

Version 0 Standard	Handbook Reference	MAPP Requirement
BAL-002-0 R2	Policy 1	Reduction in Spinning Reserve: The MAPP requirement for Spinning Reserves is a minimum of 40% for Contingency Reserves

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TOP-001-0 TOP-002--0 TOP-003--0 and TOP-004--0	Policy 2 A. Transmission Operations	<p>1. Operations Studies. Operation Studies must be conducted to ensure secure transmission operations. Refer to “The MAPP Planning Standards” Section 1A for more information.</p>
TOP-004-0 R3	Policy 2 A. Transmission Operations	<p>2. Multiple Outages. The definition of “Multiple Outages of a credible nature” for the MAPP Region is those outages delineated in Section C of Table 1 of Section 1A of “The MAPP Planning Standards”. Therefore, MAPP Operating Policy dictates that Transmission Operators and Reliability Coordinators shall operate the system to protect against instability, uncontrolled separation, or cascading outages resulting from any of these events.</p>
TOP-007-0 and VAR-001-0	Policy 2	<p>4. MAPP System Performance Requirements. During, and following, the conditions listed below, the MAPP system shall be continuously operated to prevent interruption of load due to instability, cascading, voltage instability, undamped oscillations, subsynchronous resonance or violation of transient voltage limits. This shall be done at all levels and status conditions of equipment on the power supply system at 100 kV and above. As conditions of the system change, consideration should be given to defined contingencies to avoid violating emergency voltage limits or emergency loading limits of any equipment prior to operator initiated readjustments of the system.</p> <p>During the outage of the element(s), readjustment of the system will be performed so that all voltages are within acceptable voltage levels and all facility loadings are within normal ratings. Following a contingency or other event that results in an operating security limit violation, the member shall return its transmission system to within operating security limits as soon as possible, but no longer than 30 minutes.</p>

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None	Policy 2	<p>The system must also be adequate for testing of an outaged transmission line by manual reclosing during the outage and before adjusting any generation if this is a normal operating practice. The criteria for undamped oscillations must be applied to rotor angles for the following conditions:</p> <ul style="list-style-type: none"> • Damping Factor (min.) = 5% (refer to MAPP disturbance table in Planning Standard 1A) • Damping Factor (min.) = 10% (same as above)
None	Policy 2	<p>Permissible Readjustments.</p> <p>Permissible readjustments vary with the conditions prior to the contingency being studied. The readjustment period is the time immediately following a contingency in which actions can be performed to keep facilities within emergency loading limits and emergency voltage limits and return facility loading to normal loading, voltages to acceptable voltage levels and return the system within operating security limits. The length of the readjustment period will be ten minutes to restore voltage levels to acceptable voltage levels. The readjustment period to keep loading within emergency limits is normally ten minutes, however, this time period may be extended to the length of time the member has agreed the overloaded facility can exceed its normal rating when originally defining the emergency loading limits for the facility. No rating shall be defined with a time period less than ten minutes. The readjustment period for returning the system within operating security limits will not exceed 30 minutes.</p> <p>The following summarizes readjustments which are permitted for contingencies with all transmission facilities in service before the contingency (normal conditions).</p> <ul style="list-style-type: none"> • Generation Rejection: Generation may be rejected in one of two methods; tripping the generator unit or tripping generation supported tie lines. For either method, the amount of effective generation rejection with the readjustment period shall not exceed 80% of the normal operating spinning reserve of the MAPP system (40% of the size of the largest single contingency).

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None	Policy 2	<ul style="list-style-type: none"> · Generation Adjustments: Reducing or increasing generation while keeping the units online or by bring additional units online. The amount of generation change is limited to that amount that can be accomplished with the readjustment period. Due consideration shall be given to start up time and ramp rates of the units. · Capacitor and Reactor Switching: The number of capacitors and reactors which may be switched is limited to those which could be switched during the readjustment period. This includes those capacitors and reactors which would be switched by automatic controls within the same period. · Reduction of economy exports and imports to the extent possible within the readjustment period. · Adjustment of Load Tap Changers (LTC's) to the extent possible within the readjustment period. This includes both LTC's which would automatically adjust and those under operator control which could be adjusted within the readjustment period. · Adjustment of phase shifters to the extent possible within the readjustment period. Agreement must be obtained from the owner(s). · Adjustment of the amount of the flow the HVDC can be increased or decreased within the readjustment period. · Tripping of transmission elements in situations where tripping the element will not degrade the reliability of the system. · Curtailing load during the readjustment period shall be permissible
VAR-001-0	Policy 2	<p>5. Steady State Voltages.</p> <p>Unless otherwise published by the entity responsible for the operation of the facility, acceptable Voltage Levels are Bus voltage levels between 95% and 105% of the nominal bus voltage.</p>

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None	Policy 2	<p>Interconnection Capacity. Unless limited by an operating guide for contingencies, the normal capacity of a facility shall be the lowest capacity shown in the most recent version of the MAPP Transmission Capacity Data Listing.</p>
TOP-004-0 R6	Policy 2	<p>B. Voltage and Reactive Control</p> <p>1. Voltage Stability Requirements. Voltage stability will be maintained in the MAPP region by operating at or below P_{limit} defined as the power transfer limit across the critical interface. Voltage stability can be analyzed by plotting bus voltage versus power transfer (P-v curve). P_{limit} can be determined by developing P-V curves for those buses 115kV and above which have the largest contribution to voltage instability due to the most limiting first contingency. P_{limit} is calculated as the lessor of:</p> <ul style="list-style-type: none"> • (0.9) * P_{crit} where P_{crit} is defined as the maximum power transfer (nose of P-V curve) or • The maximum power transfer before a bus voltage falls below 0.9 P.U. (shown below as point “a”) or • The maximum power transfer which does not result in a post contingency voltage violation as defined in the MAPP Member Criteria and Study Procedures Manual. <p>(see figure in Reliability Handbook)</p> <p>The type of remedial activity which will occur is based on how close the system is operating to P_{limit}.</p> <p>Flow Levels Point Actions</p> <p>I. (0.80) * P_{limit} Collect schedules and invoke relative local operating guides</p> <p>II (0.95) * P_{limit} MAPP would monitor and restrict schedules such that P_{limit} is never exceeded</p>

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None	Policy 3	No additional requirements

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EOP-004-0 R1	Policy 4	For MAPP specific requirements on Disturbance Monitoring devices see Appendix
None	Policy 4	<p>D. System Protection Coordination</p> <p>1. Independent devices. Independent devices shall be installed to the extent necessary to provide backup for the primary protection system to limit equipment damage, to limit shock to the system and to speed restoration of service. Relay applications and settings shall not restrict the power transfer capability that may reasonably be expected to exist between any two points of the system. Relaying actions and reclosing practices will be represented in the simulated tests according to the design and operation of the actual protection schemes.</p>
COM-001-0	Policy 4	<p>2. Interconnected Switching.</p> <p>Control Area System Operators and Reliability Coordinators shall use established methods of uniform communication and defined procedures utilizing common terminology when involved with interconnected switching. All switching actions that cross company boundaries will be referred to as Interconnected System Switching.</p>
None	Policy 4	<p>3. Relay Operation. Transmission and generation owning entities within MAPP should use the following guides to help insure proper operation of protective relays:</p> <p>3.1 All relay schemes should use operation indicators (targets) to facilitate fault analysis. Prompt retrieval of target status is encouraged. In case of faults in the interconnections, target information should be exchanged between the interconnected systems.</p> <p>3.2 All relays and other system protection equipment should be thoroughly tested before being put into service. Test procedures should verify operation of protective devices under conditions as close to actual operating conditions as can be simulated.</p> <p>3.3 If there is an indication of incorrect relay operation, the cause should be investigated promptly. For MAPP specific requirements, refer to Appendix 4D Subsection A.</p>

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None	Policy 4	3.4 Line pick up protection must be provided for schemes using distance relays and line side potential transformers. High set over-current relays will work, provided the proper setting can be made.
PRC-003-0 R1	Policy 4	Appendix 4D Subsection A - MAPP Regional Plan For Monitoring, Notification and Analysis of Protection Trip Operations
PRC-012-0 R1.7	Policy 4	Appendix 4D Subsection B - MAPP Regional Plan for Monitoring, Notification And Analysis of Special Protection Systems and Operations

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EOP-004-0 R1	Policy 5	MAPP Appendix 5F – MAPP Disturbance Reporting

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<p>MOD-001-0 MOD-004-0 MOD-008-0</p>	<p>Policy 6</p>	<p>Operations Planning A. Normal Operations 1. Total Transfer Capability or Available Transfer Capability and transmission coordination Appendix 6A, Subsection A, B and C (see handbook for details)</p>
<p>TOP-005-0 R1</p>	<p>Policy 6</p>	<p>Operations Planning A. Normal Operations 2. Communication of Facility Status Power System Stabilizer Status The Reliability Coordinator shall be advised of the operating status of PSS equipment that is presently installed. It shall be assumed that equipment is in service unless the Reliability Coordinator is notified otherwise. Members operating units having such equipment have the responsibility to advise the Reliability Coordinator whenever the equipment is removed from service and when it has been returned to service. The report, listing generating units whose PSS equipment has been reported to be unavailable, is updated daily. Also included is the actual status of the generator (off-line or on-line) and the unavailability of either the GRE or MP HVDC damping control equipment.</p>
<p>PRC-006-0</p>	<p>Policy 6</p>	<p>C. Load Shedding 1. Under Frequency Load Shedding A coordinated automatic underfrequency load shedding (UFLS) program is required to help preserve the security of the generation and interconnected transmission system during major declining system frequency events. Appendix 6C contains the MAPP Regional Underfrequency Load Shedding Program as approved by the Operating Subcommittee. The Operating Subcommittee has the responsibility for compliance of the MAPP Coordinated UFLS Program with NERC and MAPP Planning Standards and to assess compliance of subregional UFLS programs to the MAPP UFLS Program.</p>

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PRC-006-0 cont.	Policy 6	<p>Underfrequency load shedding relays should be installed to help balance the load with available generation should a separation occur in the interconnected system. Each Reliability Member in the MAPP region shall shed at least thirty-percent (30%) of its load in at least ten-percent (10%) steps at 59.3, 59.0 and 58.7 Hz as calculated at the entity's peak. Reliability Members that interconnect with non-Members who are in the MAPP Reliability Region shall ensure that the non-member meets these same requirements or includes sufficient load in its Underfrequency Load Shedding scheme to meet the requirements for the non-Member that it is interconnected with. Reliability Members will report data on a Control Area basis. Underfrequency relays should be installed on major generating units and be coordinated with the underfrequency load shedding relays. Care must be taken to minimize the possibility of false tripping.</p>
EOP-005-0	Policy 6	<p>D. System Restoration</p> <ol style="list-style-type: none"> 1. Each system shall establish a restoration plan with necessary operating instructions and procedures to cover emergency conditions, including the loss of vital telecommunications channels. <ol style="list-style-type: none"> 1.1 Recognize and address equipment operating problems that could exist during restoration conditions. 1.2 List key restoration contacts and facilities. 1.3 Identify primary communication systems to key restoration facilities (excluding the Public Switched Telephone Network). 1.4 Identify secondary communications systems to key restoration facilities (excluding the Public Switched Telephone Network) if such systems exist. <p>Note: A backup or secondary communications system is strongly recommended but not required.</p> 1.5 Address manpower deployment to key restoration facilities. <ol style="list-style-type: none"> 2. Each Control Area Operator shall ensure adequacy (minimum of eight hours) of back up power supply equipment to key restoration facilities. 3. Each Control Area Operator shall ensure EMS functionality during restoration. 4. Each Control Area Operator shall ensure adequate closing logic on key restoration facilities.

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EOP-008-0	Policy 6	E. Continuity of Operations 1. Each Control Area Operator shall in its plan to continue operations in the event its primary control center becomes in operable, designate a secondary location remote from the primary control center site. 2. Each Control Area Operator shall have communications equipment installed at this remote location capable of communicating with their Reliability Coordinator, the appropriate OASIS, critical control area facilities and interconnected Control Areas.

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COM-001-0	Policy 7	<p>A. Facilities</p> <p>The primary means of communication between MAPP Members and the MAPP Security Center is via the MAPP Computer Network (MCN). Regional communication is accomplished on the MCN through a system referred to as the MAPP Control Center Services (MCCS) Each MAPP Operating Authority shall install and maintain a MCCS terminal or its successor system, and a telephone in the control center. Entities must provide dedicated voice channels to adjacent control areas, its major power plants and major transmission substations, which utilizes facilities independent of the common carrier switched network. Procedures and instructions must be established to enable continued operation during telecommunication failures.</p>

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PER-002-0 R3.1	Policy 8	<p>B. Training</p> <p>1 Each Operating Authority shall:</p> <p>1.1. Provide operational guidelines to its system operators that are based on realistic problem contingencies and known facility limitations.</p> <p>1.2. Utilize the MAPP System Operator Training Program Phases I, II, and III or an equivalent in-house training program to educate its system operators on the subjects of normal and abnormal power system operations, communication methods and systems, interconnected system operations, power system control techniques, and supervisory control methods.</p> <p>1.3. Develop procedures and provide instructions to its system operators, for recognition and communication of sabotage events on its facilities and multi-site sabotage that affects larger portions of the Interconnection.</p> <p>1.4. Educate its system operators of the operating information needs of other Members, the Reliability Coordinator, and the NERC staff, and develop procedures for the effective transfer of such information.</p> <p>1.5. Be responsive to the information requirements of other operating authorities, Regional committees and the NERC Operating Committee.</p> <p>1.6. Implement periodic refresher training to ensure veteran system operators remain current with changing national and regional practices and policies.</p> <p>1.7. Comply with any system operator certification program or other requirement that may be established by the MAPP Regional Reliability Committee.</p>

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None	Policy 9	No additional requirements