

TABLE UP-4-E															
PERFORMANCE CRITERIA LIMITS EXCEEDED AND OTHER CONSTRAINTS – Overloaded Facilities, U.P. Eastern Zone															
U.P. Zone	Map Item #	Criteria Exceeded/Need	Facility Outage	Robust Economy		High Retirements		High Environmental		Slow Growth		DOE 20% Wind		Fuel & Invest. Limit.	
				2018 % of Facility Rating	2024 % of Facility Rating	2018 % of Facility Rating	2024 % of Facility Rating	2018 % of Facility Rating	2024 % of Facility Rating	2018 % of Facility Rating	2024 % of Facility Rating	2018 % of Facility Rating	2024 % of Facility Rating	2018 % of Facility Rating	2024 % of Facility Rating
Eastern	1	Straits-Pine River 69 kV, Straits-Evergreen-Pine River 69 kV	Straits-Brevort 138 kV, Brevort-Lakehead 138 kV, Lakehead-Hiawatha 138 kV, Straits-Evergreen 69 kV, Evergreen-Pine River 69 kV, Straits-Pine River 69 kV	99%-134%	108%-148%	Did not solve, 149%-175%	Did not solve, 167%-195%	100%-116%	98%-119%				96%-110%	130%-154%	142%-166%
Eastern	2	Straits-McGulpin 138 kV #1 & #3	Straits-McGulpin 138 kV #3 & #1	107%	129%	143%	151%	97%	99%					116%	127%
Eastern	3	Hiawatha 138/69 kV #2	Hiawatha 138/69 kV #1		102%	105%	106%								
Eastern	4	Pine River-Rudyard 69 kV, Rudyard-Tone 69 kV, Tone-Kincheloe 69 kV, Kincheloe-9 Mile 69 kV	Hiawatha-Engadine 69 kV, Engadine-Newberry 69 kV, Pine River-9 Mile 69 kV, Brevort-Straits 138 kV, Pine River-Rudyard 69 kV		97%	134%-176%	144%-182%		96%-101%					117%-176%	106%-189%

TABLE UP-4A-E															
PERFORMANCE CRITERIA LIMITS EXCEEDED AND OTHER CONSTRAINTS – Low Voltages, U.P. Eastern Zone															
U.P. Zone	Criteria Exceeded/Need	Facility Outage	Robust Economy		High Retirements		High Environmental		Slow Growth		DOE 20% Wind		Fuel & Invest. Limit.		
			2018 % of Nominal Bus V	2024 % of Nominal Bus V	2018 % of Nominal Bus V	2024 % of Nominal Bus V	2018 % of Nominal Bus V	2024 % of Nominal Bus V	2018 % of Nominal Bus V	2024 % of Nominal Bus V	2018 % of Nominal Bus V	2024 % of Nominal Bus V	2018 % of Nominal Bus V	2024 % of Nominal Bus V	
Eastern	Hiawatha, Lakehead, Brevort, Indian Lake 138 kV bus voltages; Michigan Limestone, Talentino, Rockview, DeTour 69 kV bus voltages	Base Case	94.5%-96.0%	92.2%-95.8%	86.9%-91.7%	84.6%-90.6%	95.9%	95.5%			91.0%-94.7%	91.3%-94.1%	83.6%-91.2%	74.2%-95.2%	
Eastern	Hiawatha, Lakehead, Brevort 138 kV bus voltages; Michigan Limestone, Talentino, Rockview, DeTour 69 kV bus voltages	Straits-Brevort 138 kV, Brevort-Lakehead 138 kV, Lakehead-Hiawatha 138 kV		80.3%-82.7%	Did not solve	Did not solve	90.8%-91.4%	90.3%-91.8%			90.9%-91.0%	90.4%-90.7%	59.2%-76.6%	49.8%-70.2%	
Eastern	Hiawatha, Lakehead, Brevort, Indian Lake 138 kV bus voltages	Plains-Arnold 138 kV, Plains-Morgan 345 kV, Morgan-Hwy22 345 kV	91.7%	85.8%-92.0%	Did not solve	Did not solve		91.2%-91.9%					78.0%-91.2%	73.4%-90.6%	
Eastern	Indian Lake 138 kV bus voltage; Indian Lake, Manistique, Glen Jenks, Valley, Blaney Park, DeTour 69 kV bus voltages	Arnold-Perkins 138 kV #1, Arnold-Perkins 138 kV #2, Perkins-Indian Lake 138 kV #1, Perkins-Indian Lake 138 kV #2			84.4%-91.1%	83.1%-88.6%					88.8%-88.9%	87.5%-87.6%	<81%	<75%	
Eastern	Rudyard, Tone, Kincheloe, DeTour, Talentino, Michigan Limestone, 3 Mile, Roberts 69 kV bus voltages	Pine River-Rudyard 69 kV, Rudyard-Tone 69 kV, Tone-Kincheloe 69 kV, Kincheloe-9 Mile 69 kV, Pine River-9 Mile 69 kV			59.4%-90.1%	53.7%-85.5%							59.9%-91.9%	51.1%-85.4%	
Eastern	Engadine, Newberry, LouPac, Newberry Hospital, Roberts, Hulbert, Eckerman, Raco, Brimley 69 kV bus voltages	Hiawatha-Engadine 69 kV, Engadine-Newberry 69 kV, Newberry-Newberry Hospital Tap 69 kV, Newberry Hospital Tap-Roberts 69 kV					80.7%-91.4%	74.9%-92.0%	90.5%-91.0%	91.5%-91.9%			Did not solve, 35.7%-55.4%	Did not solve	