Table UP-5-FI: Fuel & Investment Limitations Future –U.P. Preliminary Solutions Groups

Individual Solutions Not Common To All Solutions Groups

	Solutions Group A		Solutions Group B		Solutions Group C	
U.P. Zone	Map Item #	Solutions Description	Map Item #	Solutions Description	Map Item #	Solutions Description
Western	W13	Uprate M38-Atlantic 69 kV line to 167º F	W9	Rebuild M38-Atlantic 69 kV line at 69 kV	W9	Rebuild M38-Atlantic 69 kV line at 69 kV
Central			C15	Rebuild Munising-Seney 69 kV line, new Seney-Roberts 69 kV line		
Eastern	E23	Rebuild Pine River-Straits 2x69 kV at 138/138 kV + Pine River 138 SS + 138/69 kV xfmr. Rebuild Pine River-9 Mile 2x69 kV @ 138/69 kV + 9 Mile 138 SS + 138/69 kV xfmr. Tie one Pine River-Straits 138 line (6905) into Pine River, other (ESE_6904) from Straits directly to 9 Mile, bypassing Pine River, and connecting into rebuilt 138 kV line 6921.	E23	Rebuild Pine River-Straits 2x69 kV at 138/138 kV + Pine River 138 SS + 138/69 kV xfmr. Rebuild Pine River-9 Mile 2x69 kV @ 138/69 kV + 9 Mile 138 SS + 138/69 kV xfmr. Tie one Pine River-Straits 138 line (6905) into Pine River, other (ESE_6904) from Straits directly to 9 Mile, bypassing Pine River, and connecting into rebuilt 138 kV line 6921.	E5a	Pine River-Straits 2x69 kV rebuild at 138/138 kV + Pine River 2x138/69 kV 150 MVA
Eastern					E7	Rebuild Pine River-9 Mile 2x69 kV at 69 kV
Eastern	E11	Rebuild Roberts-9 Mile 69 kV at 69 kV	E10	Rebuild Munising-Seney 69 kV line, new Seney-Roberts 69 kV line	E11	Rebuild Roberts-9 Mile 69 kV at 69 kV

Solutions Common to All Solutions Groups

U.P. Zone	Map Item #	Solutions Descriptions
Western	W16	Adjust the Iron Grove/Aspen 138/69 kV transformer no-load tap ratios to unity
Central	C10	New Forsyth-Gwinn 69 kV line #2
Eastern	E3	Add 2 138 kV phase-shifting transformers at Straits (30º shift)
Eastern	E21	Magazine 4.08 MVAR 69 kV capacitor bank
Eastern	E22	DeTour 4.08 MVAR 69 kV capacitor bank
Eastern	E14	Adjust the Hiawatha 138/69 kV transformer no-load tap ratios to unity