

Appendix K - Operating Voltage Limits by LCC

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Table of Contents

Table 1 - Normal Voltage Limits (NORMVL)	2
Table 2 - Long Time Emergency Voltage Limits (LTEVL)	3
Table 3 - Short Time Emergency Voltage Limits (STEVl)	4
Table 4 - Drastic Action Voltage Limits (DAVL)	5
OP-19 Appendix K Revision History	6

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Table 1 - Normal Voltage Limits (NORMVL)

Normal Voltage Limits (NORMVL) ^{1, 2, 3, 8}						
<u>LCC / TO</u>	115 kV		230 kV		345 kV	
	Low voltage limits (kV)	High voltage limits (kV)	Low voltage limits (kV)	High voltage limits (kV)	Low voltage limits (kV)	High voltage limits (kV)
CONVEX (ES)	109.0	121.0	N.A.	N.A.	328.0	362.0
CONVEX (UI)	109.0	121.0	N.A.	N.A.	328.0	362.0
Maine (CMP)	109.3	122.0	N.A.	N.A.	327.8	362.0
Maine (Versant Power)	109.3	122.0	N.A.	N.A.	327.8	362.0
New Hampshire	109.3	121.0	218.5	241.5	327.8	362.0
NGRID	109.0	121.0	218.5	241.5	328.0	362.0
NSTAR	109.0	121.0	218.5	241.5	328.0	362.0
RIE	109.0	121.0	218.5	241.5	328.0	362.0
VELCO	109.3	121.0	218.5	241.5	327.8	362.0

Note ¹: Deviations are allowed, on a station-by-station basis, as determined by the LCC and/or Transmission Owner

Note ²: These limits will **not** be applied during system restoration

Note ³: These limits will be applied after local protection and automatic controls have acted

Note ⁸: Voltages outside of the limits and associated timelines as prescribed in OP-19 Appendix K and MLCC 15 Attachment E may be allowed on radial transmission stations (radial either by design or the result of a contingency)

Table 2 - Long Time Emergency Voltage Limits (LTEVL)

Long Time Emergency Voltage Limits (LTEVL) ^{1, 2, 3, 4, 8, 9}									
<u>LCC / TO</u>	115 kV			230 kV			345 kV		
	Time applicable	Low voltage limits (kV)	High voltage limits (kV)	Time applicable	Low voltage limits (kV)	High voltage limits (kV)	Time applicable	Low voltage limits (kV)	High voltage limits (kV)
CONVEX (ES)	Infinite	105.0	121.0	N.A.	N.A.	N.A.	Use NORMVL		
CONVEX (UI)	Use NORMVL			N.A.	N.A.	N.A.	Use NORMVL		
Maine (CMP)	30 minutes	105.8	124.0	N.A.	N.A.	N.A.	Use NORMVL		
Maine (Versant Power)	30 minutes	105.8	124.0	N.A.	N.A.	N.A.	Use NORMVL		
New Hampshire	120 minutes	107.0	121.0	Use NORMVL			Use NORMVL		
NGRID	30 minutes	103.5	121.0	30 minutes	207.0	241.5	30 minutes	310.5	362.0
NSTAR	Infinite	103.5	121.0	Use NORMVL			Use NORMVL		
RIE	30 minutes	103.5	121.0	30 minutes	207.0	241.5	30 minutes	310.5	362.0
VELCO	120 minutes	103.5	121.0	120 minutes	207.0	241.5	120 minutes	310.5	362.0

Note ¹: Deviations are allowed, on a station-by-station basis, as determined by the LCC and/or Transmission Owner

Note ²: These limits will **not** be applied during system restoration

Note ³: These limits will be applied after local protection and automatic controls have acted

Note ⁴: The allowable time duration for the Long Time Emergency Voltage Limit will be at least 30 minutes, but is defined by the Transmission Owner

Note ⁵: A load cycle as described in OP-19

Note ⁸: Voltages outside of the limits and associated timelines as prescribed in OP-19 Appendix K and MLCC 15 Attachment E may be allowed on radial transmission stations (radial either by design or the result of a contingency).

Note ⁹: Differences from prior sets of voltage limits are shown in **bold** and are **shaded**

Table 3 - Short Time Emergency Voltage Limits (STEVL)

Short Time Emergency Voltage Limits (STEVL) ^{1, 2, 3, 6, 8, 9}						
<u>LCC / TO</u>	115 kV		230 kV		345 kV	
	Low voltage limits (kV)	High voltage limits (kV)	Low voltage limits (kV)	High voltage limits (kV)	Low voltage limits (kV)	High voltage limits (kV)
CONVEX (ES)	102.0	121.0	N.A.	N.A.	Use NORMVL	
CONVEX (UI)	105.0	121.0	N.A.	N.A.	Use NORMVL	
Maine (CMP)	Use LTEVL		N.A.	N.A.	327.8	369.0
Maine (Versant Power)	Use LTEVL		N.A.	N.A.	327.8	369.0
New Hampshire	Use LTEVL	Use NORMVL	Use NORMVL		Use NORMVL	
NGRID	Use LTEVL		Use LTEVL	Use NORMVL	Use LTEVL	Use NORMVL
NSTAR	100.0	121.0	Use NORMVL		Use NORMVL	
RIE	Use LTEVL		Use LTEVL	Use NORMVL	Use LTEVL	Use NORMVL
VELCO	98.0	123.0	195.5	246.1	293.3	369.0

Note ¹: Deviations are allowed, on a station-by-station basis, as determined by the LCC and/or Transmission Owner

Note ²: These limits will **not** be applied during system restoration

Note ³: These limits will be applied after local protection and automatic controls have acted

Note ⁶: The allowable time duration for the Short Time Emergency Voltage Limit is 15 minutes

Note ⁸: Voltages outside of the limits and associated timelines as prescribed in OP-19 Appendix K and MLCC 15 Attachment E may be allowed on radial transmission stations (radial either by design or the result of a contingency).

Note ⁹: Differences from prior sets of voltage limits are shown in **bold** and are shaded

Table 4 - Drastic Action Voltage Limits (DAVL)

Drastic Action Voltage Limits (DAVL) ^{1, 2, 3, 7, 8, 9}						
<u>LCC / TO</u>	115 kV		230 kV		345 kV	
	Low voltage limits (kV)	High voltage limits (kV)	Low voltage limits (kV)	High voltage limits (kV)	Low voltage limits (kV)	High voltage limits (kV)
CONVEX (ES)	100.0	121.0	N.A.	N.A.	Use NORMVL	
CONVEX (UI)	100.0	121.0	N.A.	N.A.	Use NORMVL	
Maine (CMP)	Use LTEVL		N.A.	N.A.	Use NORMVL	Use STEVL
Maine (Versant Power)	Use LTEVL		N.A.	N.A.	Use NORMVL	Use STEVL
New Hampshire	Use LTEVL	Use NORMVL	Use NORMVL		Use NORMVL	
NGRID	98.0	121.0	Use LTEVL	Use NORMVL	Use LTEVL	Use NORMVL
NSTAR	98.0	121.0	Use NORMVL		Use NORMVL	
RIE	98.0	121.0	Use LTEVL	Use NORMVL	Use LTEVL	Use NORMVL
VELCO	Use STEVL		Use STEVL		Use STEVL	

Note ¹: Deviations are allowed, on a station-by-station basis, as determined by the LCC and/or Transmission Owner

Note ²: These limits will **not** be applied during system restoration

Note ³: These limits will be applied after local protection and automatic controls have acted

Note ⁷: The allowable time duration for the Drastic Action Voltage Limit is 5 minutes

Note ⁸: Voltages outside of the limits and associated timelines as prescribed in OP-19 Appendix K and MLCC 15 Attachment E may be allowed on radial transmission stations (radial either by design or the result of a contingency).

Note ⁹: Differences from prior sets of voltage limits are shown in **bold** and are shaded

OP-19 Appendix K Revision History

Document History

Rev. No.	Date	Reason
Rev 0	09/02/12	Initial Appendix version
Rev 1	06/11/14	Changed voltage criteria for some LCCs and changed table formatting; LCCs have provided revised voltage criteria, which should be in this appendix; There are now new criteria (time sensitive) that require a table design change;
Rev 2	10/29/14	Revised name entries for CONVEX (NU and UI) and Maine (BHE/EMERA) in Tables 1 & 2; Updated CONVEX/UI 115/345 kV low voltage criteria data in Tables 1 & 2; Updated REMVEC 115 kV low voltage criteria data in Table 2
Rev 3	06/15/15	Updated CONVEX/UI 115/345 kV low voltage limit data in Tables 1 & 2; Updated REMVEC 115 kV low voltage limit data in Table 2; Created new Table 3 & 4 for new voltage limit classifications
Rev 4	06/03/16	Annual review by procedure owner performed ; Tables 2, 3, and 4, changed "N/A" to "Use XXXXX limit" to indicate proper limit to use
Rev 5	04/14/17	Annual review by procedure owner performed ; Added required corporate document identity to all page footers; Table 3 modified applicable high voltage limits (currently in use and supported by a temporary guide) provided by REMVEC; Table 4, as applicable, modified LTEVL and STEVL low and/or high voltage limits for NSTAR, REMVEC/NGRID and VELCO;
Rev 5.1	03/12/18	Periodic review performed requiring no changes; Made administrative changes required to publish a Minor Revision per SOP-RTMKTS.0201.0010 Section 5,10 and sub-Section 5.10.1;
Rev 6	05/30/18	Modify New Hampshire and NGRID limits in Tables 3 and 4, Modified REMVEC name to NGRID reordered LCCs alphabetically
Rev 7	01/28/19	Annual review by procedure owner performed Modify New Hampshire, STEVL-H and DAVL-H limits in Tables 3 and 4, clarified NGRID limits Tables 3 and 4;
Rev 8	08/27/19	Annual review by procedure owner performed Table 1 and 4, reconciled data conflicts with MLCC 15H;
Rev 8.1	06/15/20	Annual review by procedure owner with no changes required Made administrative changes required to publish a Minor Revision per SOP-RTMKTS.0201.0010; data change for entity names and grammar correction in Notes
Rev 9	09/15/20	Modified Versant Power 115kV Low Voltage Limit in Table 1 and Table 2 Globally corrected grammar (plural) as applicable
Rev 9.1	05/28/21	Annual review performed by procedure owner with no changes required
Rev 9.2	04/01/22	Annual review performed by procedure owner with no changes required
Rev 9.3	02/01/23	Annual review performed by procedure owner with no intent changes required; Added Rhode Island Energy (RIE) as a TO to the document in each place that NGRID exists now; Added Note 10: Rhode Island Energy is RIE; Made administrative changes required to publish a Minor Revision.
Rev 9.4	11/29/23	Annual review performed by procedure owner with no changes required
Rev 10	02/06/24	Split out NGRID and RIE from all tables and created separate RIE row; Modified NSTAR limits and times in Tables 2, 3, & 4.
Rev 10.1	01/30/25	Annual review performed by procedure owner with no changes required.