

Table UP-5-HE: U.P. High Environmental Future – U.P. Preliminary Solutions Groups

Individual Solutions Not Common To All Solutions Groups

U.P. Zone	Solutions Group A		Solutions Group B	
	Map Item #	Solutions Description	Map Item #	Solutions Description
Western	W13	Uprate M38-Atlantic 69 kV line to 167 ° F	W9	Rebuild M38-Atlantic 69 kV line at 69 kV (22 mi)
Western	W27	Add power factor correction at Stone Container	W1	Lakota Rd-Mass-Winona 138 kV rebuild (68 mi) , new Mass 138/69 kV transformer
Central			C7	New Chandler-New Page 1-ckt 138 kV line (6 mi)
Central	C1	New Lakehead-Rapid River 138/69 kV 150 MVA + reconductor 69 kV line to Lakehead Tap	C5a	New Page 138 kV SS + 138/69 kV transformer
Central	C15	Rebuild Munising-Seney 69 kV line, new Seney-Roberts 69 kV line (59 mi)	C12	Rebuild Gwinn-Munising 69 kV line @ 69 kV (45 mi)
Eastern	E10	Rebuild Munising-Seney 69 kV line, new Seney-Roberts 69 kV line (59 mi)	E11	Rebuild Roberts-9 Mile 69 kV at 69 kV (54 mi)

All solutions groups assume the retirement of the Munising 69 kV voltage regulator

Solutions Common to All Solutions Groups

U.P. Zone	Map Item #	Solutions Description
Western	W16	Adjust the Iron Grove/Aspen 138/69 kV transformer no-load tap ratios to unity
Central	C3a	Add a 2 nd identical Chandler 138/69 kV transformer
Central	C2a	Uprate Escanaba-area 69 kV loop lines to 167°/200° F SE (38 mi)
Central	C22	New Escanaba 69 kV substation
Eastern	E4	Pine River-Straits 2x69 kV rebuild at 69/69 kV (25 mi)
Eastern	E2	Uprate the overhead portions of Straits-McGulpin 138 kV circuits #1 & #3 to 200° F
Eastern	E20	Add a 2 nd 8.16 MVAR 138 kV capacitor bank at Hiawatha
Eastern	E6	Uprate Pine River-9 Mile 69 kV line 6923 to 167° F
Eastern	E14	Adjust the Hiawatha 138/69 kV transformer no-load tap ratios to unity