

Case 6 Summary

Thermal & Voltage Analysis

- Most thermal overloads are associated with local area supply problems that continue to exist.
- The 345-kV Bethel-Norwalk HPFF cable exceeds its emergency rating under contingency conditions. The installation of power flow reduction equipment (series reactor) could lower power flows on this line. However, reducing power flows on this path will increase power flows on parallel paths.
- At a New England load of 27.7 GW and for the conditions tested, no new voltage violations are created.
- At a New England load of 30.0 GW, preliminary analyses indicate that there were a number of voltage violations and failures to converge.

Southwest Connecticut 345-kV Transmission Project - 27,700 MW NE Load Level

Thermal Overload Summary

Dispatches #2, 3, 4 & 5 - Before Transformer LTC Action

Includes All System Modifications Identified in the Bethel-Norwalk and Middletown-Norwalk CSC Applications

**Except that Only One Archers Lane-Norwalk Junction Cable is Installed
and XLPE Cable is Substituted for HPFF from East Devon to Singer to Norwalk.**

Also Includes Two 115-kV Norwalk-Glenbrook Cables, One 115-kV Norwalk Harbor-Glenbrook Cable
Second 345/115-kV Autotransformer Added at Norwalk, 2% Series Reactors Bypassed at Norwalk and Devon 345
One Additional 115-kV Circuit Breaker at Devon, Two 115-kV Circuit Breakers Added at Elmwest
50 MVAR Capacitor at Bunker Hill, Reconductored Taps into Beacon Falls, Reconductored 1466, 1780 and 1790 Lines
Existing 138/115-kV Autotransformer at Norwalk Harbor Replaced with One of Higher Impedance
Baldwin Breaker Open, Norwalk and Hawthorne Reactors In Service

Case Name	Contingency	From Bus	To Bus	Pre-load	Post-load	Rating	%	Ckt ID	Notes
MN-XLPE-062604-4	1545LINE	DRBY J B	IND.WELL	77.4	151.2	150	101.0	1	SPS #137 operates to eliminate this overload
MN-XLPE-062604-5	GRNDAV2TSTK	GRAND AV	WEST RIV	117.6	284.0	258	107.0	1	SPS #24 operates to eliminate this overload
MN-XLPE-062604-2	GRNDAV2TSTK	GRAND AV	WEST RIV	106.6	269.7	258	101.5	1	
MN-XLPE-062604-5	GRNDAV2TSTK	GRAND AV	WEST RIV	117.6	284.0	258	107.0	2	SPS #24 operates to eliminate this overload.
MN-XLPE-062604-2	GRNDAV2TSTK	GRAND AV	WEST RIV	106.6	269.7	258	101.5	2	
MN-XLPE-062604-5	1620SLINE	HADDAM	BOKUM	90.3	158.3	165	96.0	1	
MN-XLPE-062604-5	LOSSMP3	NORHR138	NWLK HAR	205.9	384.5	402	95.6	1	
MN-XLPE-062604-4	1060-1165DCT	PLUMTREE	MIDDLRIV	58.7	226.1	126	180.4	1	Local area supply issue. Will be addressed by a separate project.
MN-XLPE-062604-3	1060-1165DCT	PLUMTREE	MIDDLRIV	58.7	226.0	126	180.1	1	
MN-XLPE-062604-2	1060-1165DCT	PLUMTREE	MIDDLRIV	58.7	225.9	126	179.4	1	
MN-XLPE-062604-5	1060-1165DCT	PLUMTREE	MIDDLRIV	58.7	225.9	126	179.4	1	
MN-XLPE-062604-4	TRIANGLE2T	PLUMTREE	MIDDLRIV	58.7	163.4	126	129.3	1	
MN-XLPE-062604-3	TRIANGLE2T	PLUMTREE	MIDDLRIV	58.7	163.3	126	129.0	1	
MN-XLPE-062604-2	TRIANGLE2T	PLUMTREE	MIDDLRIV	58.7	163.1	126	128.4	1	
MN-XLPE-062604-5	TRIANGLE2T	PLUMTREE	MIDDLRIV	58.7	163.1	126	128.4	1	

Case Name	Contingency	From Bus	To Bus	Pre-load	Post-load	Rating	%	Ckt ID	Notes
MN-XLPE-062604-4	1165LINE	PLUMTREE	TRIANGLE	80.6	144.9	138	104.4	1	Local area supply issue. Will be addressed by a separate project.
MN-XLPE-062604-3	1165LINE	PLUMTREE	TRIANGLE	80.6	144.8	138	104.2	1	
MN-XLPE-062604-2	1165LINE	PLUMTREE	TRIANGLE	80.5	144.7	138	103.8	1	
MN-XLPE-062604-5	1165LINE	PLUMTREE	TRIANGLE	80.5	144.7	138	103.7	1	
MN-XLPE-062604-4	PLUMTREE31T	PLUMTREE	TRIANGLE	80.6	139.8	138	100.3	1	
MN-XLPE-062604-3	PLUMTREE31T	PLUMTREE	TRIANGLE	80.6	139.8	138	100.1	1	
MN-XLPE-062604-2	PLUMTREE31T	PLUMTREE	TRIANGLE	80.5	139.7	138	99.7	1	
MN-XLPE-062604-5	PLUMTREE31T	PLUMTREE	TRIANGLE	80.5	139.7	138	99.7	1	
MN-XLPE-062604-4	1060-1270DCT	PLUMTREE	TRIANGLE	85.2	224.8	166	134.6	2	Local area supply issue. Will be addressed by a separate project.
MN-XLPE-062604-3	1060-1270DCT	PLUMTREE	TRIANGLE	85.2	224.8	166	134.3	2	
MN-XLPE-062604-2	1060-1270DCT	PLUMTREE	TRIANGLE	85.1	224.7	166	133.9	2	
MN-XLPE-062604-5	1060-1270DCT	PLUMTREE	TRIANGLE	85.1	224.7	166	133.9	2	
MN-XLPE-062604-2	1440-1450DCT	SO.END	GLNBRK J	114.8	365.6	289	123.2	1	Terminal equipment limited. Will be addressed by a separate project.
MN-XLPE-062604-3	1440-1450DCT	SO.END	GLNBRK J	115.1	365.6	289	123.2	1	
MN-XLPE-062604-4	1440-1450DCT	SO.END	GLNBRK J	112.4	365.6	289	123.2	1	
MN-XLPE-062604-5	1440-1450DCT	SO.END	GLNBRK J	111.4	365.6	289	123.2	1	
MN-XLPE-062604-5	GLNBRKA2STK	SO.END	GLNBROOK	115.3	364.9	351	101.2	1	Terminal equipment limited. Will be addressed by a separate project.
MN-XLPE-062604-4	GLNBRKA2STK	SO.END	GLNBROOK	114.4	344.2	351	95.4	1	
MN-XLPE-062604-5	SGTN5TSTK	SOUTHGTN	SGTN B	262.4	606.6	585	103.7	2	Breaker failure scheme closes 115-kV tie breaker to eliminate this overload.
MN-XLPE-062604-2	SGTN5TSTK	SOUTHGTN	SGTN B	261.9	596.0	585	101.9	2	
MN-XLPE-062604-3	SGTN5TSTK	SOUTHGTN	SGTN B	253.6	571.9	585	97.8	2	
MN-XLPE-062604-4	SGTN5TSTK	SOUTHGTN	SGTN B	247.4	563.5	585	96.3	2	
MN-XLPE-062604-2	1440-1450DCT	TOMAC	SO.END	117.6	255.5	252	99.3	1	
MN-XLPE-062604-2	GLNBRKA2STK	TOMAC	SO.END	117.6	255.4	252	99.3	1	
MN-XLPE-062604-3	1440-1450DCT	TOMAC	SO.END	117.7	255.5	252	99.3	1	
MN-XLPE-062604-3	GLNBRKA2STK	TOMAC	SO.END	117.7	255.4	252	99.3	1	
MN-XLPE-062604-4	1440-1450DCT	TOMAC	SO.END	117.3	255.5	252	99.3	1	
MN-XLPE-062604-5	1440-1450DCT	TOMAC	SO.END	117.2	255.5	252	99.3	1	
MN-XLPE-062604-4	GLNBRKA2STK	TOMAC	SO.END	117.3	255.4	252	99.2	1	
MN-XLPE-062604-5	GLNBRKA2STK	TOMAC	SO.END	117.2	255.4	252	99.2	1	
MN-XLPE-062604-2	1440LINE	TOMAC	SO.END	117.6	255.3	252	98.8	1	

Case Name	Contingency	From Bus	To Bus	Pre-load	Post-load	Rating	%	Ckt ID	Notes
MN-XLPE-062604-2	GLNBRKCSTK	TOMAC	SO.END	117.6	255.3	252	98.8	1	
MN-XLPE-062604-3	1440LINE	TOMAC	SO.END	117.7	255.3	252	98.8	1	
MN-XLPE-062604-3	GLNBRKCSTK	TOMAC	SO.END	117.7	255.3	252	98.8	1	
MN-XLPE-062604-4	1440LINE	TOMAC	SO.END	117.3	255.3	252	98.8	1	
MN-XLPE-062604-4	GLNBRKCSTK	TOMAC	SO.END	117.3	255.3	252	98.8	1	
MN-XLPE-062604-5	1440LINE	TOMAC	SO.END	117.2	255.3	252	98.8	1	
MN-XLPE-062604-5	GLNBRKCSTK	TOMAC	SO.END	117.2	255.3	252	98.8	1	
MN-XLPE-062604-4	1060-1165DCT	TRIANGLE	MIDDLRIV	22.8	146.9	134	111.0	1	
MN-XLPE-062604-3	1060-1165DCT	TRIANGLE	MIDDLRIV	22.8	146.8	134	110.8	1	Local area supply issue. Will be addressed by a separate project.
MN-XLPE-062604-2	1060-1165DCT	TRIANGLE	MIDDLRIV	22.8	146.8	134	110.4	1	
MN-XLPE-062604-5	1060-1165DCT	TRIANGLE	MIDDLRIV	22.8	146.7	134	110.3	1	
MN-XLPE-062604-2	GRNDAV2TSTK	WATER ST	WEST RIV	48.2	282.7	273	100.8	1	
MN-XLPE-062604-5	GRNDAV2TSTK	WATER ST	WEST RIV	57.5	281.0	273	100.3	1	SPS #24 operates to eliminate this overload
MN-XLPE-062604-2	SOUTHEND6T	WATERSDE	COS COB	71.7	299.0	239	124.8	1	
MN-XLPE-062604-3	SOUTHEND6T	WATERSDE	COS COB	71.6	299.0	239	124.8	1	
MN-XLPE-062604-4	SOUTHEND6T	WATERSDE	COS COB	71.9	299.0	239	124.8	1	Terminal equipment limited. Will be addressed by a separate project.
MN-XLPE-062604-5	SOUTHEND6T	WATERSDE	COS COB	72.1	299.0	239	124.8	1	
MN-XLPE-062604-5	GLNBRKA1STK	WATERSDE	COS COB	72.1	246.6	239	102.0	1	
MN-XLPE-062604-4	GLNBRKA1STK	WATERSDE	COS COB	71.9	231.5	239	95.8	1	
MN-XLPE-062604-2	SOUTHEND6T	WATERSDE	GLNBROOK	136.9	367.3	352	102.5	1	
MN-XLPE-062604-3	SOUTHEND6T	WATERSDE	GLNBROOK	136.8	367.3	352	102.5	1	Terminal equipment limited. Will be addressed by a separate project.
MN-XLPE-062604-4	SOUTHEND6T	WATERSDE	GLNBROOK	137.2	367.3	352	102.5	1	
MN-XLPE-062604-5	SOUTHEND6T	WATERSDE	GLNBROOK	137.4	367.3	352	102.5	1	

Southwest Connecticut 345-kV Transmission Project - 27,700 MW NE Load Level

Voltage Summary

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One Additional 115-kV Circuit Breaker at Devon, Two 115-kV Circuit Breakers Added at Elmwest
50 MVAR Capacitor at Bunker Hill, Reconductored Taps into Beacon Falls, Reconductored 1466, 1780 and 1790 Lines
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Baldwin Breaker Open, Norwalk and Hawthorne Reactors In Service

Case Name	Contingency	Bus Name	Bus Voltage Base (kV)	Pre-Contingency Bus Voltage (pu)	Post-Contingency Bus Voltage (pu)	Notes
MN-XLPE-062604-4	1545-1570DCT	ANSONIA	115	1.007	0.902	
MN-XLPE-062604-4	DEVON6TSTK	ANSONIA	115	1.007	0.902	
MN-XLPE-062604-3	1545-1570DCT	ANSONIA	115	1.008	0.906	
MN-XLPE-062604-3	DEVON6TSTK	ANSONIA	115	1.008	0.906	
MN-XLPE-062604-2	1545-1570DCT	ANSONIA	115	1.009	0.912	
MN-XLPE-062604-2	DEVON6TSTK	ANSONIA	115	1.009	0.912	
MN-XLPE-062604-5	1545-1570DCT	ANSONIA	115	1.004	0.917	
MN-XLPE-062604-5	DEVON6TSTK	ANSONIA	115	1.004	0.917	
MN-XLPE-062604-5	BAIRDBSTK	BAIRD B	115	1.021	0.949	
MN-XLPE-062604-5	1272-1721DCT	BALDWINB	115	1.015	0.932	
MN-XLPE-062604-2	1272-1721DCT	BALDWINB	115	1.017	0.945	
MN-XLPE-062604-4	1272-1721DCT	BALDWINB	115	1.014	0.946	
MN-XLPE-062604-3	1272-1721DCT	BALDWINB	115	1.015	0.947	
MN-XLPE-062604-5	1272-1721DCT	BCNFL PF	115	1.005	0.943	
MN-XLPE-062604-5	1261-1620SDC	BOKUM	115	1.011	0.932	

Case Name	Contingency	Bus Name	Bus Voltage Base (kV)	Pre-Contingency Bus Voltage (pu)	Post-Contingency Bus Voltage (pu)	Notes
MN-XLPE-062604-2	1261-1620SDC	BOKUM	115	1.011	0.933	
MN-XLPE-062604-4	1261-1620SDC	BOKUM	115	1.016	0.937	
MN-XLPE-062604-3	1261-1620SDC	BOKUM	115	1.016	0.938	
MN-XLPE-062604-5	BRANFORD2T	BRANFORD	115	1.027	0.947	
MN-XLPE-062604-2	BRANFORD2T	BRANFORD	115	1.028	0.947	
MN-XLPE-062604-4	BRANFORD2T	BRANFORD	115	1.034	0.949	
MN-XLPE-062604-3	BRANFORD2T	BRANFORD	115	1.034	0.950	
MN-XLPE-062604-5	1272-1721DCT	BUNKER H	115	1.025	0.936	
MN-XLPE-062604-2	1272-1721DCT	BUNKER H	115	1.027	0.949	
MN-XLPE-062604-5	PEQUON42TSTK	CONGRESS	115	1.025	0.914	
MN-XLPE-062604-2	PEQUON42TSTK	CONGRESS	115	1.026	0.940	
MN-XLPE-062604-3	PEQUON42TSTK	CONGRESS	115	1.026	0.940	
MN-XLPE-062604-4	PEQUON42TSTK	CONGRESS	115	1.026	0.944	
MN-XLPE-062604-5	1272-1721DCT	FREIGHT	115	1.025	0.935	
MN-XLPE-062604-2	1272-1721DCT	FREIGHT	115	1.027	0.948	
MN-XLPE-062604-4	1272-1721DCT	FREIGHT	115	1.024	0.949	
MN-XLPE-062604-3	1272-1721DCT	FREIGHT	115	1.025	0.950	
MN-XLPE-062604-5	BRANFORD2T	GREEN HL	115	1.007	0.948	
MN-XLPE-062604-2	BRANFORD2T	GREEN HL	115	1.007	0.949	
MN-XLPE-062604-4	1545-1570DCT	IND.WELL	115	1.007	0.893	Installation of a capacitor bank at Ansonia substation will correct this low voltage condition.
MN-XLPE-062604-4	DEVON6TSTK	IND.WELL	115	1.007	0.893	
MN-XLPE-062604-3	1545-1570DCT	IND.WELL	115	1.008	0.897	
MN-XLPE-062604-3	DEVON6TSTK	IND.WELL	115	1.008	0.897	
MN-XLPE-062604-2	1545-1570DCT	IND.WELL	115	1.009	0.903	
MN-XLPE-062604-2	DEVON6TSTK	IND.WELL	115	1.009	0.903	
MN-XLPE-062604-5	1545-1570DCT	IND.WELL	115	1.004	0.908	
MN-XLPE-062604-5	DEVON6TSTK	IND.WELL	115	1.004	0.908	
MN-XLPE-062604-4	1163LINE	NOERA	115	1.023	0.949	

Case Name	Contingency	Bus Name	Bus Voltage Base (kV)	Pre-Contingency Bus Voltage (pu)	Post-Contingency Bus Voltage (pu)	Notes
MN-XLPE-062604-4	1163+1910LNS	NOERA	115	1.023	0.950	
MN-XLPE-062604-4	SOTHNGTN26T	NOERA	115	1.023	0.950	
MN-XLPE-062604-2	1710-1730ADC	OLD TOWN	115	1.018	0.943	
MN-XLPE-062604-3	1710-1730ADC	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-2	1710-1730CDC	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-2	PEQUON22TSTK	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-3	1710-1730CDC	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-2	1710LINE	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-2	1710-1730BDC	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-2	DEVON1TSTK	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-3	PEQUON22TSTK	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-3	1710LINE	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-3	1710-1730BDC	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-3	DEVON1TSTK	OLD TOWN	115	1.018	0.944	
MN-XLPE-062604-4	1710-1730ADC	OLD TOWN	115	1.018	0.945	
MN-XLPE-062604-4	1710-1730CDC	OLD TOWN	115	1.018	0.945	
MN-XLPE-062604-4	1710LINE	OLD TOWN	115	1.018	0.945	
MN-XLPE-062604-4	DEVON1TSTK	OLD TOWN	115	1.018	0.945	
MN-XLPE-062604-4	PEQUON22TSTK	OLD TOWN	115	1.018	0.945	
MN-XLPE-062604-4	1710-1730BDC	OLD TOWN	115	1.018	0.945	
MN-XLPE-062604-5	1710-1730CDC	OLD TOWN	115	1.016	0.946	
MN-XLPE-062604-5	1710-1730ADC	OLD TOWN	115	1.016	0.946	
MN-XLPE-062604-5	PEQUON22TSTK	OLD TOWN	115	1.016	0.946	
MN-XLPE-062604-5	1710LINE	OLD TOWN	115	1.016	0.946	
MN-XLPE-062604-5	DEVON1TSTK	OLD TOWN	115	1.016	0.946	
MN-XLPE-062604-5	1710-1730BDC	OLD TOWN	115	1.016	0.946	
MN-XLPE-062604-2	PLUMTREE31T	RDGEFLDB	115	1.021	0.932	
MN-XLPE-062604-3	PLUMTREE31T	RDGEFLDB	115	1.019	0.932	
MN-XLPE-062604-4	PLUMTREE31T	RDGEFLDB	115	1.016	0.933	
MN-XLPE-062604-5	PLUMTREE31T	RDGEFLDB	115	1.020	0.933	
MN-XLPE-062604-5	1272-1721DCT	SO.NAUG	115	1.014	0.945	

Case Name	Contingency	Bus Name	Bus Voltage Base (kV)	Pre-Contingency Bus Voltage (pu)	Post-Contingency Bus Voltage (pu)	Notes
MN-XLPE-062604-4	1545-1570DCT	TRAP FLS	115	1.013	0.915	
MN-XLPE-062604-4	DEVON6TSTK	TRAP FLS	115	1.013	0.915	
MN-XLPE-062604-3	1545-1570DCT	TRAP FLS	115	1.015	0.919	
MN-XLPE-062604-3	DEVON6TSTK	TRAP FLS	115	1.015	0.919	
MN-XLPE-062604-2	1545-1570DCT	TRAP FLS	115	1.015	0.924	
MN-XLPE-062604-2	DEVON6TSTK	TRAP FLS	115	1.015	0.924	
MN-XLPE-062604-5	1545-1570DCT	TRAP FLS	115	1.010	0.929	
MN-XLPE-062604-5	DEVON6TSTK	TRAP FLS	115	1.010	0.929	