

**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 <sup>nd</sup> 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 <sup>nd</sup> 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

Figure UP-5-HE

