



MISO Market Capacity Emergency

SO-P-EOP-00-002 Rev: 14

ROLE			ROLE	
BAO	<input checked="" type="checkbox"/>		SM	<input checked="" type="checkbox"/>
UCD-IRAC	<input checked="" type="checkbox"/>		RC	<input checked="" type="checkbox"/>
UCD-UDS	<input checked="" type="checkbox"/>		G&I	<input checked="" type="checkbox"/>
RE	<input checked="" type="checkbox"/>		LBA	<input checked="" type="checkbox"/>
TOP	<input checked="" type="checkbox"/>		MP	<input checked="" type="checkbox"/>
GOP	<input checked="" type="checkbox"/>			

Rev History	Reason for Issue	Revised By	Issue Date	Effective Date
14	Out-of-Cycle Update for STR implementation. Completed Updates to Sections 4.1.1 and 4.2.2. Operating procedure owner approval on file.	Mike Spadaro/ Don Hunter/ Terry Wright/ Bill Puller	08/25/2022	08/25/2022
13	Annual Review and updates for STR implementation. Completed Requirement Owner Review. Updates to Sections 3.1, 4.2.2, 4.3.11 and Compliance References. Operating procedure owner approval on file.	Terry Wright/ Yong Jiang/ Ken Delp/ Bill Puller	05/27/2022	06/01/2022
12	Updates for Tier 0 pricing changes implementation. Operating procedure owner approval on file.	Terry Wright/ Tracy Toumi	09/01/2021	09/01/2021

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1.0 Purpose	1
2.0 Precautions and Limitations	1
3.0 Entry Conditions	4
3.1 Capacity Advisory	4
3.2 Max Gen Alert	5
3.3 Max Gen Warning	5
3.4 Max Gen Event	5
4.0 Instructions	5
4.1 Capacity Advisory	5
4.1.1 Capacity Advisory - MISO Actions	5
4.1.2 Capacity Advisory - MISO Stakeholder Actions	6
4.2 MISO Actions during a Max Gen Emergency	8
4.2.1 Max Gen Declaration - MISO Actions	8
4.2.2 Max Gen Alert - MISO Actions	8
4.2.3 Max Gen Warning - MISO Actions	10
4.2.4 Max Gen Event Step 1a - MISO Actions	12
4.2.5 Max Gen Event Step 1b - MISO Actions	12
4.2.6 Max Gen Event Step 2a - MISO Actions	13
4.2.7 Max Gen Event Step 2b - MISO Actions	14
4.2.8 Max Gen Event Step 2c - MISO Actions	15
4.2.9 Max Gen Event Step 3a - MISO Actions	15
4.2.10 Max Gen Event Step 3b - MISO Actions	15
4.2.11 Max Gen Event Step 4a - MISO Actions	16
4.2.12 Max Gen Event Step 4b - MISO Actions	16
4.2.13 Max Gen Event Step 5 - MISO Actions	17
4.2.14 Max Gen Event Downgrade/Termination - MISO Actions	18
4.3 MISO Stakeholder Actions during a Max Gen Emergency	19
4.3.1 Max Gen Alert Level Actions - MISO Stakeholder Actions	19
4.3.2 Max Gen Warning - MISO Stakeholder Actions	20
4.3.3 Max Gen Event Step 1a - MISO Stakeholder Actions	20
4.3.4 Max Gen Event Step 1b - MISO Stakeholder Actions	20
4.3.5 Max Gen Event Step 2a - MISO Stakeholder Actions	21
4.3.6 Max Gen Event Step 2b - MISO Stakeholder Actions	22
4.3.7 Max Gen Event Step 2c - MISO Stakeholder Actions	22
4.3.8 Max Gen Event Step 3a - MISO Stakeholder Actions	22



4.3.9 Max Gen Event Step 3b - MISO Stakeholder Actions	22
4.3.10 Max Gen Event Step 4a/b - MISO Stakeholder Actions.	22
4.3.11 Max Gen Event Step 5 - MISO Stakeholder Actions	23
4.3.12 Max Gen Event Downgrade/Termination - MISO Stakeholder Actions . .	23
5.0 Definitions	24
6.0 References	25
6.1 NERC References	25
6.2 MISO References.	26
Attachment 1 — Reserve Margin Example Calculations	28
Attachment 2 — Maximum Generation Declaration Template.	30
Attachment 3 — Load Management Update Form Example	32
Attachment 4 — Slice-of-System PPAs Load/Schedule Curtailment.	33
Attachment 5 — Additional Information	35
Attachment 6 — Maximum Generation Emergency Overview.	36

1.0 Purpose

Provide a set of emergency Operating Plans to address Capacity Emergencies and Energy Emergencies within the MISO Balancing Authority Area (MBAA), which shall include the following:

1. Roles and responsibilities for the MISO Operators, Local Balancing Authorities (LBAs), Transmission Operators (TOPs), Generation Operators (GOPs), and Market Participants (MPs).
2. Process for preparation, management, and recovery from an Emergency.

2.0 Precautions and Limitations

1. As conditions require, MISO may provide instructions to move to any section or step in this procedure while providing instructions to complete actions described in earlier levels or steps as time permits.
2. Should sufficient relief be obtained during the implementation of one of the actions during a declaration step, subsequent actions within that declaration step need **NOT** be taken.
3. The Operating Reserve Requirement for the MBAA consists of Regulation and Contingency Reserve Requirements.
4. The Operating Reserve Requirement for a Region or Sub-Area consists of a Contingency Reserve Requirement based on the Most Severe Single Contingency (MSSC) within its boundaries.
5. Available Economic Resources are the Available Economic Max (including BTM but reduced by Resources that cannot be committed due to congestion or excessive Time-to-Start) and adjusted for Constraint Stranded MW and NSI Obligations.
6. South Region Available Economic Resources are the South Available Economic Max (including BTM but reduced by Resources that cannot be committed due to congestion or excessive Time-to-Start) and adjusted for South Constraint Stranded MW, the Regional Dispatch Transfer NSI (RDT NSI), and Resources from the Central and North Regions that are deliverable to the South via the RDT up to the Regional Dispatch Transfer Limit (RDTL, typically 3,000 MW).
7. The 5% Reserve Margin Entry Condition for an MBAA Capacity Advisory includes allowance for loss of the MSSC and subsequent recovery within 90 minutes for the second MSSC (if applicable), plus uncertainties.

8. Increasing the Reserve Margin Entry Condition may be required when relying on a significant amount of capacity returning from outage or if there are other forecasting uncertainties or risks to the interconnection.
9. MISO will use the Mid-term Load Forecast (MTLF) or Short-term Load forecast (STLF) where applicable to determine available Operating Reserves. MISO may adjust the load forecast values based on sustained error over time and will document the reasons for the adjustment.
10. Transmission System Emergencies that require immediate action will be declared and resolved through actions identified in MISO SO-P-EOP-00-004 *Transmission System Emergency*. Transmission constraints, which result in limitations in transferring energy into the MBAA or a sizable sub-area of the MBAA and result in a capacity or energy Emergency for such area will be managed through the current procedure.
11. Energy deficient BA obligations include immediate actions to mitigate any undue risk to the Interconnection, including Load shedding.
12. MISO posts Max Gen Declaration notification to the MISO Market and Operations - Real-Time Operations Website.
13. Depending on the urgency of the Max Gen Emergency, manual Load Shedding may be used to control the Emergency at any time. This includes the immediate shedding of load to return Area Control Error (ACE) to zero.
14. MISO's posting of the Max Gen Declaration notification to the RT Ops Website [via MISO Communication System (MCS)] serves as notice of the existence and duration of the conditions requiring the implementation of the procedures set forth in Section 40.2.20 of the Tariff.
15. MISO will render all available emergency assistance to others as requested, provided that the requesting entity has implemented its comparable emergency procedures, unless such actions would violate safety, equipment, regulatory or statutory requirements.
16. If MISO is **NOT** able to send Load Modifying Resource (LMR) availability reminders to MPs, MISO will communicate, via the Demand Side Resource Interface (DSRI) Tool, implementation instructions using the then current availability information in the tool, assuming it to be correct.
17. MISO Shift Manager (SM) should evaluate additional staffing requirements per SO-I-NOP-00-441 *Real-Time Event Resolution*.



18. The Reserve Procurement Enhancement (RPE) objective for the RDT North-to-South is to elevate MCP and energy prices in the South Region to clear additional Contingency Reserves to allow recovery of the RDT Flow to 116% post-contingent of the South MSSC. Operators must determine how to reduce the RDT Flow further to 100% from 116%. When RPE on RDT is violating, additional generation should be started. [□]
19. The Unit Commitment and Dispatch (UCD) Operator operates in real-time as the Intra-Day Reliability Assessment Commitment (IRAC) and Unit Dispatch System (UDS) Operator. The specific job responsibilities of the IRAC and UDS Operator are differentiated in this procedure to clarify operator roles. [□]

3.0 Entry Conditions

3.1 Capacity Advisory

1. Entry conditions are based on the Reserve Margin, which is the Total Operating Reserves compared to the Operating Reserve Requirement, either in MW or % of the Load, plus Operating Reserve Requirements. Attachment 1 — Reserve Margin Example Calculations has example calculations.
 - Reserve Margin:

$$\text{Total Operating Reserves} - \text{Operating Reserve Requirement}$$
 - Reserve Margin (%):

$$100 * (\text{Total Operating Reserves} - \text{Operating Reserve Requirement}) / (\text{Load} + \text{Operating Reserve Requirement})$$
 - Total Operating Reserves MBAA:

$$(\text{Avail Eco Max} - \text{Constraint Stranded} - \text{NSI}) - \text{Load}$$
 - Total Operating Reserves South Region:

$$(\text{Avail Eco Max} - \text{Constraint Stranded} - \text{RDT NSI} + \text{RDTL}) - \text{Load}$$

SM

Note

[□]

- IF a positive but somewhat low Reserve Margin is forecast:
- A Capacity Advisory will typically be declared 2 to 3 days in advance, however, it may be declared in any time frame.
- A decision to declare a Capacity Advisory may take into account other information such as time frame, weather and other risk factors
- Increasing the Reserve Margin may be required when relying on a significant amount of capacity returning from outage or if there are other uncertainties or risks to the Interconnection.

1. IF any of the following conditions are identified THEN **PERFORM** Section 4.1 Capacity Advisory: [□]

- MBAA, Region or Sub-Area forecasted Reserve Margin (%) is less than 5%
- South Region forecasted Reserve Margin is less than 2,000 MW

3.2 Max Gen Alert

SM

<u>Note</u>	[□]
<ul style="list-style-type: none"> • A positive but low Reserve Margin is forecasted in a Max Gen Alert. • For a negative Reserve Margin, a Warning or Event should be declared. • Increasing the Reserve Margin may be required when relying on a significant amount of capacity returning from outage or if there are other forecasting uncertainties or risks to the interconnection. 	

1. IF any of the following conditions are identified, THEN **PERFORM** Section 4.2.2 Max Gen Alert - MISO Actions: [□]
 - MBAA, Region or Sub-Area forecasted Reserve Margin is less than 1500 MW, or largest single contingency for Sub-Area
 - South Region forecasted Reserve Margin is less than 500 MW

3.3 Max Gen Warning

SM

<u>Note</u>	[□]
A negative Reserve Margin means that Load and Operating Reserve Requirement cannot be met with normal Economic Resources. In that scenario a Max Gen Warning or Event should be declared.	

1. IF the following condition is identified, THEN **PERFORM** Section 4.2.3 Max Gen Warning - MISO Actions: [□]
 - MBAA, Region, or Sub-Area actual or forecasted Reserve Margin is less than zero

3.4 Max Gen Event

SM

1. IF the following condition is identified, THEN **PERFORM** Section 4.2.4 Max Gen Event Step 1a - MISO Actions when: [□]
 - MBAA, Region, or Sub-Area actual or forecasted Reserve Margin is less than zero
 - Warning level actions are **NOT** sufficient

4.0 Instructions

4.1 Capacity Advisory

SM

- 4.1.1 Capacity Advisory - MISO Actions
 1. **COMMUNICATE** Capacity Advisory as follows: [□]
 - A. **DEFINE** boundaries of Capacity Advisory area. [□]
 - B. **DEFINE** start and end time of Capacity Advisory. [□]
 - C. **SEND** Capacity Advisory declaration to affected members via MCS per SO-I-NOP-00-448 *Event Communications Matrix*. [□]

- D. **SEND** Capacity Advisory declaration via Reliability Coordinator Information System (RCIS).
- SM 2. IF MCS is down or SM determines a conference call is necessary, THEN **PERFORM** conference call with affected reliability entities per SO-P-NOP-00-483 *Reliability Coordination Conference Call*.
- SM 3. IF a significant shortage of Operating Reserves is anticipated in any Reliability Assessment Commitment (RAC) process, THEN **DETERMINE** whether to issue LMR Scheduling Instructions in anticipation of a Max Gen Emergency Event Step 2a or higher.
- SM 4. **SEND** informational message via MCS to impacted area that LMRs have been called in anticipation of a Max Gen Emergency.
- SM 5. **SEND** LMR scheduling instructions (from longest to shortest lead time) via MCS for forecasted Max Gen Emergency.
- UDS 6. IF declaration is for the North/Central Region, THEN **UPDATE** STR RPE Default value(s) by 800MW in the EMD Global Reserve Requirements menu for the duration of Capacity Advisory or Max Gen declaration per SO-I-EOP-001 *Utilizing Emergency Ranges and Emergency and VOLL Pricing*.
- SM 7. **NOTIFY** Day Ahead (DA) and Forward Reliability Assessment and Commitment (FRAC) operators when STR RPE update is complete.

4.1.2 Capacity Advisory - MISO Stakeholder Actions

- LBA/MP 1. WHEN notified by MISO, THEN **ENSURE** all market data is updated with best available information for operating day(s) including the following:
- Facility and generation availability, outages and de-rates
 - Generation Offers, including any changes to reflect fuel availability
 - Fuel supply and inventory concerns
 - Fuel switching capabilities
 - Environmental constraints
 - Load forecast Values
 - LMR Availability in the DSRI
 - Voluntary Load Management information



- Load Management Measures (LMM) and any Voluntary Load Management in the MCS
- Emergency Demand Response (EDR) offers

MP **Note**
LMRs should be implemented **NO** less than the MW amount scheduled and within guidelines given by MISO.

- MP 2. IF notified by MISO, THEN **IMPLEMENT** LMRs.
- MP 3. **UPDATE** DSRI Tool as follows:
- A. **NAVIGATE** to the Active Event by clicking either of the following:
- the Scheduling Instruction event banner
 - the Active Event from the dashboard, or
 - the Events tab
- B. **REVIEW** Event Timeline and LMR Instructions broken down by each LBA.
- C. **ACKNOWLEDGE** LMR Scheduling Instructions.
- D. **NAVIGATE** to Resource Deployment tab of the Active Event.
- E. **ENTER** and **SUBMIT** MW Amounts of Resources that will be deployed in order to meet the LMR Scheduling Instruction obligation per LBA.
- F. After receiving the LMR Scheduling Instruction, **UPDATE** LMR Availability of those Resources that were designated to respond to LMR Scheduling Instruction to reflect what is newly available to MISO.

4.2 MISO Actions during a Max Gen Emergency

4.2.1 Max Gen Declaration - MISO Actions

- | | | |
|----|---|------------------------------|
| SM | 1. DECLARE applicable Max Gen Alert/Warning/Event as follows: | [<input type="checkbox"/>] |
| | A. DEFINE boundaries of declaration area. | [<input type="checkbox"/>] |
| | B. DEFINE start and end time of declaration. | [<input type="checkbox"/>] |
| | C. SEND Max Gen Declaration via MCS per SO-I-NOP-00-448 Event Communications Matrix. | [<input type="checkbox"/>] |
| | D. SEND Max Gen declaration summary information via RCIS within 30 minutes. | [<input type="checkbox"/>] |
| SM | 2. ENSURE Conservative System Operations has been declared per SO-P-NOP-00-449 Conservative System Operations. | [<input type="checkbox"/>] |
| SM | 3. IF MCS is down or SM determines a conference call is necessary, THEN PERFORM conference call with affected reliability entities per SO-P-NOP-00-483 <i>Reliability Coordination Conference Call</i> . | [<input type="checkbox"/>] |

4.2.2 Max Gen Alert - MISO Actions

- | | | |
|-----|---|------------------------------|
| SM | 1. IF starting declaration at a Max Gen Alert, THEN DECLARE Max Gen Alert per Section 4.2.1 Max Gen Declaration - MISO Actions. | [<input type="checkbox"/>] |
| UDS | 2. IMPLEMENT Emergency Pricing Tier 0 and INCREASE Short Term Reserve (STR) requirement per SO-I-EOP-00-001 <i>Utilizing Emergency Ranges and Emergency and VOLL Pricing</i> . | [<input type="checkbox"/>] |

SM	<u>Note</u>	[<input type="checkbox"/>]
	This survey is to gain an idea of amount of LMM load reduction to expect to be available if needed.	

- | | | |
|------|--|------------------------------|
| | 3. SEND survey via MCS LMM Tool in the Load Management Tab to LBAs to ensure LMM information is updated. | [<input type="checkbox"/>] |
| SM | 4. IF the Drill Mode is currently on. THEN ENSURE to “Switch to Live Mode”. | [<input type="checkbox"/>] |
| BAO | 5. IF Operating Reserve availability changes are identified, THEN NOTIFY SM. | [<input type="checkbox"/>] |
| IRAC | 6. ENSURE available economic resources are committed to meet load, firm transactions, and reserve requirements. | [<input type="checkbox"/>] |
| G&I | 7. COORDINATE with MPs with Module E Resources as follows: | [<input type="checkbox"/>] |
| | A. DETERMINE available Resources for implementation during potential Warning declaration. | [<input type="checkbox"/>] |

	B.	IF MPs have remaining available External and Internal Resources (Module E registered Capacity Resources), THEN REQUEST amount available for implementation during potential Warning declaration.	[]
	C.	ENSURE MPs identify specific information on physical location and path External Resources (Module E registered Capacity Resources) would use to deliver energy into potential Warning area.	[]
G&I	8.	NOTIFY SM of Total MW of non-firm energy sales and MISO exporting Capacity Resources.	[]
RC		Note	[]
		The following analysis should be completed in time for implementation during the potential Warning declaration.	
	9.	COORDINATE with neighboring Reliability Coordinators (RCs) and MISO TOPs to raise transfer capability into declaration area or make available constraint stranded generation (on or off line) in declaration area including: review Transmission Loading Relief (TLR) activity, binding constraints, available reconfiguration options, and use of short term emergency ratings.	[]
UDS	10.	UPDATE Short Term Reserve (STR) requirement in EMD (global reserve requirement) to override STR requirement to +800MW of normal values, for the declared duration of the emergency.	[]
UDS	11.	IF declaration is for the North/Central Region, THEN UPDATE STR RPE Default value(s) by 800MW in the EMD Global Reserve Requirements menu for the duration of Capacity Advisory or Max Gen declaration per SO-I-EOP-001 <i>Utilizing Emergency Ranges and Emergency and VOLL Pricing</i> .	[]
ALL	12.	LOG actions taken and relevant information in response to the declaration.	[]

Note

[□]

- Actions are taken to attempt to preserve Resources dedicated to firm Load and maintaining Operating Reserves.
- Actions available at this level should be fully utilized, time permitting, for all entities within the defined declaration area prior to declaring an emergency.

4.2.3 Max Gen Warning - MISO Actions

- | | | |
|------------|---|-----|
| SM | 1. IF starting declaration at a Max Gen Warning or escalating from a Max Gen Alert, THEN DECLARE Max Gen Warning per Section 4.2.1 Max Gen Declaration - MISO Actions. | [□] |
| UDS | 2. IMPLEMENT Emergency Pricing Tier 1 per SO-I-EOP-00-001 Utilizing Emergency Ranges and Emergency and VOLL Pricing. | [□] |
| IRAC | 3. SUSPEND Coordinated Transaction Scheduling (CTS) for the duration of the capacity emergency per SO-I-AOP-00-224 CTS Failure Modes. | [□] |
| G&I | 4. COMMUNICATE CTS suspension with PJM. | [□] |
| SM | 5. REVIEW EDR offers to determine EDR availability and MW amounts for Warning period. | [□] |
| SM | 6. OBTAIN updated MW amounts of relief available during effective Warning period by LBA from MCS. <ul style="list-style-type: none"> • LMMs – Stage 1 • LMMs – Stage 2 | [□] |
| SM | 7. REVIEW LMRs availability in MCS-LMR Tool for declaration period. | [□] |
| SM | 8. DIRECT the following to raise forecasted capacity: | [□] |
| BAO | A. TERMINATE Inadvertent Payback process per SO-I-NOP-00-462 Inadvertent Interchange Management. | [□] |
| BAO | B. DETERMINE if request for time error correction termination should be made per SO-P-NOP-00-455 Balancing Authority Operations. | [□] |
| SM | 9. SEND MCS message to MPs to schedule remaining available External and Internal Resources (Module E Registered Capacity Resources) that would be deliverable to Warning area, given transmission constraints. | [□] |
| SM/
G&I | 10. COORDINATE to notify MPs to schedule Module E Resources into MBAA declaration area as follows: | [□] |

- | | | |
|-----|--|-----|
| G&I | A. PROVIDE instructions on amount and time to schedule External and Internal Module E Resources into declaration area. | [] |
| G&I | B. ENSURE MPs report when this action is complete. | [] |
| G&I | C. LOG MW amounts of External and Internal Module E Resources for additional energy scheduled into MBAA declaration area. | [] |
| G&I | 11. NOTIFY SM of forecasted changes in MBAA NSI due to loss of imports. | [] |
| G&I | 12. COORDINATE to determine amount of non-firm Export Schedules to curtail. | [] |
| G&I | 13. IF Export Schedule Limits are exceeded, THEN CURTAIL Export Schedules from declaration area in amounts required to relieve shortage condition in the following order per SO-I-EOP-00-006 Interchange Scheduling Operations during Emergency Conditions: | [] |
| | A. Non-Firm Transmission Schedules. | |
| | B. Firm Schedules from Capacity (Module E) Resources that are NOT meeting their Schedule requirements and Capacity requirements. | |
| | C. Firm Schedules from non-Capacity (Module E) Resources that are NOT meeting their Schedule requirements. | |
| | D. Firm Transmission schedules from Power Purchase Agreements (PPAs) that represent a Fleet of Resources, when those resources are NOT meeting their collective resource obligation. | |
| G&I | 14. MODIFY webTrans E-tag validation mode to reflect Max Gen in affected area (North, South, or All) per SO-I-EOP-00-006 <i>Interchange Scheduling Operations during Emergency Conditions</i> . | [] |
| RC | 15. NOTIFY TOP to implement reconfiguration options agreed upon to raise transfer capability into declaration area or alleviate constraint stranded generation in declaration area. | [] |
| ALL | 16. LOG actions taken and relevant information in response to the declaration. | [] |

4.2.4 Max Gen Event Step 1a - MISO Actions

SM **Note** [□]
 Actions in this section are taken to attempt to preserve Resources dedicated to firm Load and maintaining Regulating Reserves.

1. IF starting declaration at a Max Gen Event Step 1a or escalating from a Max Gen Warning, THEN **DECLARE** Max Gen Event 1a per Section 4.2.1 Max Gen Declaration - MISO Actions. [□]

SM 2. **NOTIFY** Director On-Call to implement SO-P-AOP-00-217 *MISO and State Officials 24X7 Communication Protocols During Emergencies.* [□]

IRAC **Note** [□]
 AME are resources with a commit status of Emergency.

3. **COMMIT** the following Available Max Emergency (AME) designated resources: [□]

- Generation Resources
- Demand Response Resources – Type 1
- Demand Response Resources – Type 2

4.2.5 Max Gen Event Step 1b - MISO Actions

SM 1. IF starting declaration at a Max Gen Event Step 1b or escalating from a Max Gen Alert/Warning or lower Event step, THEN **DECLARE** Max Gen Event Step 1b and EEA1 per Section 4.2.1 Max Gen Declaration - MISO Actions. [□]

IRAC **Note** [□]
 UCD-IRAC Operator ensuring emergency ranges are available for use by UDS and UCD-UDS Operator verifying these ranges are preliminary actions to implementing these ranges in Event Step 1b.

2. **ENSURE** unit emergency ranges are pushed per SO-I-EOP-00-001 *Utilizing Emergency Ranges and Emergency and VOLL Pricing.* [□]

UDS	<p style="text-align: center;">Note [□]</p> <p>Resources selected to provide Regulating Reserve for each Generation Resource, Demand Response Resource – Type II and External Asynchronous Resource for use in MISO’s RAC, Automatic Generation Control (AGC), and UDS for the MBAA (or sub-area due to a transmission constraint) are to be excluded when implementing Emergency Maximum Limits.</p>
	<p>3. ACTIVATE Emergency Maximum Limits per SO-I-EOP-00-001 <i>Utilizing Emergency Ranges and Emergency and VOLL Pricing.</i> [□]</p>
ALL	<p>4. LOG actions taken and relevant information in response to the declaration. [□]</p>
<p>4.2.6 Max Gen Event Step 2a - MISO Actions</p>	
SM	<p style="text-align: center;">Note [□]</p> <ul style="list-style-type: none"> • LMM – Stage 1 and LMRs are utilized on a pro-rata basis within the declaration area based on availability of those actions, with the exception of EDRs, which are committed in merit order. • LMRs can be called in anticipation up to one hour prior to their required notification time. If MISO does NOT declare a Max Gen Emergency Event Step 2a or higher at least two hours prior to the start of the Scheduling Instructions issued in anticipation, the LMRs are NOT obligated to perform.
UDS	<p>1. IF starting declaration at a Max Gen Event Step 2a or escalating from a Max Gen Alert/Warning or lower Event step, THEN DECLARE Event Step 2a and EEA2 per Section 4.2.1 Max Gen Declaration - MISO Actions. [□]</p>
UDS	<p>2. ENSURE emergency pricing has been implemented as follows:</p> <ul style="list-style-type: none"> • If previously implemented, THEN CHANGE to Tier 2. [□] • If NOT previously implemented, THEN IMPLEMENT Emergency Pricing Tier 2 per SO-I-EOP-00-001 Utilizing Emergency Ranges and Emergency and VOLL Pricing. [□]
SM	<p>3. DETERMINE Manitoba Hydro’s EEA status. [□]</p>
SM	<p>4. IF Manitoba Hydro is in an EEA concurrently with MISO’s EEA2 or higher, THEN PERFORM SO-I-NOP-00-481. [□]</p>

SM	<p style="text-align: center;">Note</p> <ul style="list-style-type: none"> • One MW value will be provided per LBA for load reduction. • Determination of individual LMMs to be utilized will be managed at the LBA level. • Reduction MW amounts by LBA will be determined by proration of total amount available in declaration area. • If MCS is unavailable, notifications will be made via phone. • LMR load reduction amounts to LBAs are for information only. LBAs do not implement LMRs 	[□]
	<p>5. NOTIFY LBAs of required Load reduction via LMM – Stage 1 and LMRs in MW amounts via MCS.</p>	[□]
SM	<p>6. COORDINATE with MPs on implementing LMRs as follows:</p>	[□]
	<p style="text-align: center;">Note</p> <p>LMR implementation amounts are determined by taking prorated amount of LMR availability in each LBA area as compared to total available in declaration area, and based upon registration profile of each LMR, within the tolerances as set in the MCS-LMR Tool.</p>	[□]
	<p>A. DETERMINE LMR implementation amounts by MPs.</p>	[□]
	<p>B. PROVIDE a MW minimum implementation amount to each MP based upon this pro-ration and profile of registered LMRs via MCS-LMR Tool.</p>	[□]
SM	<p>7. DETERMINE OE-417 reporting responsibilities per SO-P-NOP-04 MISO Event Reporting Operations Plan.</p>	[□]
SM	<p>8. ENSURE required notifications are performed per SO-I-NOP-00-448 Event Communications Matrix.</p>	[□]
ALL	<p>9. LOG actions taken and relevant information in response to the declaration.</p>	[□]
	<p>4.2.7 Max Gen Event Step 2b - MISO Actions</p>	
SM	<p>1. IF starting declaration at a Max Gen Event Step 2b or escalating from a Max Gen Alert/Warning or lower Event step, THEN DECLARE Event Step 2b per Section 4.2.1 Max Gen Declaration - MISO Actions.</p>	[□]
SM	<p>2. COMMIT EDR resources, in merit order, to alleviate capacity shortage within declaration area per SO-I-NOP-00-404 <i>Emergency Demand Response Implementation</i>.</p>	[□]
ALL	<p>3. LOG actions taken and relevant information in response to the declaration.</p>	[□]

4.2.8 Max Gen Event Step 2c - MISO Actions

- SM 1. IF starting declaration at a Max Gen Event Step 2c or escalating from a Max Gen Alert/Warning or lower Event step, THEN **DECLARE** Event Step 2c per Section 4.2.1 Max Gen Declaration - MISO Actions.
- SM 2. **COORDINATE** with neighboring RCs and BAs to determine Emergency energy available from external sources.
- SM/
G&I 3. **IMPLEMENT** Emergency energy purchases from neighboring BAs through existing Emergency contractual agreements in order to conserve Operating Reserves per SO-I-NOP-00-479 Purchasing and Selling Emergency Energy.
- SM

Note
DOE Form OE-417 filing requirements for issuing Public Appeals is the responsibility of the LBA.
- 4. **INSTRUCT** LBAs in declaration area to issue public appeals to reduce demand per their internal procedures.
- ALL 5. **LOG** actions taken and relevant information in response to the declaration.

4.2.9 Max Gen Event Step 3a - MISO Actions

- SM 1. IF starting declaration at a Max Gen Event Step 3a or escalating from a Max Gen Alert/Warning or lower Event step, THEN **DECLARE** Event Step 3a per Section 4.2.1 Max Gen Declaration - MISO Actions.
- SM 2. **NOTIFY** GOPs, via MCS, in the declaration area who have Generators with de-rates from environmental restrictions to request waivers from appropriate government agencies.
- BAO 3. **IMPLEMENT** use of all spinning and supplemental reserves as needed and as time permits.
- SM 4. IF Contingency Reserves fall below minimum required (MSSC) for greater than 30 minutes and **NO** reasonable actions exist to restore within 90 minutes, THEN **DECLARE** an EEA3 per Section 4.2.1 Max Gen Declaration - MISO Actions.

4.2.10 Max Gen Event Step 3b - MISO Actions

- SM 1. IF starting declaration at a Max Gen Event Step 3b or escalating from a Max Gen Alert/Warning or lower Event step, THEN **DECLARE** Event Step 3b per Section 4.2.1 Max Gen Declaration - MISO Actions.

SM	<u>Note</u>	[]
	Reduction MW amounts by LBA will be determined by pro-rata of total amount available in declaration area.	
	2. NOTIFY LBAs, via MCS, of required Load reduction via LMM – Stage 2 in MW of interruptible demands.	[]
RC	3. IF TLR is called and MISO imports are being curtailed, THEN COORDINATE with SM to evaluate Priority 6-NN tags to exclude.	[]
SM/ G&I	4. COORDINATE to elevate identified Priority 6-NN tags per SO-I-EOP-00-006 Interchange Scheduling Operations during Emergency Conditions.	[]
SM/ G&I	5. NOTIFY RCs of tags that are being elevated to Firm.	[]
ALL	6. LOG actions taken and relevant information in response to the declaration.	[]
4.2.11 Max Gen Event Step 4a - MISO Actions		
SM	1. IF starting declaration at a Max Gen Event Step 4a or escalating from a Max Gen Alert/Warning or lower Event step, THEN DECLARE Event Step 4a per Section 4.2.1 Max Gen Declaration - MISO Actions.	[]
BAO	2. IMPLEMENT Reserve Call from Contingency Reserve Sharing Group (CRSG).	[]
4.2.12 Max Gen Event Step 4b - MISO Actions		
SM	1. IF starting declaration at a Max Gen Event Step 4b or escalating from a Max Gen Alert/Warning or lower Event step, THEN DECLARE Event Step 4b per Section 4.2.1 Max Gen Declaration - MISO Actions.	[]
RC	2. COORDINATE with neighboring RCs and BAs to identify additional available Emergency energy, including their Operating Reserves.	[]
G&I	3. IMPLEMENT Emergency energy purchases from neighboring BAs through existing Emergency contractual agreements and SO-I-NOP-00-479 Purchasing and Selling Emergency Energy.	[]
SM	4. IF Contingency Reserves fall below minimum required (MSSC) for greater than 30 minutes and NO reasonable actions exist to restore within 90 minutes, THEN DELARE an EEA3 per Section 4.2.1 Max Gen Declaration - MISO Actions.	[]



- IRAC 5. **EVALUATE** excluding Regulating Units that have room between RegMax and Emergency Max from clearing Reg per SO-I-EOP-00-001 Utilizing Emergency Ranges and Emergency and VOLL Pricing.
- ALL 6. **LOG** actions taken and relevant information in response to the declaration.

4.2.13 Max Gen Event Step 5 - MISO Actions

- SM 1. IF starting declaration at a Max Gen Event Step 5 or escalating from a Max Gen Alert/Warning or lower Event step, THEN **DECLARE** Max Gen Event Step 5 and EEA3 per Section 4.2.1 Max Gen Declaration - MISO Actions.

SM **Note**
 Attachment 4 — Slice-of-System PPAs Load/Schedule Curtailment provides additional information regarding sharing of load shedding with Slice of System PPAs.

- 2. **DETERMINE** manual Load Shedding requirements.

SM **Note**
 Issuing Emergency Operating Instructions for firm Load shed is based on the ratio of LBA forecasted or actual Load to the total forecasted or actual Load of the declaration area, taking into account applicable transmission security requirements.

- 3. **ISSUE** Emergency Operating Instructions to LBAs, in declaration area, of MW amounts of load to shed via MCS Firm Load Shed Tool or verbally per SO-P-NOP-00-431 Communications Protocol For Operating Instructions.

UDS **Note**
 Refer to SO-I-EOP-00-001 Utilizing Emergency Ranges and Emergency and VOLL Pricing.

- 4. WHEN notified by MISO SM, THEN **PERFORM** the following:
 - A. **CHECK** appropriate box(es) in the Energy Market Display (EMD) for the applicable LBAs in the column titled "Is Voll Price Enforced"
 - B. **SAVE** updates.

- SM 5. IF firm Load Shed is greater than 100 MW, THEN **DETERMINE** OE-417 reporting responsibilities per SO-P-NOP-04 MISO Event Reporting Operations Plan.

- SM 6. **ENSURE** required notifications are performed per SO-I-NOP-00-448 Event Communications Matrix.



ALL 7. **LOG** actions taken and relevant information in response to the declaration. [□]

4.2.14 Max Gen Event Downgrade/Termination - MISO Actions

<u>Note</u>		[□]
<ul style="list-style-type: none"> Steps and levels during Termination may be skipped as appropriate based on system conditions and projections. Emergency steps shall be exited in a controlled and deliberate manner so to NOT adversely affect system reliability while minimizing the impact of these emergency actions on the Load Serving Entities (LSEs). 		

- | | | |
|--------------|---|-----|
| | 1. WHEN actual obligations return below total MISO capability, THEN DOWNGRADE/TERMINATE Max Gen Event as follows: | [□] |
| SM | A. SEND Max Gen Downgrade/Termination to affected members via MCS per Section 4.2.1 Max Gen Declaration - MISO Actions. | [□] |
| UDS | B. IF Max Gen Event Step 5 is being terminated, THEN UNCHECK flag in EMD, which previously set all LMPs and MCPs to the Value of Lost Load (VOLL). | [□] |
| IRAC/
G&I | C. ENSURE CTS is enabled per SO-I-AOP-00-224 <i>CTS Failure Modes</i> . | [□] |
| UDS | D. UPDATE or TERMINATE emergency pricing and emergency ranges per SO-I-EOP-00-001 as applicable. | [□] |
| G&I | E. RETURN webTrans E-tag validation to normal mode per SO-I-EOP-00-006 Interchange Scheduling Operations during Emergency Conditions. | [□] |
| IRAC | F. EVALUATE and DECOMMIT any online emergency generation (AME) that has met its Min Run. | [□] |
| SM | G. PERFORM necessary actions to back out of steps taken in reverse order. | [□] |
| UDS | H. IF STR requirement override is NOT needed for remainder of the declared emergency, THEN REMOVE STR requirement override in EMD. | [□] |
| SM | 2. ENSURE all SO-I-NOP-00-448 Event Communications Matrix notifications are performed. | [□] |
| ALL | 3. LOG actions taken and relevant information in response to the declaration. | [□] |

4.3 MISO Stakeholder Actions during a Max Gen Emergency

4.3.1 Max Gen Alert Level Actions - MISO Stakeholder Actions

LBA/ TOP/ GOP	Note	[]
	Deferring generation/transmission maintenance until the Max Gen declaration has been terminated ensures trips are minimized.	
	1. FOLLOW MISO's SO-P-NOP-00-449 <i>Conservative System Operations</i> procedure.	[]
LBA/ TOP	2. DETERMINE potential exclusions of constrained pockets within declaration area where there is expected to be adequate generation that may NOT be transferred to other parts of declaration area due to local constraints.	[]
TOP	3. INFORM MISO RC of identified areas.	[]
GOP GOP	4. IF generators are derated, THEN PERFORM the following: A. INFORM the following of capacity limited facilities:	[]
	<ul style="list-style-type: none"> • LBAs • TOPs • MISO G&I Operator 	
GOP MP	5. UPDATE Limits and Offers.	[]
	Note	[]
	<ul style="list-style-type: none"> • Schedules that source from a resource that is identified as a Capacity Resource in Module E for a MISO LSE must be identified in the tagging process per MISO BPM-007 <i>Physical Scheduling Business Practice Manual</i> Section 16 - Capacity Resource Scheduling. • This also includes a Generation Resource internal to the MBAA that is identified as a Capacity Resource for an external BA. • This identification allows for proper curtailment of non-firm imports and exports during a capacity emergency event. 	
	6. UPDATE energy interchange transaction e-tags, sourcing or sinking, in MBAA to reflect the firmness of their Capacity Resources.	[]
MP	Note	[]
	MISO will provide instructions on when and how much the MP should schedule into MISO during Max Gen Warning.	
	7. NOTIFY MISO G&I Operator of Available External and Internal Resources (Module E registered Capacity Resources) deliverable to the declaration area, including amount available.	[]



- MP 8. **ENSURE** accuracy of LMR availability and Self-Scheduled/ Voluntary Load Management LMRs in the DSRI Tool.
- LBA 9. **ENSURE** accuracy of Non-LMR Voluntary Load Management/ Self-Scheduled LMM information in the MCS-LMR Tool.
- TOP 10. **COORDINATE** with MISO RC to determine reconfiguration options to raise transfer capability to declaration area or alleviate constraint stranded generation in declaration area.

4.3.2 Max Gen Warning - MISO Stakeholder Actions

- LBA 1. Based on Load Shed methodology, **MAKE** preparations for potential Load Shed during an Event stage.
- MP 2. **UPDATE** EDR offers for availability and MW amounts for declaration period.
- LBA 3. **SUBMIT** LMM availability via MCS per Attachment 3 — Load Management Update Form Example.
- MP 4. **ENSURE** accuracy of registered LMR availability in the DSRI Tool.
- MP 5. WHEN notified by MISO, THEN **SCHEDULE** remaining available External and Internal Resources (Module E Registered Capacity Resources) that would be deliverable to declaration area, given transmission constraints.
- LBA 6. **NOTIFY** Interruptible Loads of potential interruption.
- LBA/MP/ TOP/ GOP 7. **LOWER** energy use to a minimum using conservative measures.
- TOP 8. **IMPLEMENT** agreed upon reconfiguration options to raise transfer capability into declaration area or make available constraint stranded generation in declaration area.

4.3.3 Max Gen Event Step 1a - MISO Stakeholder Actions

- GOP 1. WHEN notified by MISO, THEN **START** applicable off-line AME Generation Resources.

4.3.4 Max Gen Event Step 1b - MISO Stakeholder Actions

GOP **Note**

MPs should ensure Emergency Range limits reflect actual resource capabilities. Specific information, limitations, and concerns on Emergency Range usage should be communicated to MISO G&I Operators as applicable.

- 1. WHEN Resources are dispatched, THEN **ENSURE** Resources move into Emergency range.

- GOP 2. **ENSURE** all co-generation and independent power producers are at maximum output and availability.
- GOP 3. **NOTIFY** MISO G&I Operator of change in output.
- GOP 4. IF additional reliable capacity is available (such as adding additional mills, duct burners, etc.), THEN **COORDINATE** adjustments with MISO G&I Operator.

4.3.5 Max Gen Event Step 2a - MISO Stakeholder Actions

- LBA 1. IF in declaration area and notified by MISO to reduce load, THEN **PERFORM** the following:
- LBA A. **REDUCE** load via LMM – Stage 1.

LBA **Note**

- Reductions through Load Management are **NOT** precise to the MW.
- Determination of individual LMMs to be utilized will be managed at the LBA level.

- B. WHEN load reduction actions have been implemented, THEN **NOTIFY** MISO.

MP **Note**

LMRs should be implemented **NO** less than the MW amount scheduled and within guidelines given by MISO.

- 2. WHEN notified by MISO, THEN **IMPLEMENT** LMRs.
- MP 3. **UPDATE** DSRI Tool as follows:
- A. **NAVIGATE** to the Active Event by clicking either of the following:

 - the Scheduling Instruction event banner
 - the Active Event from the dashboard, or
 - the Events tab

- B. **REVIEW** Event Timeline and LMR Instructions broken down by each LBA.
- C. **ACKNOWLEDGE** LMR Scheduling Instructions.
- D. **NAVIGATE** to Resource Deployment tab of the Active Event.
- E. **ENTER** and **SUBMIT** MW Amounts of Resources that will be deployed in order to meet the LMR Scheduling Instruction obligation per LBA.
- F. After receiving the LMR Scheduling Instruction, **UPDATE** LMR Availability of those Resources that were designated to respond to LMR Scheduling Instruction to reflect what is newly available to MISO.

4.3.6 Max Gen Event Step 2b - MISO Stakeholder Actions

- MP 1. WHEN notified by MISO, THEN **COMMIT** EDR Resources.

4.3.7 Max Gen Event Step 2c - MISO Stakeholder Actions

- LBA **Note**

- Public appeals to reduce demand is based on internal LBA procedures, system conditions, and Event projections provided by MISO.
- The public appeals should include an educational message on how the public may reduce demand and conserve power.
- DOE Form OE-417 filing requirements for issuing Public Appeals is the responsibility of the LBA.

1. WHEN instructed by MISO, THEN **ISSUE** public appeals to reduce demand per internal procedures.

- LBA 2. IF in declaration area, THEN **PREPARE** to shed load.

4.3.8 Max Gen Event Step 3a - MISO Stakeholder Actions

- GOP 1. IF requested by MISO to dispatch available capacity in Event Step 3a, THEN **DISPATCH** as follows:

- A. **VERIFY** Generators in declaration area with de-rates from environmental restrictions.

- B. IF approved waiver from government regulations, THEN **DISPATCH** available generation.

4.3.9 Max Gen Event Step 3b - MISO Stakeholder Actions

- LBA 1. IF in declaration area and notified by MISO to reduce Load during Event Step 3b, THEN **PERFORM** the following:

- A. **REDUCE** Load via LMM – Stage 2.

Note

- Reductions through LMMs are **NOT** precise to the MW.
- Determination of individual LMMs to be utilized will be managed at the LBA level.

- B. WHEN Load reduction actions have been implemented, THEN **NOTIFY** MISO via MCS.

4.3.10 Max Gen Event Step 4a/b - MISO Stakeholder Actions

- GOP/MP 1. **REVIEW** Offers.

- GOP/MP 2. **ENSURE** all available Emergency range and resources are offered.

GOP/MP **Note**
 All Resources should be committed, producing energy or committed for reserves, except emergency ranges on Resources providing Regulating Reserves.

3. IF there are available Resources or capacity **NOT** being utilized, THEN **NOTIFY** MISO.

4.3.11 Max Gen Event Step 5 - MISO Stakeholder Actions

LBA **Note**
 LBAs are responsible for any load shed rotation requirements, critical load evaluation in load shed schemes, and coordination with any other automatic load shed schemes such as Underfrequency and Undervoltage, for load shed directed by MISO. The minimum MISO directed load shed per LBA should be maintained at all times, until load restore directions are provided by MISO.

- LBA 1. **SHED** firm Loads per MISO issued Emergency Operating Instruction.

- LBA 2. **CONFIRM** actions taken with MISO RC via MCS Firm Load Shed Tool or verbally per SO-P-NOP-00-431 *Communications Protocol For Operating Instructions*.

- LBA 3. IF requested by MISO during Event Step 5, THEN **COMPLETE** Department of Energy (DOE) Form OE-417 as follows:

- A. **COMPLETE** DOE Form OE-417 for actions taken to reduce Load via Load Management Procedures per NERC EOP-004-4 and SO-P-NOP-04 MISO Event Reporting Operations Plan.

- B. **SUBMIT** completed DOE Form OE-417 to the following:
 • DOE
 • NERC

- C. **FORWARD** a copy of the submitted DOE Form OE-417 to the following:
 • Regional Entities
 • MISO @ RTOpsCompliance@misoenergy.org

4.3.12 Max Gen Event Downgrade/Termination - MISO Stakeholder Actions

- LBA/MP/TOP/GOP 1. **PERFORM** requests of MISO SM or designee to back out of each level.

5.0 Definitions

1. Reserve Margin - The difference between Total Operating Reserves and the Operating Reserve Requirement.
2. Constraint Stranded MW - Resource MW that are **NOT** available to meet load due to congestion on the electric grid.
3. Emergency Demand Response (EDR) - Load reductions, behind the meter generation, and other demand resources that are available to reduce demand or increase generation in exchange for guaranteed recovery of costs associated with the response in accordance with Schedule 30 (EDR Provisions) of the Tariff.
4. Load Management Measures (LMM) Stage 1 – Load management actions that can be taken to reduce demand to preserve or maintain Operating Reserves that are **NOT** included in EDRs or LMRs.
5. Load Management Measures (LMM) Stage 2 – Load management actions that can be taken to reduce demand including voltage reductions and reducing Loads that, by contract, can **NOT** be interrupted until reserves are being or are expected to be depleted and energy from Emergency Offers by Market Participants are being or are expected to be depleted. These do **NOT** include EDRs or LMRs.
6. Load Modifying Resource (LMR) - These are either Demand resources or Behind the Meter Generation that have an obligation to reduce demand or increase generation during declared system emergencies
7. Maximum Generation (Max Gen) Capacity Advisory - Provides advanced notice of forecasted capacity shortage and will request stakeholder update data.
8. Max Gen Alert - Provides an early alert that system conditions may require the use of MISO's generation Emergency procedures.
9. Max Gen Warning - MISO foresees or is experiencing conditions where all available economic Resources are committed to meet Load, firm transactions, and reserve requirements, and is concerned about sustaining required Operating Reserves.
10. Max Gen Event - MISO's forecasted or real-time energy demand and Operating Reserve Requirements within the MBAA (or sub-area due to a transmission constraint) can **NOT** be satisfied with Economic Maximum Limits of all available Resources; MISO issues a Max Gen Event due to a shortage of economic Resources.
11. MBAA Sub-Region - Sub-region may consist of a single LBA area, a group of LBA areas, or portions of an LBA area (for portions of an LBA area, a 1000 MW minimum threshold will generally be used).

6.0 References

6.1 NERC References

1. EOP-011-1 Emergency Operations

- R2 [Cover Page Rev History] [Section 1.0]
- R2.1 [Section 3.1][Section 3.2][Section 3.3][Section 3.4]
- R2.2 [Section 4.1.1][Section 4.2][Section 4.3][Table 4 on page 36]
- R2.2.1 [Section 4.1][Section 4.2.1][Section 4.2.2 Step 1.]
[Section 4.2.3 Step 1.][Section 4.2.4 Step 1.][Section 4.2.5 Step 1.]
[Section 4.2.6 Step 1.][Section 4.2.7 Step 1.][Section 4.2.8 Step 1.]
[Section 4.2.9 Step 1.][Section 4.2.10 Step 1.]
[Section 4.2.11 Step 1.][Section 4.2.12 Step 1.][Section 4.2.13 Step 1.]
- R2.2.2 Section 3.2
[Section 4.2.5 Step 1.][Section 4.2.6 Step 1.]
[Section 4.2.9 Step 4.][Section 4.2.12 Step 4.][Section 4.2.13 Step 1.][Section 4.2.14 Step 1.][Attachment 5, Section 1.0][Table 4 on page 36]
- R2.2.3
[Section 3.1][Section 4.1.1][Section 4.1.2][Section 4.2.1][Section 4.2.4 Step 3.][Section 4.2.5 Step 3.][Section 4.2.9 Step 2.][Section 4.3.3 Step 1.][Section 4.3.4 Step 2.][Section 4.3.8 Step 1.][Section 4.3.10]
- R2.2.3.1 [Section 4.2.2 Step 6.][Section 4.2.2 Step 7.]
[Section 4.2.3 Step 10.]
[Section 4.3.1 Step 4.][Section 4.3.1 Step 5.][Section 4.3.2 Step 5.][Table 4 on page 36]
- R2.2.3.2 [Section 4.1.2 Step 1.]
- R2.2.3.3 [Section 4.1.2 Step 1.]
- R2.2.3.4 [Section 4.1.2 Step 1.]
- R2.2.4 [Section 4.2.8 Step 4.][Section 4.3.7 Step 1.][Table 4 on page 36]
- R2.2.5 [Section 4.2.9 Step 2.][Table 4 on page 36]
- R2.2.6
[Section 4.3.2 Step 7.][Section 4.3.5 Step 1.][Section 4.2.6 Step 5.]
- R2.2.7
[Section 4.2.6 Step 6.][Section 4.2.7 Step 2.][Section 4.3.5 Step 2.][Section 4.3.6 Step 1.][Table 4 on page 36]
- R2.2.8 [Section 4.2.13 Step 3.][Section 4.3.11 Step 1.][Table 4 on

- page 36]
 - R2.2.9
[Section 2.0 Step 1.][Section 4.2.1 Step 2.][Section 4.3.1 Step 1.]
 - R5 [Section 4.2.1 Step 1.D.]
 - R6 [Section 4.2.5 Step 1.][Section 4.2.6 Step 1.]
[Section 4.2.9 Step 4.][Section 4.2.12 Step 4.][Section 4.2.13 Step
1.][Table 4 on page 36]
2. IRO-014-3 Coordination Among Reliability Coordinators
 - R1.2 [Section 4.2.2 Step 9.][Section 4.2.8 Step 2.]
[Section 4.2.12 Step 2.]
 3. TOP-001-5 Transmission Operations
 - R2 [Section 4.2.13 Step 3.][Table 4 on page 36]

6.2 MISO References

1. BPM-007 Physical Scheduling Business Practice Manual Section 16 – Capacity Resource Scheduling
2. MISO Open Access Transmission, Energy, and Operating Reserve Markets Tariff, Section 40.2.20
3. SO-I-EOP-00-001 Utilizing Emergency Ranges and Emergency and VOLL Pricing
4. SO-I-EOP-00-006 Interchange Scheduling Operations during Emergency Conditions
5. SO-I-AOP-00-224 CTS Failure Modes
6. SO-I-NOP-00-404 Emergency Demand Response Implementation
7. SO-I-NOP-00-441 Operations Real-Time Event Resolution
8. SO-I-NOP-00-448 Event Communications Matrix
9. SO-I-NOP-00-462 Inadvertent Interchange Management
10. SO-I-NOP-00-481
11. SO-I-NOP-00-483 Reliability Coordination Conference Call
12. SO-P-EOP-00-004 Transmission System Emergency
13. SO-P-AOP-00-217 MISO and State Officials 24X7 Communication Protocols During Emergencies
14. SO-P-NOP-00-431 Communications Protocol For Operating Instructions



15. SO-P-NOP-00-449 Conservative System Operations
16. SO-P-NOP-00-455 Balancing Authority Operations
17. SO-P-NOP-04 MISO Event Reporting Operating Plan
18. SO-I-NOP-00-479 Purchasing and Selling Emergency Energy

Attachment 1 — Reserve Margin Example Calculations

1.0 Example 1: Projection for MBAA

Table 1: Calculation

Description	Value
MBAA Peak Load Forecast:	100,000
Operating Reserve Requirement:	2,410
Load plus Operating Reserve Requirement:	102,410
Available Economic Maximum in Area:	97,000
Constraint Stranded MW:	2,000
Available Economic Resources in Area:	95,000
Imports into Area:	8,000
Reserve Margin = $95,000 + 8,000 - 102,410$	+ 590
Reserve Margin (%) = $(590 / 102,410) * 100$:	+ 0.6%

Assessment: Reserve Margin is forecasted to be +590 MW. Load plus Operating Reserve Requirement is met, however the Reserve Margin is less than 1500 MW. A Max Gen Alert declaration is needed.

Max Gen Alert

Start Time:

End Time:

[Projected Areas:](#) MISO Balancing Authority Area

[Reason\(s\):](#)

Forecasted Peak Hour Ending:

Forecasted Load (+ Reserve Requirement):

Eco Max Gen Offers:

NSI:

Projection: 590

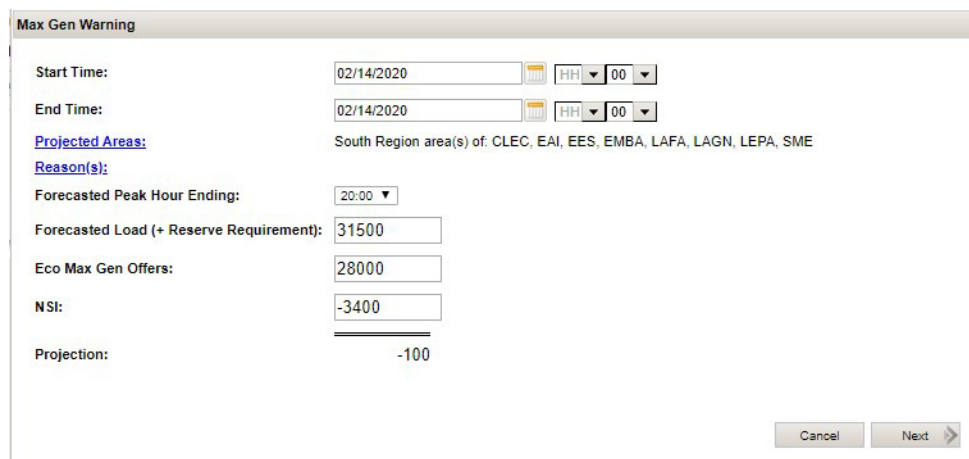
Figure 1: Example 1 MCS Message

2.0 Example 2: Projection for South Region

Table 2: Calculation

Description	Value
MBAA Peak Load Forecast:	30,000
Operating Reserve Requirement:	1,500
Load plus Operating Reserve Requirement:	31,500
Available Economic Maximum in Area:	29,000
Constraint Stranded MW:	1,000
Available Economic Resources in Area:	28,000
Imports into Area (RDT NSI):	400
RDT Import Capability up to RDTL of 3,000	3,000
Reserve Margin = 28,000+3,400-31,500	-100
Reserve Margin (\$) = (-100/31,500)*100:	- 0.3%

Assessment: Reserve Margin is -100 MW, meaning the South Region Load plus Operating Reserve Requirement is 100 MW short of being met. This means Load will be covered but the 1,500 MW Operating Reserve Requirement will not be. A Max Gen Warning or Event declaration is needed.



The screenshot shows a 'Max Gen Warning' dialog box with the following fields and values:

- Start Time: 02/14/2020 HH:MM
- End Time: 02/14/2020 HH:MM
- Projected Area(s): South Region area(s) of: CLEC, EAI, EES, EMBA, LAFA, LAGN, LEPA, SME
- Reason(s):
- Forecasted Peak Hour Ending: 20:00
- Forecasted Load (+ Reserve Requirement): 31500
- Eco Max Gen Offers: 28000
- NSI: -3400
- Projection: -100

Buttons: Cancel, Next

Figure 2: Example 2 MCS Message



Attachment 2 — Maximum Generation Declaration Template

Maximum Generation Declaration Type: [Alert/Warning/Event]

The MISO RC is Declaring/Updating a Maximum Generation Alert/Warning/Event effective from [MM/DD/YYYY] [HH:MM] EST and [MM/DD/YYYY] [HH:MM] EST for the following entities:

List the affected entities within the boundaries of the declaration by LBA. Include any constrained pockets within the declaration area with adequate generation that should be excluded from the Maximum Generation Emergency.

The reason for the declaration is:

State the reason(s): Forced Transmission Outage, Forced Generation Outage, Higher than Forecasted Load, etc.

Members are to prepare for a Maximum Generation Emergency by performing the applicable MISO Member Maximum Generation [Alert/Warning/Event] Level Actions of SO-P-EOP-002 MISO Market Capacity Emergency procedure.

CTS Suspension: Attention Market Participants: CTS (Coordinated Transaction Scheduling) is Suspended as of [MM/DD/YYYY] [HH:MM] EST. Alternative scheduling methods should be utilized.

Projections (to LBAs and TOPs only):

- Peak hour for Area is Hour Ending [MM/DD/YYYY] [HH:MM] EST.
- Load plus Operating Reserve Requirement for Area: _____
- Amount of Available Economic Resources in Area: _____
- Imports into Area: _____
- Reserve Margin shortfall(-)/surplus(+) for Area: _____

1. Summary information in the top of the MCS Message/template will be communicated to MPs via the following:
 - A. MCS
 - B. MISO public web site – Real Time Notifications Tab via MCS View Real-Time Operations Updates at <https://www.misoenergy.org/markets-and-operations/notifications-overview/>



2. Completed MCS message/template will be communicated to TOPs, LBAs, BAs and neighboring BAs, and RCs as follows:
 - A. MCS
 - B. RCIS
3. MISO will provide summary information to the following email exploder lists via MCS message:
 - [*MISO Alerts BA and TO](#)
 - [*MISO Alerts FERC, State Comm., RRO, Neighboring RCs and BAs](#)
 - [*RT Ops Notification](#)

Attachment 3 — Load Management Update Form Example

Local Balancing Authorities report via MCS or phone to the RC Load reductions that would be available, time permitting, via Load Management should a Maximum Generation Emergency Event be implemented during the same time frame the Warning is effective. MISO will provide the expected notification time* for LBAs to assume when completing form.

Load Management may include but are **NOT** limited to public appeals, voltage reduction, and interruption of end use loads in accordance with applicable contracts, demand-side management, utility load conservation measures, and starting behind the meter generation*.

Load Management is separated into LMM – Stage 1 and LMM – Stage 2.

*Excludes Registered DRR Type 1 and DRR Type 2 Resources

Table 3: LBAs report the following estimated values:

LBA:	
Notification time for Load Management Measures (i.e. less than 4 hours)	
LMM Stage 1 available:	10
LMM Stage 2 available:	5
Total:	15
LBAs should list, LMM Stage 1 and LMM Stage 2 that are already or projected to be implemented at the Event time:	
LMM Stage 1:	100
LMM Stage 2:	0
Total:	100

Attachment 4 — Slice-of-System PPAs Load/Schedule Curtailment

1.0 Slice-of-System Power Purchase Agreements (PPAs) Curtailed Pro-Rata with Load in the Source Balancing Authority when Source Balancing Authority is in Emergency Procedures

1. PPAs in this category will continue to qualify as Planning Resources so long as the PPA only will be curtailed pro-rata along with load in the source Balancing Authority and only when the source Balancing Authority is operating under Emergency Procedures.
2. Under this situation, a PPA with a 1,000 MW export schedule from an external Balancing Authority with a 3,000 MW load will be curtailed pro-rata along with the load when the external Balancing Authority is operating under Emergency Procedures. That is, curtailment would take place three-quarters to firm load and one quarter to the firm schedule. This pro-rata treatment is triggered when MISO experiences emergency conditions at the same time as the external Balancing Authority.

2.0 Slice-of-System PPA in a Balancing Authority that Coordinates Planning Reserve Qualifications and Shares Emergency Responsibilities with MISO's Balancing Authority

1. In addition to the slice-of-system PPA treatment noted in category (B) above, slice-of-system PPAs can continue to qualify as External Resources under this category, and MISO and the external BA will share Load Shedding on a pro-rata basis in proportion to the load in the area under the Capacity Emergency, so long as the requirements of this category are met.
2. This qualification category has several requirements for the host BA:
 - A. It must be in MISO's RC area.
 - B. It must share Operating Reserves with the MISO BA.
 - C. It must have a Seams Operating Agreement with MISO containing several features.
3. Seams Operating Agreement must specify the following:
 - A. The host BA has established planning reserve processes and criteria similar to MISO's.
 - B. Actions that will be taken by both entities – MISO and the host BA – during Emergency Procedures prior to implementing Load Shedding.
 - C. BA responsibilities include:
 - (1.) Submitting load estimates to MISO in a similar manner as submitted by other Load entities under Module E-1.

- (2.) Providing generator testing data for all resources used to serve firm requirements of the host Balancing Authority.
- (3.) Providing transparency to such resource plans in the form of a Fixed Resource Adequacy Plan, pursuant to Module E-1.
4. With these requirements in place, when both BAs have exhausted other emergency operating actions and are in a firm load shedding event, load shedding is shared on a pro-rata basis in proportion to the load in the area under the capacity emergency.

Example 1

If the load of an external BA in capacity emergency is 3000 MW and the load of the area in MISO in capacity emergency is 17,000 MW, then pro-rata load shed is 3/20 of the total for the external Balancing Authority and 17/20 for the area in MISO in the capacity emergency.

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5. This treatment is appropriate for BAs that meet the requirements indicated above because MISO can count on the fact that the external BA is planning and testing its resources in an equivalent manner to MISO, and is part of MISO's RC area and subject to emergency procedures it has developed with MISO. It has also agreed to operate its system in a similar manner, including the agreement to share its Operating Reserves with MISO during emergency conditions.

3.0 When MISO is in an EEA and the external BA with PPA is not, then MISO will determine if the PPA should flow or determine the curtailable MWs of the PPA.

1. $LBA_{NET}(Excess\ Capability) = \sum (LBA_online\ RTmw - LBA_online\ MaxObligation)$
 - Where $RTmw$ = Current RT MWs of Resource
 - Where $MaxObligation$ = The lesser of a resource's Effective ICAP (capacity obligation) and their Real-Time Must Offer availability
2. Prior to any curtailments, MISO will contact the external BA by phone.
3. If the BA indicates that the curtailment will cause the BA to enter an EEA, then MISO will initiate SO-I-NOP-00-481.
4. If the BA indicates that the curtailment will **NOT** cause the BA to enter an EEA, then MISO will curtail any relevant schedule(s).

Attachment 5 — Additional Information

1.0 Max Gen Emergency

1. MISO may call for a Max Gen Alert, Warning or Event, or EEA level prior to the actual forecasted start time of such Alert, Warning, Event or EEA level.
 - A. The purpose of this would be to communicate forecasted conditions that meet the criteria of these levels, as well as to provide notice of certain implementation steps which require longer notification times.
 - B. An example would be an LMR which has an 8 hour notification time, requiring implementation instructions to be sent prior to the actual start time of the Event, or EEA.
 - C. Due to the dynamic nature of the BES these preliminary declarations and instructions may be canceled prior to the actual start time of the forecasted Alert, Warning, Event or EEA as conditions warrant.
 - D. At the Max Gen Alert level, Emergency Pricing Tier 0 is in effect until termination of the Alert or increasing Max Gen level to Warning level or higher.
2. Max Gen Warning
 - A. EDRs may also be registered as LMRs in Module E. If a MP has decided to offer in all or part of their resource as an EDR for an operating day, the MP should reduce the availability of that resource as an LMR in the MCS-LMR Tool for all 24 hours of the same operating day by the maximum MW amount offered in for that resource as an EDR. In addition, if an MP has implemented any resources voluntarily, which are registered as an LMR, the MP should adjust the availability of that resource in the MCS-LMR Tool.
 - B. Tier 1 prices are in effect from Max Gen Warning until an Emergency Event Step 2a, when Tier 2 prices are implemented. This is an ex-post ELMP pricing change and does **NOT** affect system commitment or dispatch. Emergency Pricing will be utilized as necessary on an LBA basis.
3. Max Gen Event
 - A. MISO will implement Emergency Pricing Offer Tier 2 during Step 2a of an Emergency Event. This is an ex-post ELMP pricing change and does **NOT** affect system commitment or dispatch. Emergency Pricing will be utilized as necessary on an LBA basis.



Attachment 6 — Maximum Generation Emergency Overview

The following is an overview of Max Gen Emergency actions and should be used for reference only during an actual event.

Table 4: Maximum Generation Emergency Overview

Level	MISO Major Actions	Stakeholder Major Actions
Declaration	Send MCS Declaration message	Prepare to implement this procedure and follow internal procedures for emergency conditions
	Declare Conservative System Operations	Follow instructions per Conservative System Operations procedure and declaration
Alert	Identify available Module E Resources	MPs communicate available Module E Resources
	Identify non-firm Export Schedules	MPs update energy interchange transaction E-tags of Capacity Resources
	Implement Emergency Pricing - Tier 0	LBA/TOP provide potential exclusion of constrained pockets within the declaration area
	Raise transfer capability or make constraint stranded generation available	TOPs coordinate with MISO RC to identify potential reconfiguration options
	Request MPs/LBAs ensure accuracy of LMM/LMR availability and Self Scheduled values	LBAs/MPs ensure accuracy of LMM/LMR availability and Self Scheduled values in MCS/DSRI Tools
	Send LBAs LMM survey	Affected GOPs communicate capacity limited facilities to MISO and update limits and offers
Warning	Implement Emergency pricing - Tier 1	
	Suspend CTS	
	Determine EDR availability and MW amounts	MPs update EDR availability and MW amounts
	Obtain updated MW amounts of relief available via Load Management Form in MCS	LBAs update LMM availability via Load Management Form in the MCS
	Review LMR availability using MCS-LMR tool	MPs ensure LMR availability data is correct in the DSRI Tool
	Schedule available Module E Resources into declaration area	As directed by MISO, MPs schedule available Module E Resources into the declaration area
	Curtail Export Schedules as required	
	Instruct TOPs to implement reconfiguration options	As directed by MISO RC, MPs implement reconfiguration options



Table 4: Maximum Generation Emergency Overview

Level	MISO Major Actions	Stakeholder Major Actions
Event Step 1a	Commit AME resources	As directed by MISO, LBAs/GOPs/MPs start AME Resources
Event Step 1b/EEA1	Declare EEA1	MPs review Offers and ensure all available Emergency ranges and Resources are offered
	Activate Emergency Maximum Limits	
Event Step 2a/EEA2	Declare EEA2	
	Implement Emergency pricing - Tier 2	
	Instruct Load to be reduced via LMMs - Stage 1 and LMRs	As directed by MISO, LBAs reduce load via LMM - Stage 1
	Implement LMRs	MPs implement LMRs via DSRI Tool
Event Step 2b	Commit EDR Resources	As directed by MISO, MPs commit EDRs
Event Step 2c	Implement Emergency energy purchases	LBAs issue public appeals to reduce demand per internal procedures and OE-417 filings
	Instruct LBAs to issue Public Appeals	
		LBAs in defined Event area shall prepare to shed Load
Event Step 3a	Notify affected GOPs with Generator de-rates to request waivers	Affected GOPs dispatch de-rated Generators with waivers from government regulations
	Implement spinning and supplemental reserves	
Event Step 3b	Elevate identified Priority 6-NN tags	
	Instruct Load to be reduced via LMMs - Stage 2	Affected LBAs reduce load via LMM - Stage 2
Event Step 4a	Implement Reserve Call from CRSG	MPs review Offers and ensure all available Emergency ranges and Resources are offered
Event Step 4b	Implement Emergency energy purchases from neighboring BAs (Operating Reserves)	
Event Step 5/EEA3	Declare EEA3	
	Issue Emergency Operating Instruction to shed load	LBAs shed load per MISO and confirm action via MCS Firm Load Shed Tool
	Set LMPs and MCPs to the VOLL	LBAs review OE-417 filing requirements