

CURTAILMENT OF TRANSMISSION AND ENERGY

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1.0 OVERVIEW

Curtailement of transmission service occurs when an emergency or other unforeseen condition and/or commercial activity threatens to impair or degrade the reliability of the transmission system. Curtailements will be made on a non-discriminatory basis to relieve the constraint.

An Economic Interruption of transmission service occurs, up until the end of Real Time scheduling (see Section 10 of BC Hydro's OATT Business Practice on *Submitting Energy Schedules*), when:

1. a valid, higher class transmission reservation interrupts a lower-class transmission reservation; or
2. a Non-Firm transmission reservation is purchased from unused capacity of Firm transmission and the Firm transmission owner schedules on their rights.

BC Hydro reserves the right to interrupt, in whole or in part. Example: Firm Point-to-Point (PTP) transmission service can interrupt Network Economy service, Non-Firm service and Secondary service. BC Hydro does not charge for the transmission reservation if an economic interruption occurs.

These Business Practices provide clarification of the rules, standards and practices used by BC Hydro to implement its OATT. While the terms of BC Hydro's OATT and these Business Practices govern, customers should also refer to the NAESB WEQ Business Standards and WECC Regional Criteria which BC Hydro has followed in most, but not all, respects. BC Hydro also complies with the Mandatory Reliability Standards adopted by the BCUC.

2.0 SCHEDULING LIMIT (SL)

The SL of a path is the primary determinant on whether or not curtailement to transmission is required.

$$SL = TTC - TRM_u$$

TTC is the Total Transfer Capability and TRM_u is the Transmission Reliability Margin. Refer to BC Hydro's OATT Business Practice on *TTC/ATC* for further information. Counterflow is energy scheduled and flowing on the opposite path.

An infringement upon SL can occur when the amount of energy scheduled is greater than the SL for a path and cannot be accommodated while including counterflow energy.

$$\text{Total energy scheduled} > \text{SL} + \text{counterflow} = \text{infringement upon SL}$$

3.0 CURTAILMENT PRIORITY - TRANSMISSION

At xx:40 if there is an infringement upon SL for the next scheduling hour or if there is a condition that degrades the reliability of the transmission system and causes an infringement upon SL, BC Hydro will proceed with alleviating the infringement by issuing a Reliability Limit to the appropriate transmission reservations. This may also lead to the curtailment of energy schedules.

NERC eTag 1.8 Functional Specifications defines Reliability Limit as the maximum allowable level at which a transaction may run when that transaction has been identified by a Reliability Coordinator or other reliability entity as being limited by some constraint. This limit is typically used to indicate curtailments.

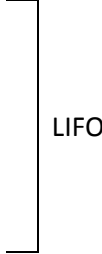
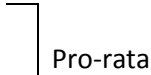
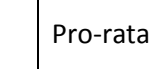
BC Hydro will assign each transmission reservation a NERC curtailment priority code (0 – 7), which will determine the transmission reservation order of Reliability Limits. If two transmission reservations are of the same NERC priority, the Reliability Limit will be based upon Last In-First Out (LIFO) methodology.

Reliability Limits will be assigned after all unscheduled Network Economy Service (Type 1 and Type 2 priority) has been recalled. The Reliability Limits will be assigned to transmission reservation in priority order. Therefore, all Non-Firm transmission service and Network Economy Service (Type 2 Priority) will be assigned Reliability Limits first. Reliability Limits will be assigned until the infringement upon SL is resolved.

Within each priority group, the Reliability Limit will be assigned according to LIFO or Pro-rata as applicable – refer to Section 3.1 below. Any remaining Network Economy Service (Type 1 priority) will be curtailed Pro-rata with Conditional Firm Service during the conditional period. If the infringement upon SL is not alleviated after all Non-Firm service and Network Economy Service (Type 1) have been curtailed, then Firm transmission service and Conditional Firm Service during the non conditional period will be curtailed Pro-rata.

If a Reliability Limit is assigned to a transmission reservation, the Transmission Customer can select the Impacted MW on the CONFIRMED TSR to review the details.

3.1 NERC Curtailment Priority Codes

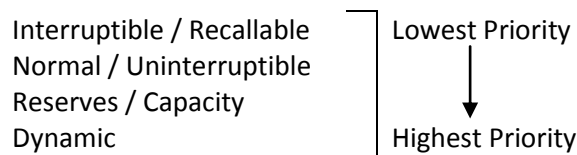
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|--|---|
| <ul style="list-style-type: none"> ▪ ONX – Next Hour Market ▪ 1NS – Non-Firm Secondary ▪ 2NH – Non-Firm Hourly ▪ 6NN – Network (Type 2) ▪ 3ND – Non-Firm Daily ▪ 4NW – Non-Firm Weekly ▪ 5NM – Non-Firm Monthly |  |
| <ul style="list-style-type: none"> ▪ 6NN – Network (Type 1) ▪ 7F – Conditional Firm Service (Conditional Period) |  |
| <ul style="list-style-type: none"> ▪ 7F – Firm including Conditional Firm Service (Non conditional period) |  |

4.0 CURTAILMENT PRIORITY - ENERGY

eTags with the Reliability Limit issued on transmission will be curtailed LIFO and Pro-rata according to the Product code and cut priority set by the PSE (Purchasing-Selling Entity) on each eTag. For eTags with no assigned PSE cut priority order or for eTags of like assigned PSE priority order, BC Hydro will curtail by LIFO.

Refer to BC Hydro’s OATT Business Practice on *Submitting Energy Schedules* for Energy Product Codes and PSE assigned Cut_Priority order for eTags.

BC Hydro will prioritize eTags as follows when curtailment is required:



For example:

- TSR 1 is 100 MW with the following eTags scheduled against the TSR:
- eTag 1 (G-NF) is for 25 MW
- eTag 2 (G-F) is for 25 MW; “Cut_Priority” = 1
- eTag 3 (G-F) is for 25 MW; “Cut_Priority” = 2
- eTag 4 (G-F) is Dynamic

At xx:40, a Reliability Limit is set to TSR 1 for 55 MW and curtailment of energy schedules is required. BC Hydro will curtail the eTags as follows (based on the priorities discussed above):

- eTag 1 is curtailed for 25 MW
- eTag 3 is curtailed for 20 MW

If energy curtailment(s) results in an infringement upon SL on the Counterflow path, BC Hydro will assign a Reliability Limit to the appropriate transmission on the Counterflow path. BC Hydro will assign the Reliability Limit in accordance with the transmission curtailment priority defined in Section 3 above.

If BC Hydro, as the Load Control Area or Generating Control Area curtails energy, it will send out a Reliability Adjustment (Curtailment) eTag pursuant to industry rules.

5.0 CURTAILMENT PROCESS

At xx:40, BC Hydro will recall all unscheduled Network Economy Service (Type 1 and 2 priority). BC Hydro will then determine if an infringement upon SL exists for each path for the next scheduling hour.

If there is no infringement upon SL, then a Reliability Limit is not required for transmission reservations.

If there is an infringement upon SL, the following will occur:

1. BC Hydro will assign Reliability Limits on transmission reservations according to the priority defined in Section 3 above. If a Reliability Limit is assigned to Firm transmission that implies the Reliability Limit for all Non-Firm transmission is zero.
2. Within each transmission priority group, Reliability Limits will be assigned to transmission reservations according to LIFO or Pro-rata as applicable – refer to Section 3.1 above.
3. Reliability Limits will be assigned until the infringement upon SL is resolved (total capacity of transmission reservations is equal to or less than SL).
4. If total energy schedule exceeds the SL, BC Hydro will curtail eTags to the Reliability Limits assigned to the transmission reservation(s). Curtailment of eTags will be performed according to the Product Code and PSE defined Cut_Priority (noted in Section 4 above) within each transmission reservation.
5. If the total of the curtailed energy is below the SL, BC Hydro will reallocate, on a pro-rata basis, the unscheduled capacity of transmission reservation(s) to energy schedules that were to be curtailed. Therefore allowing total energy schedules to equal the SL limit and in some instances, eTags to be above the Reliability Limit of the transmission.

Example:

- $SL = TTC - TRM_u = 100 \text{ MW}$
- Energy schedules = 280 MW and Counterflow = 0 MW
- Transmission reservations total 500 MW for this path
- Reliability Limits are assigned to transmission reservations so that the total capacity of the transmission reservations equals the SL.

TSR Priority (per Section 3 above)	Original Capacity	Curtailment
	Transmission (MW)	Transmission Reliability Limit (MW)
TSR 8 – Non-Firm	25	0
TSR 4 – Network Type 2	50	0
TSR 1 – Non-Firm	50	0
TSR 2 – Firm	50	13
TSR 3 – Firm	150	40
TSR 5 – Firm	25	7
TSR 6 – Firm	100	27
TSR 7 - Firm	50	13
TOTAL	500	100

- Energy Schedules total 280 MW and therefore exceeds SL. (If total energy schedules had been equal to or below 100 MW, no eTags would need to be curtailed).
- eTags with Reliability Limits assigned to transmission will be curtailed to the Reliability Limit.
- However, the new energy schedules total is 93 MW, which is below the SL of 100 MW.
- TSR 6 has unscheduled capacity (7 MW). The 7 MW is reallocated on a pro-rata basis to the eTags that were curtailed. This results in the final curtailment to the eTags.

TSR Priority (per Section 3 above)	Transmission Reliability Limit (MW)	Original Energy (MW) in Curtailment Priority	Projected Energy Curtailed To Reliability Limit (MW)	Final Energy Curtailed To SL (MW)
TSR 8 – Non-Firm	0	eTag 1 = 25	0	0
TSR 4 – Network Type 2	0	eTag 2 = 50	0	0
TSR 1 – Non-Firm	0	eTag 4 = 20 eTag 3 = 25	0	0
TSR 2 – Firm	13	eTag 11 = 20 eTag 5 = 20	eTag 11 = 0 eTag 5 = 13	eTag 11 = 0 eTag 5 = 14
TSR 3 – Firm	40	eTag 6 = 50	eTag 6 = 40	eTag 6 = 44
TSR 5 – Firm	7	eTag 7 = 10 eTag 8 = 10 (same priority)	eTag 7 = 0 eTag 8 = 7	eTag 7 = 0 eTag 8 = 8
TSR 6 – Firm	27	eTag 9 = 20	eTag 9 = 20	eTag 9 = 20
TSR 7 - Firm	13	eTag 10 = 35	eTag 10 = 13	eTag 10 = 14
TOTAL	100	280	93	100

5.1 Current Hour Curtailments

Following an energy curtailment, BC Hydro will confirm the new Net Scheduled Interchange with the adjacent Balancing Authorities.

If an energy schedule is curtailed across the hour (current hour to next hour) and/or days the integrated energy value will be calculated for both hours.

Example: A 100 MW schedule for HE 24 and HE 01 the next day is curtailed effective time 23:59 with ramp duration of 20 minutes. The integrated energy values will be calculated for both HE 24 and HE 01.

Customer notification of all energy curtailments will be made available electronically using eTag information.

6.0 CURTAILMENT OF LOSSES

If BC Hydro curtails a Transmission Customer's Losses eTag, the Transmission Customer will not be assessed with a "strike" pursuant to Section 15.7 of BC Hydro's OATT. BC Hydro will financially settle with the Transmission Customer for the Losses for that scheduling hour. Refer to BC Hydro's OATT Business Practice on *Ancillary Services* for information on Real Power Losses.

7.0 RELOADS

7.1 Reloads by BC Hydro

BC Hydro will reload eTags where an eTag has been curtailed in error by BC Hydro. If the approved reload causes an infringement upon SL, BC Hydro will issue Reliability Limits to transmission reservations and curtail energy according to this Business Practice to relieve the SL.

In the case where eTags have been curtailed in the scheduling hour due to a real time reduction of TTC, BC Hydro will reload the curtailed eTags should an increase in TTC be made available. Etags will not be reloaded, where reloads would cause an SL infringement.

7.2 Reloads by Other Balancing Authorities

In the scheduling hour, BC Hydro will approve all eTags reloaded by other Balancing Authorities unless the transmission allocated to the eTag is fully utilized or the reload causes an infringement upon SL.

Document Change History

Issue	Reason for Issue	Date
2	Corrected typo.	August 8, 2012
1	Updated procedures to implement new curtailment methodology. Previously Business Practice 12.	November 1, 2010

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