Information Document
Keephills Ellerslie Genesee Area Transmission Constraint Management
ID #2013-004R

Information documents are not authoritative. Information documents are for information purposes only and are intended to provide guidance. In the event of any discrepancy between an information document and any authoritative document[1] in effect, the authoritative document governs.

1 Purpose

This information document relates to the following authoritative document:

- Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management* ("Section 302.1").

The purpose of this information document is to provide additional information regarding the unique operating characteristics and resulting constraint conditions and limits on the Keephills Ellerslie Genesee Cutplane[2] of the Alberta interconnected electric system.

Section 302.1 sets out the general transmission constraint management protocol steps the AESO uses to manage transmission constraints in real time on the Alberta interconnected electric system. These steps are referenced in Table 1 of this information document as they are applied to the Keephills Ellerslie Genesee area.

2 General

The Keephills Ellerslie Genesee Thermal Cutplane measures the flows across the Keephills 240/138 kV transformer and the transmission lines connecting the Keephills and Genesee substations to the Alberta interconnected electric system.

The AESO has established the Keephills Ellerslie Genesee Thermal Cutplane operating limits. The map attached as Appendix 3 of this information document illustrates this cutplane. To ensure the safe and reliable operation of the Alberta interconnected electric system, the AESO has developed policies and procedures to manage the Keephills Ellerslie Genesee Thermal Cutplane transmission constraints.

Appendix 1 lists the effective generation units for managing transmission constraints in the Keephills Ellerslie Genesee area. Appendix 2 provides a detailed geographical map of the Keephills Ellerslie Genesee area indicating bulk transmission lines and substations. Appendix 3 provides a schematic of the Keephills Ellerslie Genesee Thermal Cutplane, including the pool assets effective in managing a transmission constraint.

[1] "Authoritative document" 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.

[2] A cutplane is a common term used in engineering studies and is a theoretical boundary or plane crossing two or more bulk transmission lines or electrical paths. The cumulative power flow across the cutplane is measured and can be utilized to determine flow limits that approximate conditions that would allow safe, reliable operation of the Alberta interconnected electric system.

3. Constraint Conditions and Limits

3.1 Non-Studied Constraints and Limits

For system conditions that have not been pre-studied, the AESO uses energy management system tools and dynamic stability tools to assess unstudied system operating limits in real time.

3.2 Studied Constraints and Limits

Constraints Under System Normal Conditions or When One Element is Out of Service

The Keephills Ellerslie Genesee Thermal Cutplane limits that exist in the summer and winter seasons, during system normal conditions and under certain transmission facility statuses, are provided in Appendix 4.

Based on studies which considered power flow, voltage, and transient stability, the system is capable of reliably transferring all anticipated flow across the Keephills Ellerslie Genesee Cutplane under system normal conditions.

In the event of a 1203L or 1209L outage, engineering studies have identified that Keephills Ellerslie Genesee area transient stability concerns can be present depending on the Genesee plant MW production, Fort McMurray exports and the status and MW flow on WATL.

Constraints With Bus Reconfiguration

For system conditions under forced or planned outages, the studies identified that outages of 1209L or 1203L transmission lines would have the greatest impact on the Keephills Ellerslie Genesee System operating limit.

The following bus reconfiguration procedures may be used in the event of an outage to any of these lines:

- In the event of a 1202L outage, the system will be reconfigured to trip Genesee 3 for a unplanned 1209L outage.
- In the event of a 1209L outage, the system will be reconfigured to trip Keephills 3 for an unplanned 1202L outage.
- In the event of a 1238L and 1239L outage, the Genesee generation pool assets are connected to the Alberta interconnected electric system by a single radial feed. The combined MW output of the Genesee generation pool assets, consisting of the net-to-grid energy and dispatches issued for operating reserve for GN1, GN2, GNR1, GNR2 and GN3, becomes the Alberta interconnected electric system's most severe single contingency.

4 Application of Transmission Constraint Management Procedures

The AESO manages transmission constraints in all areas of Alberta in accordance with the provisions of Section 302.1. However, not all of those provisions are effective for the Keephills Ellerslie Genesee Cutplane due to certain operating conditions that exist in the area. This information document describes the application of the general provisions of Section 302.1 to the Keephills Ellerslie Genesee Cutplane, and the additional clarifying steps required to effectively manage transmission constraints in that area.

The protocol steps which are effective in managing transmission constraints are outlined in Table 1 below.

Table 1 – Transmission Constraint Management
Sequential Procedures for Keephills Ellerslie Genesee Cutplane

Section 302.1, subsection 2(1) protocol steps		Is the procedure applicable to the Keephills Ellerslie Genesee cutplane?
(a)	Determine effective pool assets	Yes
(b)	Ensure maximum capability not exceeded	Yes
(c)	Curtail effective downstream constraint side export service and upstream constraint side import service	No
(d)	Curtail effective demand opportunity service on the downstream constraint side	No
(e)(i)	Issue a dispatch for effective contracted transmission must-run	No
(e)(ii)	Issue a directive for effective non-contracted transmission must-run	No
(f)	Curtail effective pool assets in reverse energy market merit order followed by pro-rata curtailment	Yes
(g)	Curtail effective loads with bids in reverse energy market merit order followed by pro-rata load curtailment	No

Applicable Protocol Steps

The first step in managing a transmission constraint is to identify those pool assets, both generating units and loads, effective in mitigating the transmission constraint. A list of the generating pool assets that are effective in managing constraints are identified in Appendix 1.

Step (a) in Table 1

The effective pool assets are as shown in Appendix 1.

Step (b) in Table 1

Curtailing effective generation pool assets to their maximum capability as per step (b) is an effective step in managing Keephills Ellerslie Genesee area transmission constraints.

Step (c) in Table 1

There are no interties in the Keephills Ellerslie Genesee area and curtailing import and export flows elsewhere on the system is not effective in managing a transmission constraint.

Step (d) in Table 1

Curtailing effective demand opportunity service on the downstream constraint side is not effective in managing Keephills Ellerslie Genesee area constraints because there is no demand opportunity service in the area.

Step (e) in Table 1

With respect to steps (e)(i) and (ii), there are no transmission must-run contracts in the Keephills Ellerslie Genesee area and using transmission must-run is not effective in managing a transmission constraint in this area.

Step (f) in Table 1

Curtailing effective pool assets using reverse energy market merit order followed by pro-rata curtailment is effective in managing Keephills Ellerslie Genesee area transmission constraints.

Step (g) in Table 1

Downstream load curtailment is not effective in managing Keephills Ellerslie Genesee area transmission constraints, as curtailing downstream load does not directly lessen the flow across the cutplane and available downstream generation pool assets can reasonably supply that load.

5 Project Updates

As necessary, the AESO intends to provide information in this section about projects underway in the Keephills Ellerslie Genesee area that are known to have an impact on the information contained in this information document.

Appendices

Appendix 1 – *Effective Pool Assets*

Appendix 2 – *Geographical Map of the Keephills Ellerslie Genesee Area*

Appendix 3 – *Single Line Drawing Showing Keephills Ellerslie Genesee Cutplane*

Appendix 4 – *Keephills Ellerslie Genesee Cutplane Thermal Limit*

Revision History

Posting Date	Description of Changes
2024-04-26	Amended Section 3 to update studied constraints and remove information regarding most severe single contingency. Updated effective pool assets in Appendix 1 and revised maps in Appendices 2 and 3. Revised Appendix 4 based on engineering study results. Removed Appendix 5 – KEG Cutplane Transient Stability Limits Without Bus Reconfiguration and Appendix 6 – KEG Cutplane Transient Stability Limits With Bus Reconfiguration based on updated studies.
2023-04-03	Amended Section 3 to update studied constraints with and without bus configuration and add Genesee islanding preparation. Revised map in Appendix 3 and updated thermal limits in Appendix 4 to reflect. Updated transient limits in Appendix 5 and Appendix 6. Administrative updates.
2018-05-03	Revised map in Appendix 3 and updated thermal limits in Appendix 4 to reflect the 1045L Tap entering into service.
2016-09-29	Revised maps in Appendices 2 and 3 and updated thermal limits in Appendix 4 to reflect transmission line 1043L in the Edmonton area entering into service.
2016-04-14	Administrative updates. Section 3.2 amended to communicate the bus reconfiguration process if either the 1202L transmission line or the 1209L transmission line is out of service and transient stability limits shown in Appendix 5 are at risk of being exceeded. Revised Appendix 5 and added Appendix 6 based on updated studies.
2015-12-10	Section 3.2 amended to reflect studied constraints and limits with WATL in service, Appendix 2 and 3 revised and Appendix 4 replaced with new Appendices 4 and 5 which include information on cutplane limits.
2015-02-19	Appendix 4 amended to include changes to cutplane limits.
2014-10-02	Appendix 4 amended to remove Keephills T6 contingency from the 500 kV KEG Outages Table and Appendix 3 amended to include a new single line diagram.

2014-07-17	Section 5 amended to remove temporary cutplane operating limits and Appendix 4 amended to reflect changes to cutplane operating limits.
2014-03-13	Amended to include temporary cutplane operating limit changes in section 5 due to the Edmonton Region 240 kV Line Upgrades.
2014-02-27	Initial Release

Appendix 1 – Effective Pool Assets

The effective pool assets for the Keephills Ellerslie Genesee cutplane, listed alphabetically by their pool IDs, are:

GN1

GN2

GN3

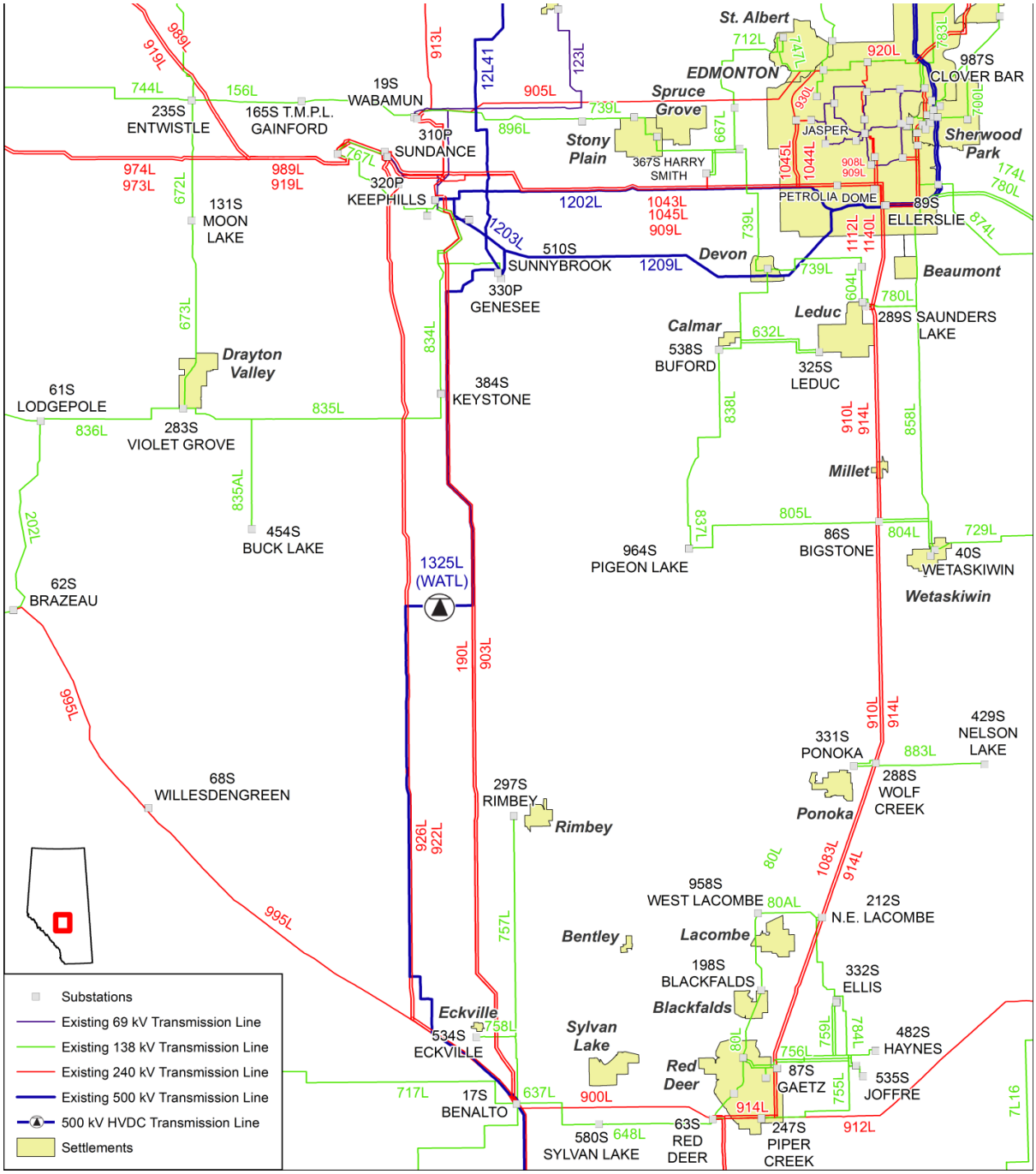
GNR1

GNR2

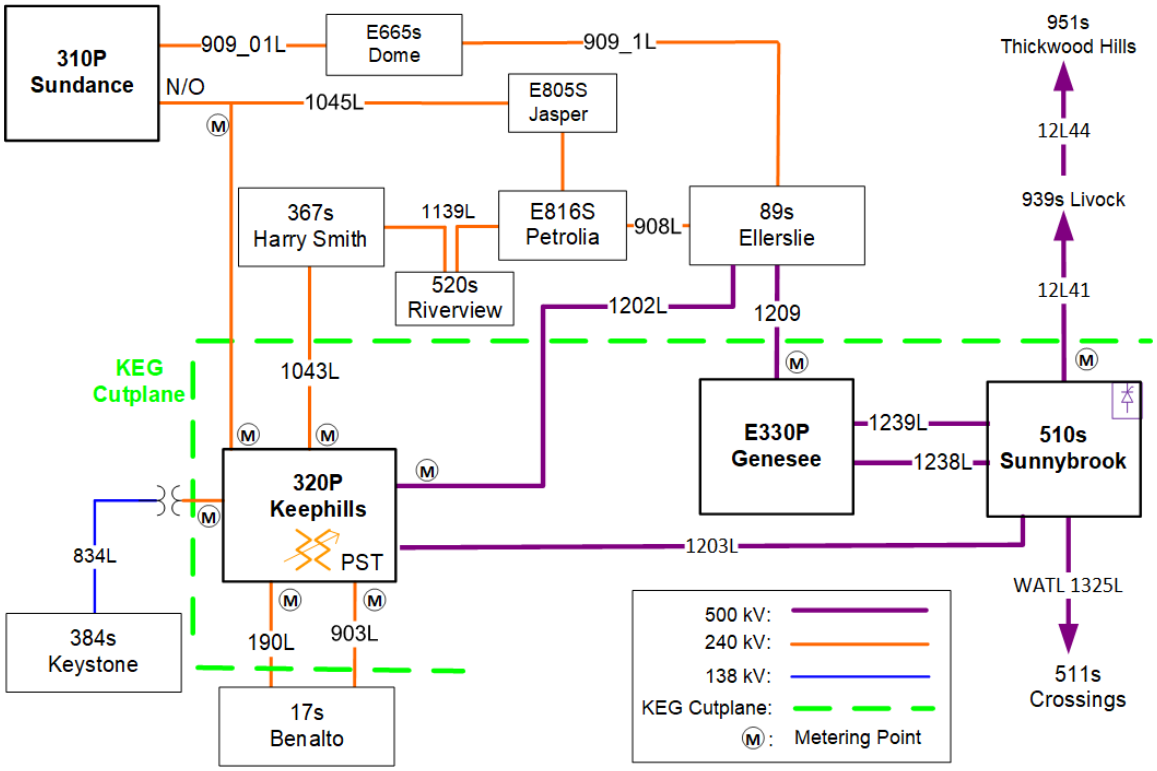
KH2

KH3

Appendix 2 – Geographical Map of the Keephills Ellerslie Genesee Area



Appendix 3 – Single Line Drawing Showing Keephills Ellerslie Genesee Cutplane



Appendix 4 – Keephills Ellerslie Genesee Thermal Cutplane Limit

If real time contingency analysis allows a higher cutplane limit for the contingencies listed in the tables below, the AESO operates to the higher limit.

Outage		Summer (MW)	Winter (MW)
		KEG_{AC}	**KEG_{AC}**
System Normal (N-0)	None	N/A[1]	
N-1	12L41	N/A[1]	
	1202L	1150	1500
		1550[2]	N/A[2]
	1203L	850	1150
	1209L		
	Ellerslie T1	2290	2290
	Ellerslie T2		
	1043L	1300	N/A
		1500[3]	N/A[3]
	1045L	1300[4]	N/A[4]
		1900[3,4]	N/A[3,4]

Note:

1. Maximum KEG generation reached before a limit was established.
2. These limits are applied after the Genesee bus has been reconfigured.
3. The cutplane limit is based on the system after the bus is split at E814s Bellamy.
4. If the 1045L at 310P Sundance is closed, the thermal limit is provided based on real time conditions.