



Interconnections
OPP 312

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312 IMPORT LOAD REMEDIAL ACTION SCHEME (ILRAS) AND LOAD SHED SERVICE (LSS)

1. Purpose

To define the policies and procedures for the system controller (SC) in the application of the import load remedial action scheme (ILRAS) and the Load Shed Service (LSS), in order to facilitate increased import capability on the Alberta-BC interconnection for energy and reserve services.

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2. Background

The Alberta-BC interconnection is a critical transmission element to the Alberta Interconnected Electric System (AIES). It improves the reliability of the AIES as well as provides access to additional supply capacity and energy for Alberta.

The import limit for the interconnection is constrained to ensure the AIES does not experience unacceptable under-voltage or under-frequency should the interconnection trip. However, the interconnection import limit can be increased if adequate ILRAS loads are armed in combination with the LSS.

ILRAS service, if armed, provides interruptible loads that will be automatically tripped following the loss of the Alberta-BC interconnection during high import levels. LSS provides loads that will be automatically tripped when the AIES frequency drops to 59.5 Hz or below, which may occur when the interconnection trips at high import levels. However, if the interconnection has tripped and the AIES frequency does not fall to 59.5 Hz or below, and the AIES contingency reserve is insufficient to recover the loss of the BC import energy, LSS loads may be manually curtailed.

The available transfer capability (ATC) specified in [OPP 304](#) assumes that the required amount of ILRAS loads is armed and the LSS load is on-line in accordance with [Table 1](#). If there is insufficient ILRAS load or LSS load, then the import transfer levels must be adjusted to the level corresponding to the required ILRAS and LSS amount in [Table 1](#).

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3. Policy

3.1 ILRAS Loads

- ~~Fortis Alberta Inc. is obliged to provide ILRAS loads until such time as the service is no longer required, in accordance with direction given by the ISO and in accordance with the ILRAS service agreement.~~

3.2 LSS loads

- ~~All available LSS loads will be applied towards the combined ILRAS and LSS load requirements in Table 1, before determining the amount of ILRAS load required to be armed.~~
- ~~The list of LSS providers and contracted volumes is shown in Table 2.~~

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- The contact information for the LSS providers is shown in Table 3 (confidential).

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3.3 Application of ILRAS and LSS

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- ILRAS is currently only available for arming during a supply shortfall condition as per OPP 801.

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- The required amount of ILRAS loads to be armed is the greater of the following two factors:

- The minimum amount of combined ILRAS and LSS load requirement based on the Alberta-BC interconnection import schedule and Alberta internal load (AIL) as indicated in Table 1, minus the LSS load on-line
- Net Import – LSS – CRO + ER**

If external reserve services are offered over the Alberta-BC interconnection and are dispatched,

where:

Net Import is the net import of the Alberta-BC interconnection,

LSS is the total amount of LSS load on-line,

CRO is the contingency reserve obligation for NWPP reserve sharing,

ER is the amount of dispatched external reserves over the Alberta-BC interconnection.

- As noted in Table 1, when 5L92 is out of service, ILRAS will be armed according to the total of Alberta-BC import and the single largest generation contingency in the AIES.
- The ILRAS arming level is normally set at the beginning of the scheduling hour. However the ILRAS arming level will be modified if the requirement changes during the scheduling hour by an amount exceeding 15 MW.
- Upon notification from the ILRAS service provider of a change in the ILRAS loads availability, import ATC and any imports scheduled, and/or external reserve dispatched on the Alberta-BC interconnection must be reviewed and, if necessary, adjusted to the import level for the corresponding combined ILRAS loads and LSS amount in Table 1.
- If 1201L trips when ILRAS has been armed, the ILRAS operation will trip the armed ILRAS loads immediately. The AIES may experience under-frequency at a level that will trip the LSS loads.
- After an ILRAS operation, while maintaining system reliability, restoration priority is (1) the ILRAS loads, then (2) contingency reserves and then (3) LSS loads.
- Additional ILRAS loads will be armed if doing so will reduce the AIES reserve requirement (since the AIES is in a supply shortfall). For further details refer to OPP 801 and OPP 402.

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3.4 Arming and disarming ILRAS

- The SC will dispatch the arming and disarming of ILRAS.

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- The ILRAS service provider will, under special circumstances, also be able to withdraw and disarm the ILRAS as outlined further in [Section 3.5](#).

3.5. Unavailability of ILRAS and LSS

- The ILRAS service provider must advise the SC immediately of full or partial unavailability of ILRAS.
- The LSS Provider will make reasonable commercial efforts to advise the SC of LSS load unavailability, if the unavailable portion of the load is greater than 20% of the contracted volume and the unavailability period exceeds one hour.

3.6. Hunting the AIL

- If the AIL falls right on, or very close to, the boundary of ILRAS and LSS level requirements as defined in [Table 1](#), the higher level of ILRAS will be armed during the hour that the load is expected to be at the boundary.

3.7. Withdrawing or changing ILRAS levels*

- ILRAS is a key system protection in facilitating a tie import schedule above certain specified levels. The ILRAS service provider may only withdraw the service under the following conditions:
 - wind speeds in excess of 100 km/hr as measured at the Mabutte weather station
 - lightning activity near the 1201L (5L94) line
 - increased risk to equipment damage, personnel or public safety.
- Service withdrawal will require close coordination with the SC to facilitate timely adjustments to interconnection schedules or reserve services dispatch.
- The ILRAS service provider will monitor the lightning activity near the 1201L (5L94) line and endeavour to provide as much advance warning to the SC as possible before withdrawing the service. Upon receipt of notification to withdraw service by the ILRAS service provider, curtailment of the schedule with BCTC will be initiated by the SC as quickly as possible, if required. The ILRAS service provider will be advised by the SC after the schedule has been curtailed. To limit the risk of tripping ILRAS load, the SC will endeavour to complete the schedule curtailment within 15 minutes of receiving the notice from the ILRAS service provider.

*Note that ILRAS is currently not available for use except for supply shortfall conditions as detailed in OPP 801. When ILRAS load is armed in accordance with OPP 801, the conditions in Section 3.5 will apply.

3.8. Curtailing import during the scheduling hour

- If there is insufficient ILRAS load or LSS load as a result of the withdrawal of ILRAS or unavailability of LSS, the import transfer level must be adjusted to the level corresponding to the required ILRAS and LSS amount in [Table 1](#). The policy and procedures regarding curtailment of interchange transactions during the scheduling hour are contained in [OPP 303](#).

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3.9 Restoring ILRAS and LSS loads

- The ILRAS and LSS loads, if tripped by the activation of the ILRAS or under the terms of LSS respectively, must not be restored until authorized by the SC.
The ILRAS and LSS providers will be given permission by the SC to restore any load tripped. If a permanent fault remains on the 500 kV interconnection, the tripped ILRAS load will be restored by the SC as additional supply resources become available. Priority is to restore the ILRAS loads, then the reserves and the LSS loads.

3.10 Separation between ILRAS, LSS and SUPPL reserves

- The ILRAS service provider will provide a clear indication to the ISO if any SUPPL reserves are being offered at any time as load under the ILRAS service. The load that is offered under the ILRAS may not be counted as part of the operating reserve defined in OPP 402.
During the term of LSS supply, the LSS Provider will not contract for operating reserve with the same load offered as LSS.

3.11 Interface with Reserve Management during system emergencies

- OPP 801 will be followed during periods of supply shortfall. If ILRAS is available under system emergency conditions (i.e., capacity shortages or frequency conditions), ILRAS will be armed by the SC to increase the import capability and/or reduce the AIES reserve requirement.
During an AIES supply shortfall event, LSS load may be curtailed as described in OPP 801.

3.12 Real-time telemetry of ILRAS and LSS loads

- The ILRAS service provider will provide the SC with real-time telemetry of the ILRAS load available to be armed as well as the amount of load currently armed.
The LSS providers will provide the SC with real-time telemetry of the LSS load available to be curtailed.

4. Responsibilities

4.1 ISO

The ISO is responsible for:

- Communicating planned outages that affect LSS via the System Coordination Plan.
Contracting for the ILRAS loads and LSS loads.

System Controller

The SC is responsible for:

- Dispatching the arming and disarming of ILRAS loads.
Adjusting import schedules on the Alberta-BC interconnection if the ILRAS or LSS load availability changes.

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Deleted: 3.11 LSS loads
All available LSS loads will be applied towards the combined ILRAS and LSS load requirements in Table 1, before determining the amount of ILRAS load required to be armed.
The list of LSS Providers and contracted volumes is shown in Table 2.
The contact information for the LSS Providers is shown in Table 3 (confidential).
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- Re-posting import available transfer capability (ATC) on the Alberta-BC interconnection if the ILRAS or LSS load availability changes.

4.2 ILRAS Service Provider (note that the AltaLink Control Centre Operator is the real-time operations contact)

The ILRAS service provider is responsible for:

- Developing corresponding operating procedures consistent with this OPP.
- Arming and disarming ILRAS loads as dispatched by the SC.
- Notifying the SC of any changes in the ILRAS loads availability due to the planned switching of feeder loads, giving as much advance notice as possible.
- Notifying the SC if the dispatched amount of ILRAS load cannot be maintained.
- Monitoring lightning activity near the 1201L (5L94) line and providing as much advance warning to the SC as possible before withdrawing the service.
- Providing a clear indication to the ISO if any SUPL reserves are being offered at any time as load under the ILRAS service.
- Providing the SC with real-time telemetry of the ILRAS load available to be armed and the amount of load currently armed.

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4.3 LSS Provider

The LSS Provider is responsible for:

- Developing corresponding operating procedures for their facilities to comply with this OPP.
- Informing the SC of any planned changes to the availability of the LSS load at least 2 weeks ahead of the scheduled unavailability. Updates of the schedule, if any, must be directed to the SC.
- With reasonable commercial efforts, informing the SC of unplanned LSS load unavailability, if the unavailable portion of the load is greater than 20% of the contracted volume and the unavailability period exceeds one hour, and provide the cause and anticipated duration of the unavailability.
- Providing the SC with real-time telemetry of the LSS load available.

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5. System Controller Procedures

5.1 Arming ILRAS in normal system conditions

The SC will:

1. Confirm the net Alberta-BC interchange schedule with the BC Hydro real-time scheduler for the next scheduling hour as described in OPP 301.
2. Determine the amount of ILRAS load that needs to be armed by:
 - a. Estimating the minimum AIL in the next scheduling hour.

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- b. Using [Table 1](#) to determine the minimum amount of combined ILRAS and LSS load required corresponding to the net import schedule and the estimated minimum AIL for the next scheduling hour. Note that if 5L92 is out of service, then ILRAS will be armed corresponding to the total of net import schedule and the AIES single largest generation contingency.
 - c. Determining the amount of external reserve services that are offered over the Alberta-BC interconnection that will be dispatched for the next scheduling hour (i.e., in-merit according to the AS merit order).
 - d. Referring to the HIMP energy management system display (#6975) to obtain the total amount of LSS loads on-line.
 - e. Calculating the amount of ILRAS loads to be armed, which is the greater of:
 - i. The minimum amount of combined ILRAS and LSS loads required as indicated in [Table 1](#), determined in step b, minus the total amount of LSS loads on-line, as determined in step d. Assume zero if the result is a negative value.
 - ii. Net import for the next scheduling hour, minus LSS loads determined in step d, minus Alberta CRO, plus external reserves determined in step c. Assume zero if the result is a negative value.
3. If ILRAS loads are required to be armed, contact the ILRAS service provider at least 10 minutes before the start of the next scheduling hour and issue a dispatch for:
- a. The amount of ILRAS loads required to be armed.
 - b. The time the ILRAS loads are to be armed (at the start of the ramp if ramping up or at the end of the ramp if ramping down).

5.2 Adjusting the amount of armed ILRAS load during the scheduling hour

The SC will:

- 1. Monitor the following factors which may affect the required amount of ILRAS loads to be armed:
 - a. The import schedule, which may be required to change as result of a change to the BC-to-Alberta Import ATC (see [OPP 304](#)) or a directive for external reserve from BC.
 - b. The AIL.
 - c. The amount of LSS loads on-line, by referring to the HIMP energy management display (#6975).
 - d. The dispatch volume of external reserves over the Alberta-BC interconnection.
- 2. If the required amount of ILRAS load has changed by more than 15 MW, contact the ILRAS service provider to dispatch the arming of ILRAS load to the new required amount.

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5.3 Adjusting import schedule and external reserve dispatch on the Alberta-BC interconnection due to changes in ILRAS or LSS load availability

Upon receiving notification from the service provider of full or partial unavailability of ILRAS or LSS load, or withdrawal of ILRAS service, the SC will:

1. Note the reasons for the change in availability. For withdrawal of ILRAS service, the reasons may be one or more of the following:
 - a. Wind speeds in excess of 100 km/hr as measured at the Mabutte weather station.
 - b. Lightning activity in the vicinity of 1201L/5L94 line.
 - c. Increased risk to equipment damage, personnel or public safety.
2. Using [Table 1](#), determine the new import limit on the Alberta-BC interconnection based on the revised availability level of ILRAS and/or LSS load.
3. If the current import schedule is higher than the new import limit:
 - a. Within 15 minutes, curtail the import schedule to the new import limit.
 - b. After ramp down is complete, contact the ILRAS service provider, if required, to dispatch the amount of ILRAS load to be disarmed.
4. If the future hourly import ATC on the Alberta-BC interconnection is revised, then re-post the hourly import ATC as per procedures in [OPP 304](#).
5. If the change in ILRAS load availability affects the amount of external reserves that can be used, adjust the AS dispatches as required.

5.4 Restoration after a 1201L trip and an ILRAS operation

After the system frequency has recovered to 60 Hz, the SC will:

1. Set the Alberta-BC interchange schedule to zero MW.
2. Coordinate with the BCTC operator and the AltaLink transmission operator to restore 1201L.
3. If 1201L is restored successfully, perform the following in coordination with reserve management:
 - a. Give permission to the ILRAS service provider to restore ILRAS loads that were tripped.
 - b. Give permission to the LSS Provider(s) to restore the LSS loads that were tripped.
 - c. Resume the import schedule on the Alberta-BC interconnection at a time mutually agreed with BCTC.
 - d. Dispatch the required amount of ILRAS load to be armed for the time when the import schedule resumes.
 - e. Resume the normal external reserve dispatch, starting the next scheduling hour.
4. If 1201L is not restored successfully, dispatch on the Energy Market Merit Order to increase energy supply in order to restore load and reserves in the following priority:
 - a. ILRAS loads that were tripped.
 - b. Contingency reserves.

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c. LSS loads that were tripped.

5.5 Arming ILRAS during AIES supply shortfall conditions

When the AIES is experiencing or expects an imminent supply shortfall and 1201L is in service, the SC will arm ILRAS in accordance with the procedures in [OPP 801](#).

6. Figures and Tables

Table 1

Minimum amount of combined ILRAS and LSS load requirement based on import schedule and AIL

Import Level (MW) (note 3)	Minimum amount of combined ILRAS and LSS load required (MW) (note 1)								
	AIL (MW) (note 2)								
	<6300	6300 to 6599	6600 to 6899	6900 to 7199	7200 to 7499	7500 to 7799	7800 to 8099	8100 to 8399	≥8400
<300	0	0	0	0	0	0	0	0	0
300 to 325	0	0	0	0	0	0	0	0	0
326 to 350	0	0	0	0	0	0	0	0	0
351 to 375	35	0	0	0	0	0	0	0	0
376 to 400	70	40	0	0	0	0	0	0	0
401 to 425	105	80	40	0	0	0	0	0	0
426 to 450	140	120	80	45	0	0	0	0	0
451 to 475	175	160	120	90	45	0	0	0	0
476 to 500	210	200	160	135	90	45	0	0	0
501 to 525	245	240	200	180	135	90	50	0	0
526 to 550	280	280	240	225	180	135	100	50	0
551 to 575	*	320	280	270	225	180	150	100	55
576 to 600	*	*	320	315	270	225	200	150	110
601 to 625	*	*	*	360	315	270	250	200	165
626 to 650	*	*	*	*	360	315	300	250	220
651 to 675	*	*	*	*	*	360	350	300	275
676 to 700	*	*	*	*	*	*	380	350	330

Note:

1. ILRAS is armed only after the available LSS is fully used. For example, if 130 MW LSS is on line and available, only 120 MW ILRAS needs be armed for an import of 626 to 650 MW when the AIL is between 8100 and 8,399 MW. If only 100 MW of LSS is on line and available, then 150 MW of ILRAS will have to be armed.
2. If the AIL falls on or very close to a boundary of the above ranges, use the lower AIL range to determine the combined amount of ILRAS to be armed and LSS on line, i.e., arm the higher amount of ILRAS.
3. When 5L92 is out of service, use the total of BC-Alberta import and AIES's single largest generation contingency as import level in applying Table 1.

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Table 2

Load Shed Service (LSS) Providers

Service Provider	Facility Location	Contracted Level (MW)
Canexus Chemicals Canada L.P. ¹	Bruderheim	20
Alberta Newsprint Company ²	Whitecourt	50

Note:

- The calculation for the Canexus LSS load is:
 $LSS = L1 \text{ minus } 1.2 \text{ MW}$, where L1 is 846L outflow at Bruderheim substation (T127S), to a maximum of 20 MW.
 (Note that there is approximately 1.2 MW of plant load that is not on LSS)
- The calculation for the ANC LSS load is:
 $LSS = (122S \text{ T1-L MW}) + (122S \text{ T3-L MW})$, to a maximum of 50 MW.

Table 3

Operational Contact Information for Load Shed Service (LSS) Providers

[Click to view confidential table.](#)

7. Revision History

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2008-12-01	Approved for interim implementation effective 2008-12-01; supersedes 2008-05-01
2008-05-01	Supersedes 2008-01-01
2008-01-01	Approved for interim implementation, supersedes 2007-03-15
2007-03-15	Supersedes interim OPP effective 2006-11-01
2006-11-01	Approved for interim implementation, supersedes 2006-04-27
2006-04-27	Supersedes interim OPP effective 2005-12-01
2005-12-01	Approved for interim implementation
2004-03-03	Supersedes 2003-07-28
2003-07-28	Revised to ISO Operating Policies and Procedures

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