submit offers for their available capability, in accordance with Section 203.3.

7 Validation of E-tags by the AESO

This section provides information on subsection 7 of Section 203.6.

Any balancing authority or transmission provider impacted by an interchange transaction schedule has its own criteria, priorities and timelines and the authority to validate and deny an e-tag. In current practice, some adjacent balancing authorities curtail e-tag transactions up to 15 minutes prior to the settlement interval according to their priority order to ensure that the total of the schedules submitted are within capacity limits. However, the AESO takes steps at approximately 15 minutes prior to the settlement interval to address any constraint that continues to exist even if the adjacent balancing authority is still in the process of taking action. The balancing authorities adjacent to the AESO are BC Hydro, SaskPower and Northwestern Energy.

8 Interchange Schedules and Dispatches by the AESO

This section provides information on subsection 8 of Section 203.6.

The current ramp rates for hourly fixed transactions are as follows, but may be subject to change based on agreement between the AESO and the adjacent balancing authority:

- (a) the Alberta-Saskatchewan interchange ramping duration is 10 minutes and ramping starts 5 minutes before the interchange schedule start time and end time;
- (b) the Alberta-British Columbia interchange ramping duration is 20 minutes and ramping starts 10 minutes before the interchange schedule start time and end time; and
- (c) the Alberta-Montana interchange ramping duration is 20 minutes and ramping starts 10 minutes before the interchange schedule start time and end time.

9 Available Transfer Capability Allocations for Transfer Paths

This section provides information on subsection 10 of Section 203.6.

9.1 Allocation examples

The following is intended to provide examples of the available transfer capability allocations for transfer paths set out in subsection 10 of Section 203.6. In these examples, assume the AESO determined the following available transfer capability limits based on the procedure detailed in subsection 2 of Section 203.6.

Import capability limits and export capability limits in Table 9 below are for the example purposes only, and are not meant to imply any particular ongoing or expected future limitations. Please refer to sections 4 and 5 of this information document for more detail regarding the calculation of import capability limits and export capability limits.

Table 9: Capability Limits Illustration (MW)

Transfer Path	Import Available Transfer Capability (TTC – TRM _s)	Export Available Transfer Capability (TTC – TRM _s)
British Columbia intertie	600	600
Montana intertie	300	300
Saskatchewan intertie	150	150
Grouping	Import Capability Limit (operating limit – TRM)	Export Capability Limit (operating limit – TRM)
Combined British Columbia/Montana intertie	600	600
Combined British Columbia/Montana/Saskatchewan interties	725	600

Example 1 – All Limits Exceeded on Import

Assume the following energy offers received at T-2 as referenced in subsection 5(1) of Section 203.6. Assume also that all import offers are priced at \$0/MWh and all exports at \$999.99/MWh:

British Columbia Intertie			Montana Intertie			Saskatchewan Intertie		
Import	Export	Net	Import	Export	Net	Import	Export	Net
1,000	200	800 (Import)	450	0	450 (Import)	200	0	200 (Import)

Combined British Columbia/Montana Interties			Combined British Columbia/Montana/Saskatchewan Interties		
Import	Export	Net	Import	Export	Net
1,450	200	1,250 (Import)	1,650	200	1,450 (Import)

In accordance with subsection 10(1) of Section 203.6, the assessment of this example is as follows:

Based on energy offers received 2 hours prior to the settlement interval, all three individual transfer paths would exceed their available transfer capability limits if the interchange transactions were realized during the settlement interval. Additionally, both the combined British Columbia/Montana and combined British Columbia/Montana/Saskatchewan capability limits would be exceeded. Therefore, the AESO determines and posts individual transfer path available transfer capability allocations by adjusting allocation transmission reliability margin (TRM_a) values as detailed in section 5 of this information document.

The AESO must make available transfer capability allocation calculations in accordance with subsection 10(2)(a) of Section 203.6, so net import volumes for each individual transfer path are first compared to the respective transfer path import available transfer capability limit and, if the net import volume exceeds the respective transfer path import available transfer capability limit, the allocation is set at that limit. After this step, the individual transfer path allocations would be provided in the table below:

British Columbia intertie	600 MW (Import)
Montana intertie	300 MW (Import)
Saskatchewan intertie	150 MW (Import)

In accordance with subsection 10(2)(b) and (c) of Section 203.6, the combined allocations for the British Columbia and Montana interties are compared to the combined British Columbia/Montana capability limit. In this example, the combined allocation is a net import of 900 MW, while the combined British Columbia/Montana import capability limit is 600 MW. A further allocation of capability on these two transfer paths is required such that their total allocation does not exceed 600 MW.

Furthermore, as all transactions are priced equally, the step under subsection 10(2)(c)(i) of Section 203.6 does not result in any change to the allocations calculated under subsection 10(2)(a) of Section 203.6. As there are equally priced transactions, allocations are reduced on a pro rata basis in accordance with subsection 10(2)(c)(ii) of Section 203.6 as follows:

the allocation resulting from subsection 10(2)(a) of Section 203.6;

divided

by the sum from subsection 10(2)(b) of Section 203.6;

multiplied

by the amount by which the combined British Columbia/Montana import capability limit is exceeded.

In this example, the reduction for the British Columbia intertie is:

$$600 / 900 \times 300 = 200 \text{ MW}$$

In this example, the reduction for the Montana Alberta intertie is:

$$300 / 900 \times 300 = 100 \text{ MW}$$

After completing the requirements of subsection 10(2)(c) of Section 203.6 are as follows:

British Columbia intertie	400 MW (Import)
Montana-Alberta intertie	200 MW (Import)
Saskatchewan intertie	150 MW (Import)

In accordance with subsection 10(2)(d) and (e) of Section 203.6, the combined allocations for the British Columbia, Montana Alberta and Saskatchewan interties are now compared to the combined British Columbia/Montana/Saskatchewan capability limit. In this example, the combined allocation at this stage is a net import of 750 MW, while the combined British Columbia/Montana/Saskatchewan import capability limit is 725 MW. A further allocation of combined British Columbia/Montana/Saskatchewan capability on all three transfer paths is required such that their total allocation does not exceed 725 MW.

In this example, as all transactions are priced equally, the step under subsection 10(2)(e)(i) of Section 203.6 does not result in any change to the allocations calculated under subsections 10(2)(a) or 10(2)(c) of Section 203.6. As there are equally priced transactions, allocations are reduced on a pro rata basis in accordance with subsection 10(2)(e)(ii) which proceeds as follows:

the allocation resulting from subsections 10(2)(a) or 10(2)(c) of Section 203.6;

divided

by the sum from subsection 10(2)(d) of Section 203.;

multiplied

by the amount by which the combined British Columbia/Montana/Saskatchewan import capability limit is exceeded.

In this example, the reduction for British Columbia is:

$$400 / 750 \times 25 = 13 \text{ MW}$$

In this example, the reduction for Montana Alberta is:

$$200 / 750 \times 25 = 7 \text{ MW}$$

In this example, the reduction for Saskatchewan is:

$$150 / 750 \times 25 = 5 \text{ MW}$$

The resulting individual transfer path allocations after completing the requirements of subsection 10(2)(e) of Section 203.6 are as follows:

British Columbia intertie	387 MW (Import)
Montana Alberta intertie	193 MW (Import)
Saskatchewan intertie	145 MW (Import)

If interchange transactions were implemented in the volumes as allocated above, all individual transfer paths and relevant combinations of transfer paths would be within capability limits. The AESO would use the above available transfer capability allocations for the individual transfer paths in the determination of the allocation transmission reliability margin as described in section 5.4 above and would post them at approximately 85 minutes prior to the start of the settlement interval. The AESO would then use these allocations, if necessary, in the curtailment procedures described in subsection 11 of Section 203.6.

Example 2 – Wheel Through Transaction with Capability Limit Exceeded

Assume the following energy offers are received at T-2 as referenced in subsection 5(1) of Section 203.6. Assume that all import offers are priced at \$0/MWh and all exports at \$999.99/MWh. In this case, the AESO identifies a wheel through transaction from Montana to British Columbia, as the same market participant submits an import offer and an export bid in the same volume, but across two separate interties.

British Columbia Intertie			Montana Alberta Intertie			Saskatchewan Intertie		
Import	Export	Net	Import	Export	Net	Import	Export	Net
800	200	600 (Import)	200	0	200 (Import)	0	0	0

British Columbia/Montana Combined			British Columbia/Montana/Saskatchewan Combined		
Import	Export	Net	Import	Export	Net
1,000	200	800 (Import)	1,000	200	800 (Import)

In accordance with subsection 10(1) of Section 203.6 the assessment of this example is as follows:

Based on energy offers received at T-2, all three individual transfer paths are within their available transfer capability limits if the interchange transactions were realized during the settlement interval. However, both the combined British Columbia/Montana import capability limit and the combined British Columbia/Montana/Saskatchewan import capability limit would be exceeded. Therefore, the AESO determines and posts individual transfer path available transfer capability allocations. As the AESO has identified a wheel through transaction from Montana Alberta to British Columbia and it does not result in the violation of the capability limits on either the Montana Alberta or British Columbia interties, the AESO excludes this transaction from the allocation calculation in accordance with subsection 10(1)(b) of Section 203.6.

The AESO makes available transfer capability allocation calculations in accordance with subsection 10(2)(a) of Section 203.6, so net import volumes for each individual transfer path are first compared to the respective transfer path available transfer capability limit and, if the net amount exceeds the limit, the allocation is set at the limit. After this step, the individual transfer path allocations would be:

British Columbia intertie	600 MW (Import)
Montana Alberta intertie	200 MW (Import)
Saskatchewan intertie	0 MW

In accordance with subsections 10(2)(b) and (c) of Section 203., the combined allocations for the British Columbia and Montana Alberta interties are now compared to the combined British Columbia/Montana capability limit. In this example, the combined allocation is a net import of 800 MW, while the combined British Columbia/Montana import capability limit is 600 MW. A further allocation of available transfer capability on these two transfer paths is required such that their total allocation does not exceed 600 MW.

In this simple example, as all transactions are priced equally, the step under subsection 10(2)(c)(i) of Section 203.6 does not result in any change to the allocations calculated under subsection 10(2)(a). As the AESO has identified a wheel through transaction from Montana Alberta, these volumes are excluded from the allocation calculations. After adjusting for the wheel through transaction, the allocation in accordance with subsection 10(2)(c)(ii) of Section 203.6 proceeds as follows:

the allocation resulting from subsection 10(2)(a) of Section 203.6;

divided

by the sum from subsection 10(2)(b) of Section 203.6;

multiplied

by the amount by which the combined British Columbia/Montana Alberta capability limit is exceeded.

In this example, the reduction for British Columbia is:

$$600 / (800 - \text{wheel through of } 200) \times 200 = 200 \text{ MW}$$

In this example, the reduction for Montana Alberta is:

$$(200 - \text{wheel through of } 200) / (800 - \text{wheel through of } 200) \times 200 = 0 \text{ MW}$$

The individual transfer path allocations after the application of subsection 10(2)(c) of Section 203.6 are as follows:

British Columbia intertie	400 MW (Import)
Montana Alberta intertie	200 MW (Import)
Saskatchewan intertie	0 MW

In accordance with the provisions of subsection 10(2)(d) and (e) of Section 203.6, the combined allocations for the British Columbia, Montana Alberta and Saskatchewan interties are now compared to the combined British Columbia/Montana/Saskatchewan capability limit. In this wheel through example, the combined allocation at this stage is a net import of 600 MW while the combined British Columbia/Montana/Saskatchewan import capability limit is 725 MW, so no further allocation is required. If the AESO implemented interchange transactions in the volumes as allocated above, all individual transfer paths and relevant combinations of transfer paths would be within capability limits. The AESO would post the above available transfer capability allocations for the individual transfer paths at approximately 85 minutes prior to the start of the settlement interval. The AESO would then use these allocations, if necessary, in the curtailment procedures described in subsection 11 of Section 203.6.

10 Transfer Path Constraint Management

This section provides information on subsection 11 of Section 203.6.

At any time at or after 15 minutes prior to the settlement interval the AESO determines whether any of the current available transfer capability or system operating limits are exceeded and if so, curtails the effective e-tags to the available transfer capability limits of the individual transfer paths. If the constraint still exists, the AESO curtails the effective e-tags on both the Alberta-British Columbia transfer path and the Alberta-Montana transfer path to the combined British Columbia/Montana capability limit. If the constraint still continues to exist, the AESO curtails e-tags to the combined British Columbia/Montana/Saskatchewan capability limit.

11 Unscheduled Flow Reduction and IRO-006-WECC-AB-2

This section provides additional information on IRO-006-WECC-AB-2 which details the AESO's standards for managing unscheduled flows across a transfer path, further describing the impact to pool participants of the AESO acting to reduce or prevent additional unscheduled flow across a transfer path.

When a reduction to an interchange transaction is required to reduce unscheduled flow on a constrained qualified path, the sink control area can reduce the contributing interchange transaction or any other interchange transaction, provided the reduction achieves the equivalent effect on reducing unscheduled flow on the affected transfer path.

The AESO denies new e-tags submitted after an unscheduled flow event is declared with a transfer distribution factor on the qualified path in the qualified direction of 5% or more.

The AESO denies adjustments or extensions to (non-expired) or replacements of (expired) e-tags submitted after an unscheduled flow event is at step 4 (first level curtailment) or higher and with a transfer distribution factor on the qualified path in the qualified direction of 5% or more.

12 Intertie Restatements

Pursuant to subsection 6(4) of Section 203.6, where a pool participant's transmission service is curtailed by a transmission provider, the pool participant is required to submit an energy restatement or an ancillary services restatement. The AESO recognizes that interchange transactions may be impacted by scheduling practices of different jurisdictions, and recommends the following courses of action to pool participants:

- (a) For one or more curtailments that are issued prior to or at the settlement interval and that take effect at the start of the settlement interval, restate the associated offer or bid to the curtailed volume as soon as reasonably practicable after the curtailment is issued.
- (b) For one or more curtailments that take effect after the start of the settlement interval, make best efforts to restate the associated offer or bid to the curtailed volume at the time the curtailment becomes effective.
- (c) At the time a curtailment is no longer in effect, make best efforts to restate the associated offer or bid to any e-tag volume, in MW, taking into account any curtailment) that remains in effect for the associated offer or bid.

If the AESO expects the offer or bid at the close of the settlement interval to match any associated e-tags at the close of the settlement interval.

While the AESO recognizes that the energy restatement is of limited use to the AESO system controller as dispatches for the interties are issued based on e-tags, the energy restatement is required for other AESO downstream systems and processes including the energy market merit order, ancillary service merit order, market reporting and compliance tools and processes. The AESO may consider whether there is an option to automate energy restatements at a future time.

13 Internal Most Severe Single Contingency reduction during a 1201L outage

When 1201L is out of service, and to reduce the risk of underfrequency load shed, the most severe single contingency for generators and transmission elements within the interconnected electric system is reduced from 466 MW to 425 MW based on current engineering studies.

The AESO may reduce the most severe single contingency:

- (a) 24 hours after an unplanned 1201L outage; or
- (b) a planned 1201L “Continuous” outage that lasts longer than 24 hours in accordance with the *Alberta Electric System Operator System Co-ordination Plan Approved Outages* list.

Revision History

Posting Date	Description of Changes
2021-08-06	Added Section 13 for internal most severe single contingency reduction during a 1201L outage. Updated throughout to align document to current AESO drafting principles.
2021-03-04	Limit change to Table 7a: Minimum Amount of Load Shed Service for Import Load Requirement based on Ops Engineering study results.
2020-11-09	Limit change to Table 1b from 700-780MW based on Ops Engineering study results
2020-08-12	Updated to reflect changes to import ATC due to inclement weather and real-time system inertia.
2020-06-23	Updated Table 7 with newly implemented LSSi values Added various table note(s) pertaining to 1201L outage Administrative amendments
2018-07-20	Updated Table 7 with newly implemented LSSi values Updated Table 5(a) and the associated “Notes” section
2018-06-01	Addition of Table 7b which included the new LSSi values as of 10:00 am July 3, 2018
2017-06-15	Updated section 12
2017-06-01	Updated Tables 1(a), 1(b), 2(a), 2b, 5(a), 5(b), 6(a), 6(b), 8(a), 8(b) for Path 1 out-of-service TTC; Updated section 2 and section 12; and

Information Document

Available Transfer Capability and Transfer Path Management

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Posting Date	Description of Changes
	Administrative amendments.
2017-02-28	Updated section 12; and Administrative revisions.
2016-11-30	Updated Tables 1(a), 1(b), 2(a), 2b; Addition of Table 5(a); Table renumbering; and Administrative revisions.
2016-08-23	Addition of section 12, Intertie Restatements.
2015-10-29	Updated Tables 1(b), 3, 9(b) and 12; revised definition of transmission reliability margin in section 5; updated section 5.1 to reflect the AESO's operating procedure in the event of a change to the operating limit within 15 minutes prior to the start of a settlement interval; revised section 5.3 to reflect that the transmission reliability margin will be increased to reflect available load shed service for import volumes; administrative changes to improve consistency and alignment.
2015-08-20	Updated Table 4.
2015-06-04	Updated Tables 1(a), 2, 9(a) and 11.
2014-12-11	Updated Tables 1(a), 9(a) and 10.
2014-11-01	Updated Tables 3, 8, 10 and 12.
2014-05-01	Updated Table 1 and Table 9.
2014-02-27	Updated Table 4.
2014-01-30	Updated Table 1, Table 4, Table 9 and Table 10; administrative changes to improve consistency and alignment.
2013-11-12	Administrative Updates.
2013-08-13	Initial release.
2013-03-14	Second draft release.
2011-10-01	Initial draft release.