

304 ALBERTA-BC INTERCONNECTION TRANSFER LIMITS

1. Purpose

To define the policies and procedures for establishing the transfer limits on the Alberta-BC interconnection while ensuring system reliability on the AIES.

2. Background

The north-south transfer limits, named the South of Keephills/Ellerslie/Genesee (KEG) or SOK-240 operating limits, are defined in [OPP 521](#). The SOK-240 operating limits, together with SOK generation and SOK load, will determine the total Alberta export capability. The sum of net exports on the Alberta-BC interconnection and the Alberta-Saskatchewan interconnection must not exceed the total Alberta export capability.

3. Policy

3.1 Transfer limits - general

- The Alberta to BC (export) total transfer capability (TTC) and BC to Alberta (import) TTC, are defined as the maximum transfer levels that meet all of the specified pre-contingency and post-contingency criteria. The TTC levels are determined by system studies under various Alberta internal load (AIL) and contingency conditions.
- TTC is a Path 1 system operating limit (SOL). If the actual transfer exceeds the TTC, actions must be taken to reduce the actual transfer to below the TTC value within 20 minutes.
- The Alberta-BC import and export available transfer capability (ATC), both calculated as the TTC minus the transmission reliability margin (TRM), are the transfer volumes that are available for commercial activity. TRM is usually 65 MW except under certain system conditions as described in [Table 1](#).
- Events that occur on the AIES that require the limits to be adjusted, beyond those identified in this OPP, will be addressed in the ISO's System Coordination Plan or by the SC in real time.
- The transfer limits on the Alberta-BC interconnection are determined as the lesser of:
 - Transfer limits as determined by the ISO based on Alberta's system conditions and constraints (as posted on the AESO web site).
 - Transfer limits as determined by BCTC (BC Transmission Corporation) based on BC's system conditions and constraints.
- The AESO, as path operator, will perform the "lesser of" determination and send the transfer limits to BCTC and the Vancouver Reliability Coordinator (VRC). BCTC will post the "lesser of" transfer limits on its Open Access Same Time Information System (OASIS).

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3.2 Import TTC

- The Alberta-BC import TTC, corresponding to various AIL ranges under system normal conditions, are listed in [Table 2](#).
- The Alberta-BC import TTC, corresponding to various transmission element/generating unit status, are listed in [Table 3](#). This table will supersede [Table 2](#) when any of the conditions in [Table 3](#) exist.
- The Alberta-BC import TTC may be constrained if the available load under the ILRAS and the LSS are insufficient. Refer to [OPP 312](#) for details.

3.3 Export TTC

- The Alberta-BC export TTC depends on the SOK-240 operating limits (refer to [OPP 521](#)), and is calculated as:

$$[\text{SOK-240 ATC} \textit{ minus Forecast SOK load plus Forecast SOK generation}] \textit{ multiplied by}$$
Export Conversion Factor
where:
 - SOK-240 ATC is defined in [OPP 521](#), and
 - Forecast SOK load is the sum of the forecast loads downstream of the SOK cut plane as defined in [OPP 521](#), and
 - Forecast SOK generation is the estimated in-merit generation downstream of the SOK cut plane as defined in [OPP 521](#), and
 - Export Conversion Factor is 0.95. It has been determined and confirmed by studies as a factor to convert SOK capability to export capability and to account for the associated increase in losses.
- For any given system condition, the export TTC can not exceed the maximum export TTC as specified in [Table 4](#).
- For multiple outages to more than one transmission facility ([Table 4](#)), or for accumulated capacitor bank unavailability in the Calgary area greater than 395 MVAR, the maximum export TTC limits must be determined by studies based on the particular system conditions at the time of the multiple outages or unavailability. If such studies are not available, the export TTC will be reduced to 65 MW.
- If the total submitted e-tags for the Alberta-BC interconnection and the Alberta-Saskatchewan interconnection exceeds the total Alberta export capability as determined by the SOK-240 operating limits, then the exports on both interconnections must be managed in real-time. The SC must monitor the actual SOK-240 flow. The export on both interconnections may be curtailed on a pro-rata basis based on the actual schedule.

4. Responsibilities

4.1 ISO

The ISO must:

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- Review the Alberta-BC interconnection transfer limits as required, ensuring the reliable operation of the system. The review will be carried out in coordination with the TFOs and BCTC.
- Submit the “OTC Certification Form (Form A.6)” to the WECC office within 30 days following the start of the operating season.
- Post the ATC for the Alberta-BC interconnection on the AESO website at www.aeso.ca.

System Controller

The SC must:

- Determine the TTC, ATC and TRM on the Alberta-BC interconnection based on AIES conditions in real-time and:
 - Adjust the ATC posted on the AESO’s website, if required, in real-time.
 - Inform the BCTC transmission operator of any adjustment to the export or import ATC on the Alberta-BC interconnection based on AIES conditions in real-time.
- Report unusual operating conditions or difficulties in adhering to the transfer limits for review to the manager, System Coordination Centre.

4.2 BC Transmission Corporation (BCTC)

The BCTC operator must:

- Carry out engineering studies to establish TTC and ATC for the Alberta-BC interconnection.
- Inform the SC of their transfer limits based on BC’s system conditions and constraints.
- Post the transfer limit for the Alberta-BC interconnection on the BCTC OASIS as instructed by the SC.

4.3 Transmission Facility Operator

Each TFO operator must:

- Inform the SC of the status of the transmission elements listed in [Table 4](#).

5. System Controller Procedures

5.1 Determine export transfer limit

Prior to T-70 minutes before each scheduling hour, and also on an as required basis when operating conditions change, the SC must:

1. Determine the SOK-240 ATC as described in [OPP 521](#).
2. Determine the forecast SOK load and forecast SOK generation including wind generation for the next scheduling hour.
3. Calculate the export TTC using the following:
$$\text{Export TTC} = [\text{SOK-240 ATC} \textit{ minus forecast SOK load} \textit{ plus forecast SOK generation including wind generation}] \textit{ multiplied by } 0.95.$$
4. Determine the maximum export TTC based on the status of the transmission elements listed in [Table 4](#). If the transmission element status changes during the hour, use the status

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that poses greater constraint on the TTC (i.e., assume that it is out of service for the entire hour).

5. Determine the AESO's export TRM using [Table 1](#).
6. Obtain from BCTC their import TTC and TRM limit based on BC's system conditions and constraints.
7. Determine the export TTC to be "the lesser" of the results from steps 3, 4 and 6.
8. Determine the export TRM to be "the greater" of the results from steps 5 and 6.
9. Calculate the export ATC by subtracting export TRM from export TTC.

5.2 Determine import transfer limit

The SC must:

1. Forecast the minimum AIL for each hour.
2. Establish the hourly import TTC as the lowest of the following:
 - a. Import TTC based on transmission element/generating unit statuses for the hour, according to [Table 3](#). If the transmission element status is expected to change during the hour, use the status that poses greater constraint on the TTC limit (i.e., assume that it is out of service or on recloser block for the entire hour).
 - b. Import TTC based on system normal conditions and the forecast minimum AIL for the hour, according to [Table 2](#), if none of the transmission element/generating unit status in [Table 3](#) exists.
 - c. Import TTC based on the forecast minimum AIL and the available total ILRAS and LSS load, according to Table 1 in [OPP 312](#). The amount of ILRAS load available for arming and the amount of LSS load on-line can be obtained from the HIMP energy management system display (# 6975).
3. Determine the AESO's import TRM using [Table 1](#).
4. Obtain from BCTC their export TTC and TRM limit based on BC's system conditions and constraints.
5. Determine the import TTC to be "the lesser" of the results from steps 2 and 4.
6. Determine the import TRM to be "the greater" of the results from steps 3 and 4.
7. Calculate the import ATC by subtracting import TRM from import TTC.

5.3 Re-post the hourly BC to Alberta transfer limit

If the import or export ATC is changed from those posted on the AESO website, the SC will:

1. Revise the hourly ATC on the Alberta-BC interconnection by:
 - a. Logging onto the Interconnection Transfer Capability Posting System (ITC) and follow the instructions in the "ATC Postings Override Maintenance User Document" to enter the revised ATC.
 - b. Confirming that the ATC posting has been updated on the AESO's website.
2. Call and inform the BCTC operator of the revised limit parameters (TTC, ATC and TRM) on the Alberta-BC interconnection, considering the following guidelines:

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- For immediate transfer limit changes within the current hour, call immediately or as soon as possible.
- For transfer limit changes effective the next scheduling hour, endeavour to call by hh:05.
- For future hourly transfer limit changes, provide as much advance notice as possible.

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6. Figures and Tables

Table 1

Transmission Reliability Margin (TRM) under various system conditions

** Under other system conditions that are not listed below, the SC may change the TRM if it is so required to ensure system reliability.

System Conditions	Import TRM (MW)	Export TRM (MW)
System Normal, or 1201L OOS	65	65
1201L in service and Alberta single largest contingency (SLC) > contingency reserve obligation (CRO) to the Northwest Power Pool	The greater of: <ul style="list-style-type: none"> • 65 • SLC – CRO 	65
1201L in service and the Ford Elk area load is served by Alberta ¹ and <ul style="list-style-type: none"> • 887L/1L274 open at Natal or open between Natal and Pocaterra(T48S), or • Both 887L/1L274 and 786L/1L275 open at Natal 	65 + MW flow on 887L/1L274 at Pocaterra	65
1201L in service and the Ford Elk area load is served by Alberta ¹ and <ul style="list-style-type: none"> • Two parallel transformers at Natal OOS, or • 2L113 in the BC system is OOS 	65 + MW flow on 887L/1L274 + MW flow on 786L/1L275	65
When 1203L or 1209L OOS for various Genesee SLC level ²	TTC using Table 2/Table 3 <i>minus</i> ATC as described in Table 3 in OPP 517	65

Note:

1. For details refer to [OPP 303](#), Section 3.8.
2. For details refer to [OPP 517](#), Section 3.6.

Table 2

Import TTC during system normal condition for various Alberta internal load (AIL) levels

Alberta Internal Load (AIL) (MW)		Import TTC (MW) ¹
From	To	
0	6,599	605
6,600	6,899	630
6,900	7,199	655
7,200	7,499	680
7,500	7,799	705
7,800	8,099	730
8,100	8,399	755
8,400	And above	780

Note:

1. Limits are extrapolated from an import limits graph.

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Table 3 ¹

Import TTC corresponding to system conditions at all Alberta internal load (AIL) levels

Transmission Element / Generating Unit	Import TTC (MW)
1201L (102S Langdon-Cranbrook) out of service (OOS) (see Note 1)	65
1201L (102S Langdon-Cranbrook) recloser block	As per Table 1 in OPP 312 with ILRAS load = 0 MW
102S Langdon SVC OOS	465
BCTC 2L294 OOS ²	As per Table 1 in OPP 312 with ILRAS load = 0 MW
936L (102S Langdon-74S Janet) or 937L (102S Langdon-74S Janet) OOS	565
One of the following north-south 240 kV lines OOS 928L, 906L, 922L, 903L, 190L, 910L, 914L, 926L, 918L, 932L, 929L, 925L, 901L	565

Note:

1. If any of the transmission element/generating unit status exists, Table 3 supersedes Table 2.
2. For contingency reserve requirements refer to [OPP 402](#) Supplemental and Spinning Reserve Services.

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Table 4

Maximum Export TTC⁵ - summer season (May 1 to October 31)

All units in MW

Alberta Internal Load (AIL) ¹	System Normal	1201L OOS	SVC OOS	936L or 937L OOS	One 240 kV Backbone Line OOS ^{2,4}	Accumulated Capacitor Bank Unavailability in the Calgary Area ^{3,5,6}		
						>81 MVAR and ≤184 MVAR	>184 MVAR and ≤314 MVAR	>314 MVAR and ≤395 MVAR
8800 to 10000	65	65	65	65	65	65	65	65
8600 to 8799	280	115	65	65	280	65	65	65
8400 to 8599	560	115	65	65	560	400	65	65
8200 to 8399	670	115	65	65	670	495	200	65
8000 to 8199	700	115	65	65	700	540	320	65
7800 to 7999	720	115	465	240	720	615	440	290
7600 to 7799	800	115	465	240	800	705	520	340
7400 to 7599	800	115	465	240	800	800	685	595
7200 to 7399	800	115	465	240	800	800	775	690
0 to 7199	800	115	465	240	800	800	800	800

Note:

1. AIL means the total load within Alberta including behind-the-fence-load. AIL represents the total domestic demand of AIES connected loads in Alberta and includes industrial loads served by on-site generation, and the City of Medicine Hat's load served by the city's generators.
2. North-south 240 kV backbone lines refer to 928L, 906L, 922L, 903L, 190L, 910L, 914L, 918L, 929L, 925L, 926L, 901L and 900L; OOS - out of service.
3. Calgary area capacitor banks refer to capacitor banks at substations T42S, T74S, C21S, T5S, C31S, C38S, C14S, C41S and T17S.
4. If one of the 240 kV backbone lines is out of service and the accumulated capacitor bank unavailability falls into one of the first two columns (>81 MVAR and ≤184 MVAR or >184 MVAR and ≤314 MVAR) then the maximum export TTC limit is the value indicated in the next largest accumulated capacitor bank unavailability column. For example, if 928L is OOS and the accumulated capacitor bank unavailability is 108 MVAR and the system load is 8,300 MW, then the maximum export TTC limit is 200 MW, as indicated in the >184 MVAR and ≤314 MVAR capacitor bank unavailability column.
5. In case of multiple outages to more than one transmission facility in the table columns, or accumulated capacitor bank unavailability in the Calgary area greater than 395 MVAR, the maximum export TTC limits must be determined through studies based on the particular system conditions. If such studies are not available, the export TTC will be reduced to 65 MW.
6. When Benalto T17S capacitor (110 MVAR) is unavailable for dispatch, treat it as 54 MVAR capacitor out of service in Calgary area.

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Table 5

Maximum Export TTC⁵ - winter season (November 1 to April 30)

All units in MW

Alberta Internal Load (AIL) ¹	System Normal	1201L OOS	SVC OOS	936L or 937L OOS	One 240 kV Backbone Line OOS ^{2,4}	Accumulated Capacitor Bank Unavailability in the Calgary Area ^{3,5,6}		
						>81 MVar and ≤184 MVar	>184 MVar and ≤314 MVar	>314 MVar and ≤395 MVar
9200 to 10000	65	65	65	65	65	65	65	65
9000 to 9199	365	115	65	65	365	190	65	65
8800 to 8999	800	115	465	65	800	450	190	65
8600 to 8799	800	115	465	65	800	550	335	175
8400 to 8599	800	115	465	65	800	770	455	330
8200 to 8399	800	115	465	65	800	800	530	415
8000 to 8199	800	115	465	65	800	800	615	520
7800 to 7999	800	115	465	240	800	800	685	600
7600 to 7799	800	115	465	240	800	800	800	710
7400 to 7599	800	115	465	240	800	800	800	760
7200 to 7399	800	115	465	240	800	800	800	800
0 to 7199	800	115	465	240	800	800	800	800

Note:

1. AIL means the total load within Alberta including behind-the-fence-load. AIL represents the total domestic demand of AIES connected loads in Alberta and includes industrial loads served by on-site generation, and the City of Medicine Hat's load served by the city's generators.
2. North-south 240 kV backbone lines refer to 928L, 906L, 922L, 903L, 190L, 910L, 914L, 918L, 929L, 925L, 926L, 901L and 900L; OOS - out of service.
3. Calgary area capacitor banks refer to capacitor banks at substations T42S, T74S, C21S, T5S, C31S, C38S, C14S, C41S and T17S.
4. If one of the 240 kV backbone lines is out of service and the accumulated capacitor bank unavailability falls into one of the first two columns (>81 MVar and ≤184 MVar or >184 MVar and ≤314 MVar) then the maximum export TTC limit is the value indicated in the next largest accumulated capacitor bank unavailability column. For example, if 928L is OOS and the accumulated capacitor bank unavailability is 108 MVar and the system load is 8,300 MW, then the maximum export TTC limit is 530 MW, as indicated in the >184 MVar and ≤314 MVar capacitor bank unavailability column.

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5. In case of multiple outages to more than one transmission facility in the table columns, or accumulated capacitor bank unavailability in the Calgary area greater than 395 MVAR, the maximum export TTC limits must be determined through studies based on the particular system conditions. If such studies are not available, the export TTC will be reduced to 65 MW.
6. When Benalto T17S capacitor (110 MVAR) is unavailable for dispatch, treat it as 54 MVAR capacitor out of service in Calgary area.

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7. Revision History

Issued	Description
2010-01-22	Supersedes 2008-11-13
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2003-07-28	Power Pool POP-303 and POP-304 combined with Transmission Administrator OP-366