ISO Rules
Part 500 Facilities
Division 503 Technical & Operating Requirements
Section 503.5 Voltage Ride-Through

Applicability

1 Section 503.5 applies to:

(a) the **legal owner** of a **generating unit** that:

(i) has:

(A) a **maximum authorized real power** greater than 9.0 MW; or:

(B) is a part of a complex with another **generating unit**, **aggregated facility**, or **energy storage resource** with an aggregate **maximum authorized real power** amount greater than 9.0 MW;

and

(ii) is directly connected to the **transmission system**, or to a **transmission facility** within the service area of the City of Medicine Hat, including a **generating unit** situated within an industrial complex that is directly connected to the **transmission system**;

(b) the **legal owner** of an **aggregated facility** that:

(i) does not contain an **energy storage resource**; and

(ii) is directly connected to the **transmission system**, or to a **transmission facility** within the service area of the City of Medicine Hat, including an **aggregated facility** situated within an industrial complex that is directly connected to the **transmission system**;

and

(c) the **legal owner** of an **energy storage resource**, or **aggregated facility** containing an **energy storage resource**, that:

(i) has a range greater than 5 MW between its **maximum authorized charging power** and **maximum authorized real power**; and

(ii) is directly connected to the **transmission system** or **to transmission facilities** within the City of Medicine Hat, including an **energy storage resource** situated within an industrial complex that is directly connected to the **transmission system**.

Requirements

Voltage Ride-Through

2(1) The **legal owner** of a **generating unit**, **aggregated facility**, or **energy storage resource** must, for purposes of determining the voltage ride-through requirements of this Section 503.5, determine the root mean square phase-to-phase voltage value at the high-voltage side of the **transmission system** step-up transformer, to be used as the 1.0 per unit voltage value.

(2) The **legal owner** must ensure that the **generating unit**, **aggregated facility**, or **energy storage resource** is designed to meet the following voltage ride-through requirements:

(a) continuous operation between greater than or equal to 0.90 and less than 1.10 per unit of the voltage value determined under subsection 2(1);

(b) not tripping or going off-line during, or as a result of, a voltage dip or post-transient voltage deviation resulting from a **disturbance** on the **transmission system**, on any phase or combination of phases at or beyond the **point of connection**, in accordance with the applicable timing requirements of Appendix 1; and

(c) the amount of time that the voltage of the **generating unit**, **aggregated facility**, or **energy**

storage resource remains at 0.0 per unit must be at least the **normal clearing** time for a 3-phase fault at the specific location where the **generating unit**, **aggregated facility**, or **energy storage resource** is electrically connected.

(3) A **generating unit**, **aggregated facility**, or **energy storage resource** is not required, notwithstanding any other provision of this Section 503.5, to ride-through a fault that:

(a) causes a forced outage of a radial transmission line connecting the **generating unit**, **aggregated facility**, or **energy storage resource** to the **transmission system**;

(b) occurs on the **generating unit**, **aggregated facility**, or **energy storage resource** side of the **point of connection**, including the low-voltage network and the substation; or

(c) results in the activation of a transfer trip or anti-islanding protection scheme at the **generating unit**, **aggregated facility**, or **energy storage resource** that causes the **generating unit**, **aggregated facility**, or **energy storage resource** to be disconnected from the **transmission system**.

Appendices

Appendix 1 – Voltage Ride-Through Requirements

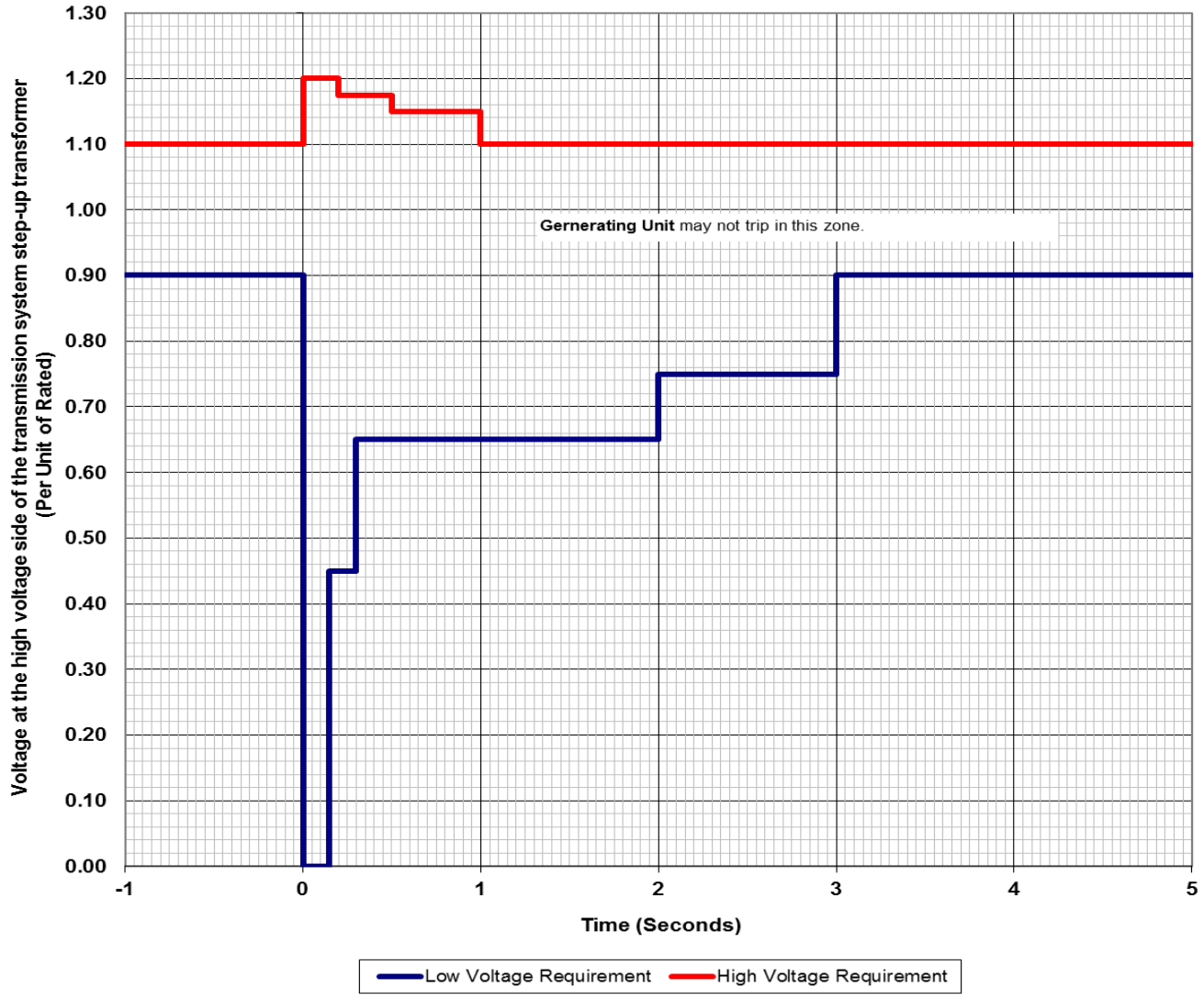
Revision History

Date	Description
2024-04-01	Initial release.

Appendices

Appendix 1 – Voltage Ride-Through Requirements

High Voltage Ride-Through Duration		Low Voltage Ride-Through Duration	
Voltage (per unit)	**Time**	**Voltage (per unit)**	**Time**
≥ 1.200	Instantaneous trip	< 0.45	4 to 9 cycles
≥ 1.175	0.20 seconds	< 0.65	0.30 seconds
≥ 1.15	0.50 seconds	< 0.75	2.00 seconds
≥ 1.10	1.00 seconds	< 0.90	3.00 seconds
< 1.10	Continuous operation	≥ 0.90	Continuous operation


Voltage at the high voltage side of the transmission system step-up transformer (Per Unit of Rated)
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-1
0
1
2
3
4
5
Time (Seconds)
Gernerating Unit may not trip in this zone.
Low Voltage Requirement
High Voltage Requirement