

Conservative System Operations SO-P-NOP-00-449 Rev: 0

ROLE		ROLE	
BAO	\checkmark	SM	\checkmark
IRAC	\checkmark	RC	\checkmark
UDS		RGD	\checkmark
GOP	\checkmark	TOP	\checkmark
LBA	\checkmark	MP	\checkmark

Rev History	Reason for Issue	Revised By	Issue Date	Effective Date
0	Annual Review. Enhance RTO-OP-018 to meet new formatting and writing standards as part of PREP. Operating Procedure Owner approval on file.	Chris Hoffman/ Eric Young	10/28/2016	10/28/2016
RTO-OP- 018-r15.1	Removed GOPs from Step 3.2.3.3. Operating Procedure Owner approval on file.	Terry Wright	02/16/2016	02/16/2016

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1.0 Purpose

Provide instructions for identifying and coordinating Conservative System Operations to maximize MISO's ability to operate the Bulk Electric System (BES) reliably during periods of extreme weather conditions and other abnormal circumstances that pose an imminent threat to the Bulk Electric System.

Provide instructions for identifying and coordinating severe weather/ environmental conditions to provide an early indication to operating personnel that system conditions may require the use of MISO Emergency Procedures or Conservative System Operations process.

2.0 Roles and Responsibilities

- 1. Generator Operator (GOP)
 - Reviews and prepares to implement applicable portions of this procedure when notified of Alert conditions.
 - Follows internal procedures and communication protocols including notification to all stations and key personnel of declaration.
- 2. Local Balancing Authority (LBA)
 - Reviews and prepares to implement applicable portions of this procedure when notified of Alert conditions.
 - Follows internal procedures and communication protocols including notification to all stations and key personnel of declaration.
- 3. Market Participant (MP)
 - Reviews and prepares to implement applicable portions of this procedure when notified of Alert conditions.
 - Follows internal procedures and communication protocols including notification to all stations and key personnel of declaration.
- 4. Transmission Operator (TOP)
 - Reviews and prepares to implement applicable portions of this procedure when notified of Alert conditions.
 - Follows internal procedures and communication protocols including notification to all stations and key personnel of declaration.
- 5. MISO Shift Manager (SM)
 - Coordinates actions necessary to alleviate Alert conditions.
 - Ensures all necessary notifications are performed throughout the duration of Alert conditions.



[□]

[□]

- 6. MISO Operations Personnel
 - Performs actions to alleviate Alert Conditions as outlined in this procedure.

3.0 Precautions and Limitations

- Alerts issued within this procedure may be implemented for the entire MISO Reliability Footprint, MISO Balancing Authority (BA) Area, or a sub-area of the two areas. A sub-area may consist of a single BA or Local Balancing Authority (LBA), a group of LBAs or BAs, or portions of LBAs and BAs.
- During conservative system operations, real-time system conditions may reflect conservative transfers, double contingencies activation, and additional reactive reserves.
- 3. MISO will restrict communications of sensitive information related to reliability to market participants and to the public in order to protect the integrity of the BES.
- Attachment 1 MISO Declaration Template provides a generic example of the declaration submitted via MCS. Message content and information may be adjusted based on system conditions.
- 5. Attachment 2 Additional Information provides supporting information that may be used in the performance of this procedure. []

4.0 Prerequisites

None

5.0 Instructions

5.1 Conservative System Operations

5.1.1 MISO Conservative System Operations Actions 1. WHEN conditions warrant the need for Conservative SM/ Operations THEN DECLARE Conservative System RC/ Operations as follows: BAO [□] SM A. DEFINE boundaries of Conservative System Operations Area. [□] SM B. DEFINE start and end time of Conservative System Operations.



		Sile
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SM	C. SEND Conservative System Operations Declaration to	
	affected members via MCS including the following:	[□]
	• MSS	
	RT Ops Website (public-only)	
	Operator Log	
	Management Text List	
	 Email Notifications per SO-I-NOP-00-448 	
SM	D. SEND Conservative System Operations Declaration	
	summary information via Reliability Coordinator	
	Information System (RCIS).	[□]
SM	<u>Note</u>	[□]
	The following steps provide a list of potential actions that MISO may implement	ent
	based on reasons that warranted Conservative System Operations.	
	2. REVIEW the following Control Center staffing levels:	[□]
	Carmel	
	• Eagan	
	Little Rock	
	Sheridan	
SM	3. DETERMINE the need for additional staffing to manage the	
	conditions identified.	[□]
RC/	4. REVIEW System Adequacy Requirements.	[□]
IRAC		
SM/	<u>Note</u>	[□]
RC	Maintenance includes non-essential planned maintenance, tree trimming,	
	Remote Terminal Unit (RTU) work, protection and control testing, etc.,	
	unless such maintenance will result in improved BES monitoring, control and security. Such maintenance will be coordinated between MISO and	
	the applicable entity.	
	5. COORDINATE with affected entities to identify at risk	
	generation or transmission equipment maintenance as	
	follows:	[□]
SM/	A. REVIEW outage plans to determine if any maintenance	
RC	or testing, scheduled or being performed on any	
	monitoring, control, generation or transmission	
	equipment can be deferred or canceled.	[□]



					Pu	DIIC
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SM/				В.	IF scheduled maintenance will NOT adversely	
RC					affect BES and improve BES monitoring, control, and	
					reliability, THEN COORDINATE with TOP or GOP to	
_					identify maintenance for potential completion.	[□]
SM		_			Note	[□]
			•	•	er systems can be within MISO or MISO member system	
					Conservative System Operations, including EMS and	
		inter-C	onuo		enter Communications Protocol (ICCP) maintenance and telecommunication equipment.	
			0			
					NTIFY at risk critical computer systems maintenance due Conservative Operations declaration as follows:	[□]
SM				A.	REVIEW outage plans to determine if any critical	
					computer systems maintenance or testing, scheduled	
					or being performed, can be deferred or canceled.	[□]
SM				В.	IF critical computer system maintenance will result in	
					improved BES monitoring, control and reliability, and	
					NOT adversely affect BES, THEN IDENTIFY	r_1
014				~	maintenance for potential completion.	[□]
SM			(C.	SUSPEND all critical computer maintenance NOT identified for completion.	[_]
						[□]
		5.1.2	MIS	ΟN	lember Conservative System Operations Actions	
GOP/			1. (со	ORDINATE with MISO and BA/LBA to perform the	
TOP			i	follo	owing:	[□]
GOP/			1	A.	REVIEW outage plans to determine if any maintenance	
TOP					or testing, scheduled or being performed on any	
					monitoring, control, generation or transmission	[_]
				-	equipment can be deferred or canceled.	[□]
GOP/ TOP			l	В.	IF scheduled maintenance will result in improved BES monitoring, control and reliability, and NOT adversely	
IUP					affect BES, THEN COORDINATE with MISO and LBA to	
					identify maintenance for potential completion.	[□]
		-				r_1
	5.2	<u>Seve</u>			<u>ner Alert</u>	
		5.2.1	MIS	0 8	Severe Weather Alert Actions	
SM					EN forecasted extreme weather conditions are projected	
					mpact the BES, THEN DECLARE Severe Weather Alert	
				_	follows:	[□]
SM			1	A.	DEFINE boundaries of Severe Weather Alert Area.	[□]
SM			I	В.	DEFINE start and end time of Severe Weather Alert.	[□]



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SM	<u>Note</u>	[□]
	Declaration updates should be provided on a regular basis as the weather system moves across the MISO footprint.	
	 C. SEND Severe Weather Alert Declaration, including nature of Alert, to affected members via MCS including the following: MSS 	[□]
	RT Ops Website (public-only)	
	Operator Log	
	Management Text List	
	Email Notifications per SO-I-NOP-00-448	
SM	D. SEND Severe Weather Alert Declaration summary information via RCIS.	[□]
SM/	Note	[□]
RC	Maintenance includes non-essential planned maintenance, tree trimming, Remote Terminal Unit (RTU) work, protection and control testing, etc., unless such maintenance will result in improved BES monitoring, control and security. Such maintenance will be coordinated between MISO and the applicable entity.	
	2. COORDINATE with affected entities to identify at risk	
	maintenance as follows:	[□]
SM/ RC	 A. REVIEW outage plans to determine if any maintenance or testing, scheduled or being performed on any monitoring, control, generation or transmission equipment can be deferred or canceled. 	[□]
SM/ RC	B. IF scheduled maintenance will result in improved BES monitoring, control and reliability, and NOT adversely affect BES, THEN COORDINATE with TOP or GOP to identify maintenance for potential completion.	[□]
	5.2.2 MISO Member Severe Weather Alert Actions	
top Gop/	 REPORT severe weather conditions in area to MISO RC. COORDINATE with affected entities to perform the 	[□]
TOP	following:	[□]
GOP/ TOP	 A. REVIEW outage plans to determine if any maintenance or testing, scheduled or being performed on any monitoring, control, generation or transmission 	
	equipment can be deferred or canceled.	[□]



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gop/ Top				B.	IF scheduled maintenance will result in improved BES monitoring, control and reliability, and NOT adversely affect BES, THEN COORDINATE with affected entities to identify maintenance for potential completion.) [□]
	5.3	<u>Hot W</u>	Voatk	or		
	5.5					
		5.3.1	MIS	50 F	lot Weather Alert Actions	
SM			1.	We and req	IEN projected temperatures are to exceed Table 1: Hot ather Alert Temperature Criteria along with high humidity I concerns about Capacity and Operating Reserve uirements, THEN DECLARE Hot Weather Alert	
				ast	follows:	[□]
SM				Α.	DEFINE boundaries of Hot Weather Alert Area.	[□]
SM				В.	DEFINE start and end time of Hot Weather Alert.	[□]
SM				C.	SEND Hot Weather Alert Declaration to affected members via MCS including the following:	[□]
					• MSS	
					RT Ops Website (public-only)	
					Operator Log	
					Management Text List	
					Email Notifications per SO-I-NOP-00-448	
SM				D.	SEND Hot Weather Alert Declaration summary information via RCIS.	[□]
SM/ IRAC			2.	RE	VIEW System Adequacy Requirements.	[□]



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RGD	3.	CC	INTACT MPs to determine fuel/environmental limitations	110
NOD	0		d unit availability for the projected Alert period.	[□]
RC/			Note	
RGD	Remote unless su	Term ch ma	cludes non-essential planned maintenance, tree trimming, inal Unit (RTU) work, protection and control testing, etc., aintenance will result in improved BES monitoring, control such maintenance will be coordinated between MISO and the applicable entity.	[-]
	4.		DORDINATE with affected entities to identify at risk intenance as follows:	[□]
SM/ RC		A.	REVIEW outage plans to determine if any maintenance or testing, scheduled or being performed on any monitoring, control, generation or transmission equipment can be deferred or canceled.	[□]
SM/ RC		B.	IF scheduled maintenance will result in improved BES monitoring, control and reliability, and NOT adversely affect BES, THEN COORDINATE with TOP or GOP to identify maintenance for potential completion.	[□]
	5.3.2 M	IISO I	Member Hot Weather Alert Actions	
GOP	1.	Dis	DTIFY and UPDATE MISO Regional Generation spatcher (RGD) concerning all fuel/environmental limited sources for the duration of Alert.	[□]
GOP/ TOP	2.	CC	OORDINATE with affected entities to perform the following:	[□]
gop/ Top		A.	REVIEW outage plans to determine if maintenance or testing, scheduled or being performed on monitoring, control, generation or transmission equipment can be deferred or canceled.	[□]
gop/ Top		B.	IF scheduled maintenance will result in improved BES monitoring, control and reliability, and NOT adversely affect BES, THEN COORDINATE with affected entities to identify maintenance for potential completion.	[□]



Cold Weather Alert 5.4 5.4.1 MISO Cold Weather Alert Actions 1. WHEN projected temperatures are to fall below Table 2: Cold SM Weather Alert Temperature Criteria along with severe wind chill factors and concerns about Capacity and Operating Reserve requirements, THEN DECLARE Cold Weather Alert as follows: [□] A. **DEFINE** boundaries of Cold Weather Alert Area. SM [□] SM B. DEFINE start and end time of Cold Weather Alert. [□] SM C. SEND Cold Weather Alert Declaration to affected members via MCS including the following: [□] MSS • RT Ops Website (public-only) ٠ **Operator Log** ٠ Management Text List • Email Notifications per SO-I-NOP-00-448 ٠ SM D. **SEND** Cold Weather Alert Declaration summary information via RCIS. [□] SM/ **REVIEW** System Adequacy Requirements. [□] 2. IRAC RGD 3. **CONTACT** MPs to determine fuel/environmental limitations and unit availability for the projected Alert period. [□] RC/ [0] Note RGD Maintenance includes non-essential planned maintenance, tree trimming, Remote Terminal Unit (RTU) work, protection and control testing, etc., unless such maintenance will result in improved BES monitoring, control and security. Such maintenance will be coordinated between MISO and the applicable entity. **COORDINATE** with affected entities to identify at risk 4. maintenance as follows: [□] SM/ A. **REVIEW** outage plans to determine if any maintenance or testing, scheduled or being performed on any RC monitoring, control, generation or transmission

equipment can be deferred or canceled. [□] B. IF scheduled maintenance will result in improved BES SM/ RC monitoring, control and reliability, and **NOT** adversely affect BES, THEN COORDINATE with TOP or GOP to identify maintenance for potential completion. [□]



				Poge 0	-f 4 C
	542	MI	201	Page 9 o /Iember Cold Weather Alert Actions	01 16
GOP	0.4.2	1.		PLEMENT plans to winterize units and plants to ensure	
GOF		1.		ilability during emergency conditions.	[□]
GOP		2.		ORDINATE personnel staffing to ensure all scheduled	
				nbustion turbines and diesel generators are available for	
				ding during load pick up period.	[□]
GOP		3.	RE	VIEW fuel supply/delivery schedules.	[□]
GOP		4.	NO	TIFY and UPDATE MISO RGD concerning all fuel/	
			env	vironmental limited resources for the duration of Alert.	[□]
GOP/		5.	CO	ORDINATE with affected entities to perform the following	:[□]
TOP					
GOP/			Α.	REVIEW outage plans to determine if maintenance	
TOP				or testing, scheduled or being performed on	
				monitoring, control, generation or transmission equipment can be deferred or canceled.	[□]
GOP/			В.	IF scheduled maintenance will result in improved BES	[⊔]
TOP			В.	monitoring, control and reliability, and NOT adversely	
				affect BES, THEN COORDINATE with affected entities	
				to identify maintenance for potential completion.	[□]
5.5	<u>Geo-l</u>	Maq	netio	c Disturbance (GMD) Alert of Warning (K-8 or higher)	
	5.5.1	MI	50.0	GMD Alert of Warning (K-8 or higher) Actions	
SM	0.011	1.		Space and Weather Prediction Center (SWPC) issues a	
Civi				ID Warning or Alert of K-8 or higher, THEN DECLARE	
				nservative Operations due to GMD Alert as follows:	[□]
SM			Α.	DEFINE boundaries of GMD Alert Area.	[□]
SM			В.	DEFINE start and end time of GMD Alert.	[□]
SM			C.	SEND GMD Alert Declaration to affected members via	
				MCS including the following:	[□]
				• MSS	
				RT Ops Website (public-only)	
				Operator Log	
				Management Text List	
				Email Notifications per SO-I-NOP-00-448	
SM			D.	SEND GMD Alert Declaration summary information via	
				RCIS.	[□]



			JUIC
		Page 10 c 5.5.2 MISO Member GMD Alert of Warning (K-8 or higher) Actions	of 16
gop/ Mp		1. COMMUNICATE condition of GMD monitoring to MISO RC.	[□]
GOP/ MP		 ENSURE mitigation actions are performed per SO-P-AOP-01 Geomagnetic Disturbance Operating Plan. 	1 [□]
LBA/ TOP		3. COMMUNICATE condition of GMD monitoring to MISO RC.	[□]
LBA/ TOP		 ENSURE mitigation actions are performed per SO-P-AOP-01 Geomagnetic Disturbance Operating Plan. 	1 [□]
	5.6	Termination	
		5.6.1 MISO Termination Actions	
SM		 WHEN Alert conditions are NO longer met, THEN BACK OUT of Alert as follows: 	[□]
SM		A. SEND Termination update to affected members via MCS	
		including the following: MSS 	[□]
		RT Ops Website (public-only)	
		Operator Log	
		Management Text List	
		Email notifications per SO-I-NOP-00-448	
SM		B. SEND Alert Update summary information via RCIS.	[□]
SM		<u>Note</u>	[□]
		Termination steps shall be exited in a controlled and deliberate manner to to NOT adversely affect system reliability while minimizing the impact of these actions on affected entities.	
		C. ISSUE Operating Instructions necessary to return the system to normal.	[□]
	6.0	Definitions	
		 System Adequacy Requirements - The amount of Operating Reserve versus Operating Reserve Requirements. 	/es
	7.0	References	
	7.1	MISO References	
		1. PSS-OP-001	
		2. SO-RA-NOP-00-429	

3. RTO-AOP-001 System Status Levels Procedure



- 4. SO-I-NOP-00-448
- 5. SO-P-NOP-00-431 Communications Protocol For Operating Instructions
- 6. RTO-OP-009 Operational Performance Reliability Criteria Procedure
- 7. SO-P-AOP-01 Geomagnetic Disturbance Operating Plan
- 8. SO-P-EOP-00-002 MISO Market Capacity Emergency



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Attachment 1 — MISO Declaration Template

Declaration Type: [Conservative System Operations Declaration or Severe/Cold/ Hot Weather Alert]

MISO is declaring [Conservative System Operations or Severe/Cold/Hot Weather Alert] in effect from [MM/DD/YYYY] [HH:MM] EST and [MM/DD/YYYY] [HH:MM] EST for the following entities:

List affected entities for Area or sub-area affected by [Conservative System Operations or Severe/Cold/Hot Weather Alert] Declaration.

The reason for the declaration is:

(state the reason(s): Maximize MISO's ability to maintain reliable operation of the Bulk Electric System, prepare operating personnel and facilities for extreme weather conditions, etc.).

MISO declared [Conservative System Operations for the purpose of maximizing MISO's ability to maintain reliable operation of the Bulk Electric System] or [Severe/Cold/Hot Weather Alert to prepare operating personnel and facilities for extreme weather conditions].

Members are to prepare for a [Conservative System Operations Declaration or Severe/Cold/Hot Weather Alert] by reviewing the applicable MISO Member Actions of SO-P-NOP-00-449 Conservative System Operations.



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Attachment 2 — Additional Information

1.0 Conservative System Operations

- The decision to implement Conservative System Operations will be made by the MISO Shift Manager (SM), Balancing Authority Operator (BAO), or Reliability Coordinator (RC) and may be based on any condition, combination of conditions, or threat(s) to the transmission system that, in the opinion of the SM, BAO, or RC, could result in single contingencies or multiple simultaneous (or near-simultaneous) contingencies occurring on the BES.
- 2. Conditions or events that could warrant implementation may include, but are **NOT** limited to:
 - Geo-Magnetic Disturbances (GMDs) of a magnitude that may cause system disturbances.
 - Potential fuel delivery issues identified.
 - Environmental conditions.
 - Weather-related conditions such as severe thunderstorms, intense lightning storms, tornadoes, ice/snow accompanied with high winds, hurricanes and floods.
 - Contingency related or extreme cold or hot weather conditions that lead to sub-area or system-wide capacity shortages.
 - Suspected or confirmed terrorist activity aimed at causing instability on the transmission system.
 - If, at any time, MISO loses (or may lose) the ability to accurately monitor the BES or a portion of the BES as applicable. Refer to RTO-AOP-001 System Status Levels Procedure.
 - An event or condition that in the judgment of the SM, BAO, or RC poses an imminent threat to the interconnected transmission system.

2.0 Severe Weather Alert

- 1. A severe weather alert is to prepare operating personnel and facilities for extreme weather conditions that may impact the integrity of the BES.
- 2. Extreme weather conditions are weather-related conditions such as severe thunderstorms with high winds and/or intense lightning storms, tornadoes, ice/snow accompanied with high winds, hurricanes etc.
- A severe weather alert should be issued when forecasted extreme weather conditions are projected and have the potential to impact the BES.



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3.0 Hot Weather Alert

- 1. A Hot Weather Alert is to prepare operating personnel and facilities for extreme hot or humid weather conditions which may cause capacity requirements to be higher than normal and unit unavailability to be greater than forecasted and these conditions are expected to persist for an extended period.
- 2. A Hot Weather Alert can be issued by MISO, on a market footprint or a sub-area basis, if projected temperatures are to exceed the temperatures defined in Table 1: Hot Weather Alert Temperature Criteria along with high humidity and there are concerns about Capacity and Operating Reserve requirements.

Region	Weather Location	Temperatures (°F)
Central	Indianapolis, IN	95
Central	St. Louis, MO	95
Central	Detroit, MI	90
Central	Madison, WI	90
Central	Milwaukee, WI	90
North	Des Moines, IA	95
North	St. Paul, MN	90
South	New Orleans, LA	98
South	Little Rock, AR	98
South	Jackson, MS	98
South	Houston, TX	98
South	Baton Rouge, LA	98

Table 1: Hot Weather Alert Temperature Criteria



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4.0 Cold Weather Alert

- 1. A Cold Weather Alert is to prepare operating personnel and facilities for extreme cold weather conditions which may cause capacity requirements to be higher than normal and unit unavailability to be greater than forecasted and these conditions are expected to persist for an extended period.
- 2. A Cold Weather Alert can be issued by MISO, on a market footprint or a sub-area basis, if projected temperatures are to exceed fall below the temperatures defined in Table 2: Cold Weather Alert Temperature Criteria along with severe wind chill factors and concerns about Capacity and Operating Reserve requirements.

Region	Weather Location	Temperatures (°F)
Central	Indianapolis, IN	-5
Central	St. Louis, MO	-5
Central	Detroit, MI	-5
Central	Madison, WI	-15
Central	Milwaukee, WI	-15
North	Des Moines, IA	-15
North	St. Paul, MN	-15
South	New Orleans, LA	28
South	Little Rock, AR	28
South	Jackson, MS	28
South	Houston, TX	28
South	Baton Rouge, LA	28

Table 2: Cold Weather Alert Temperature Criteria

5.0 Geo-Magnetic Disturbance Alert of Warning (K-8 or higher)

1. A GMD Alert or Warning is to prepare RCs, TOPs, BAs, LBAs, and GOPs with advance notice of an upcoming GMD. Notice can range from a few hours to less than an hour depending on the notice given from the Space Weather Prediction Center (SWPC). Frequent communications between the TOPs, LBAs, BAs, and GOP with their RC in regards to GMD monitored equipment should occur.



- The specific actions MISO will take to disseminate current and forecasted space weather information, including GMD Alerts or Warnings of K-7 or higher, is documented in SO-P-AOP-01 Geomagnetic Disturbance Operating Plan.
- Specific actions that MISO, or TOPs, LBAs, BAs, or GOPs in the MISO Reliability Coordinator Footprint can take to mitigate the impacts of space weather on the transmission system is documented in SO-P-AOP-01 Geomagnetic Disturbance Operating Plan.

6.0 MISO Communications Protocols

6.1 General Notifications

- 1. MISO shall communicate conditions as appropriate to LBAs, BAs, MPs, GOPs, and TOPs, government agencies, and to Neighboring BAs, TOPs, and RCs via the appropriate communication tools.
- 2. MISO will restrict communications of sensitive information related to reliability to MPs and to the public in order to protect the integrity of the BES.
- 3. MISO Blast Calls
- 4. MISO will provide summary information to the following:
 - *MISO Alerts BA and TO
 - *MISO Alerts FERC, State Comm., RRO, Neighboring RCs and BAs
 - *RT Ops Notification
- 5. CMPL on-call representative will be contacted via phone and coordinate with the SM on any necessary notifications per SO-I-NOP-00-448 to make necessary notifications.
- 6. For potential physical or cyber security attack or threat, the following notifications are made by SM per PSS-OP-001:
 - A. Manager of Physical Security & Safety or Site Security
 - B. Operations Compliance (CMPL) On-Call