

Business Process

BP_SO_9.2 Declaration of System Alerts

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1 ASSUMPTIONS

Assumptions made during the design of this process include:

- This is an all-island business process, meaning the same process will be used across both jurisdictions on the island, Ireland and Northern Ireland; however any alerts should only be issued by the Control Centre in the affected jurisdiction;
- The following business processes addresses all requirements, including roles, tools, and activities that will enable the TSOs to achieve scheduling objectives; and
- All required systems, including MMS are in place. They offer all required functionalities to support business needs.

2 PROCESS REFERENCES

2.1 RELATED RULES REFERENCES

The following table provides references to the documents that govern the design of this business process.

Document Title	Relevant Section	Description
EirGrid Grid Code	OC9 Emergency Control and Power System Restoration	OC9.4 outlines the criteria for issuing of System Alerts by the TSO in the event of a System Emergency Condition or imminent shortfall in capacity. These alerts may include an Amber Alert, Red Alert or Blue Alert.
Trading and Settlement Code	Chapter G	Chapter G includes provision for Administered Imbalance Settlement in the event of electrical system collapse.

2.2 RELATED DOCUMENTS

The following table provides a list of documents that are related to this business process.

Document Title	Relationship	Description
Demand Control Process	This business process may be a trigger for it.	Demand control or load shedding process details the steps taken by the Control Centre, relevant Distribution System Operator and Market Operator in the event of a demand reduction event. If this process is triggered a red alert is typically declared.

3 PROCESS CONTEXT

3.1 BUSINESS MODEL RELATIONSHIP

The Declaration of System Alerts sits within 'Real Time Control' process group within the Systems Operator processes. Aside from scheduling and dispatching the system, there are a number of planned and unplanned activities that occur in Real Time that can be implemented.

3.2 BACKGROUND AND SCOPE

Background

Power system alerts range in severity from amber (level 1 or level 2) when there is a reasonable probability of failing to meet system demand, to red which indicates demand control has happened or is expected

imminently, followed by blue in the event of a total or partial system shutdown. The alert system is a mechanism to notify relevant parties, including, generators, and distribution system operators, internal staff, regulators and the market operator that the system is in an abnormal state (see Appendix 9.1 for list of parties informed.) Upon receipt of an alert the different parties implement their own procedures.

Power system alerts are issued on a jurisdictional basis. As there are limited transmission connections between the Northern Ireland and Ireland power systems, it is plausible for one system to be in an alert state whilst the other one isn't. The criteria for alert levels in each jurisdiction are as follows:

3.2.1 AMBER ALERT – LEVEL 1

Northern Ireland

The Amber Alert Level 1 signal should be initiated by CHCC when, for any period, the NI System enters an "ALERT STATE" such that the jurisdictional margin (i.e. all the available plant, including wind, plus any guaranteed emergency assistance from interconnection less the predicted demand) pre fault in that period is less than the largest jurisdictional infeed but more than the primary spinning reserve requirement associated with this infeed i.e.

$$LSI_{NI} > MAR_{NI} > (POR \%) LSI_{NI}$$

Where:

$$MAR_{NI} = [GEN_{NI} + WIND_{NI} +/- ICF_{NI} + EAIC_{NI} +/- TL + EATL] - LOAD_{NI}$$

GEN_{NI} = Available generation in NI

WIND_{NI} = Expected generation from wind in NI

LOAD_{NI} = Expected system load in NI

ICF_{NI} = Flow on the Moyle Interconnector

EAIC_{NI} = Emergency Assistance available on the Moyle Interconnector

TL = Flow on Tie Line

EATL_{NI} = Emergency Assistance available on the Tie Line

LSI_{NI} = largest MW infeed to jurisdiction

POR% = currently agreed at 0.75

Ireland

The Amber Alert – Level 1 should be initiated by NCC when the system margin is such as the tripping of the largest set, would give rise to a reasonable possibility of;

(a) Failure to meet the System Demand - Use the following formula as a guideline:

Total system availability¹ + Emergency Assistance from NI + Emergency Assistance over East-West - Peak Demand < Largest Infeed

(b) Frequency or voltage departing significantly from normal

Or when multiple contingencies are probable because of thunderstorm or high wind activity.

¹ Total System Availability should only include that plant which is on load or can start within the timeframe of the alert.

3.2.2 AMBER ALERT – LEVEL 2

Northern Ireland

The "AMBER ALERT - LEVEL 2" signal should be initiated by CHCC when, for any period, the NI System enters an "ALERT STATE" such that:

The system margin pre-fault is less than the jurisdictional primary spinning reserve requirement but more than the jurisdictional minimum or regulating reserve requirement i.e.

$$(POR\%)LSI_{NI} > MAR_{NI} > RR_{NI}$$

Where:

RR_{NI} = Regulating Reserve currently set at 50MW (dynamic)

[Note: on a day when the wind is gusting or ramping down quickly the TSO may decide to set the Regulating Reserve at a higher value].

POR%, LSI_{NI} and MAR_{NI} are as per above.

Ireland

The "AMBER ALERT - LEVEL 2" signal should be initiated by the NCC when the System enters an "ALERT STATE", that is:

1. When the system margin (i.e. the available plant + Emergency Assistance less the predicted peak demand) is less than the jurisdictional primary spinning reserve requirement.

3.2.3 RED ALERT

Northern Ireland

The "RED ALERT" signal should be initiated by CHCC when it is likely/imminent that the System will enter an "Emergency state", that is;

In the period immediately ahead (i.e. in the next 4 hours) there is a high risk of failing to meet System Demand (or maintaining normal Voltage and Frequency levels in all substations) and the following condition will arise:

$$MAR_{NI} < RR_{NI}$$

Ireland

The "RED ALERT ON" signal should be initiated by the NCC when the System enters an "Emergency state", that is

1. The System frequency deviated significantly from normal i.e. < 49.3Hz for a sustained period of time
2. System voltages have deviated significantly from normal i.e. a group of stations have 110kV voltages less than 95kV
3. Consumer load has been shed
4. In the period immediately ahead there is a high risk of failing to meet System Demand or maintaining normal Voltage and Frequency.

3.2.4 BLUE ALERT

Northern Ireland

Blue alert facilities are available in all Northern Ireland generating stations, NIE's DCC and key Blackstart transmission stations. [For a full list refer to the Power System Restoration Plan (PSRP) Appendix 11]. Blue alerts should be issued using the Procedure below.

The "BLUE ALERT" signal should be initiated by the CHCC when the System enters a "Blackstart" state, that is:

1. The Northern Ireland system has been separated from the Ireland system and
2. A power station or stations is/are required to start from black, and/or,
3. the system is black.

Ireland

The Blue Alert signal is issued by the NCC to inform relevant parties that all or part of the transmission system must be started from black.

3.2.5 CANCELLATION OF ALERTS

In general alerts should be cancelled only once system conditions have stabilised for at least one hour and there is only a very low probability of another alert being issued on the same day.

Scope

This business process outlines the criteria for issuing each type of alert for both jurisdictions, and the steps taken by the relevant control centre to issue that alert including notification of relevant parties and updating of the European Awareness System. It also covers the steps taken to cancel an alert.

4 PROCESS OBJECTIVE

The objective of this Business Process is to meet the following obligations:

- EirGrid Grid Code OC9.4 System Alerts
- Trading & Settlement Code, Chapter G Financial and Settlement
- ENTSO-E Obligations in relation to European Awareness System

5.1.1 REAL TIME

The following table provides a summary of the obligations of the Real Time team relating to Declaration of System Alerts:

Team Name	Responsibility in relation to process	Timeline Associated
Real Time	<ul style="list-style-type: none"> • Issue power system alert and notify the relevant people including the Market Operator. • Cancel power system alert once system has stabilised. 	As required

5.1.1 TRADING

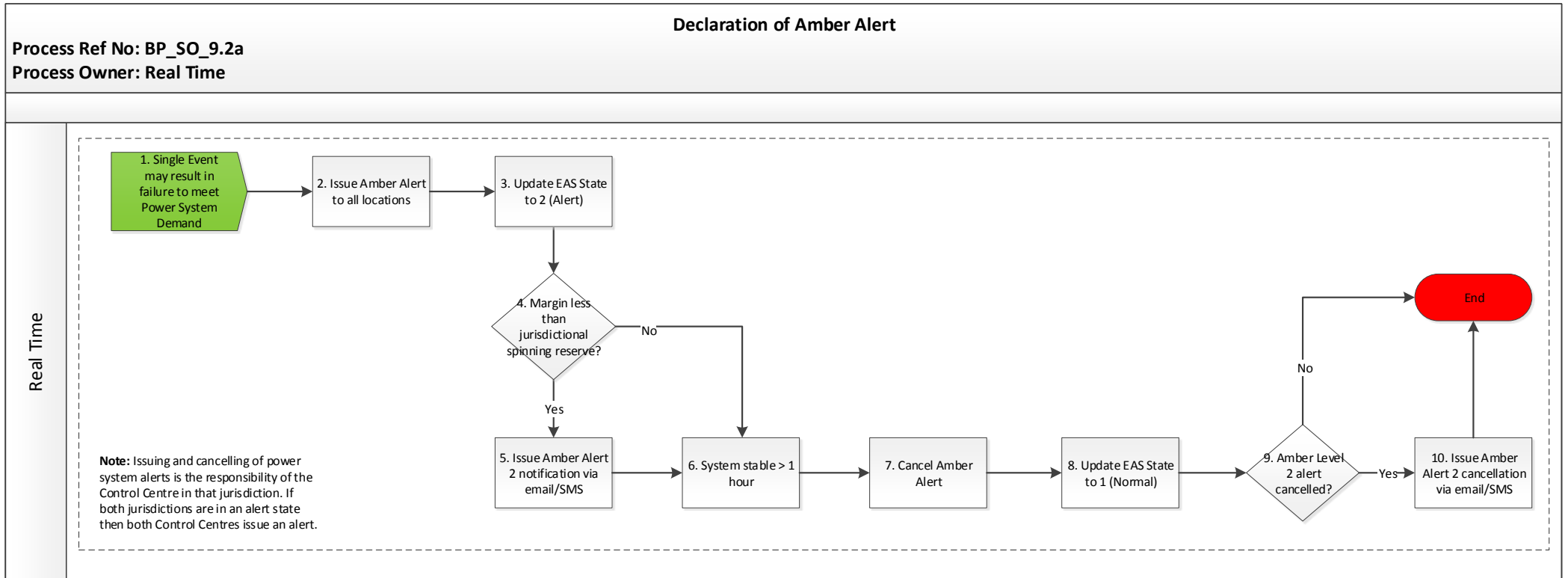
The following table provides a summary of the obligations of the Trading team relating to Declaration of System Alerts:

Team Name	Responsibility in relation to process	Timeline Associated
MO Trading	<ul style="list-style-type: none"> • Receive notification of power system blue alerts and cancellations and trigger Administered Settlement process. 	This will be as required. MO Trading office hours only (07.00 to 19.00, 7 days a week)

6 PROCESS DESCRIPTION

6.1 LEVEL 3 PROCESS

6.1.1 PROCESS MAP – DECLARATION OF AMBER ALERT

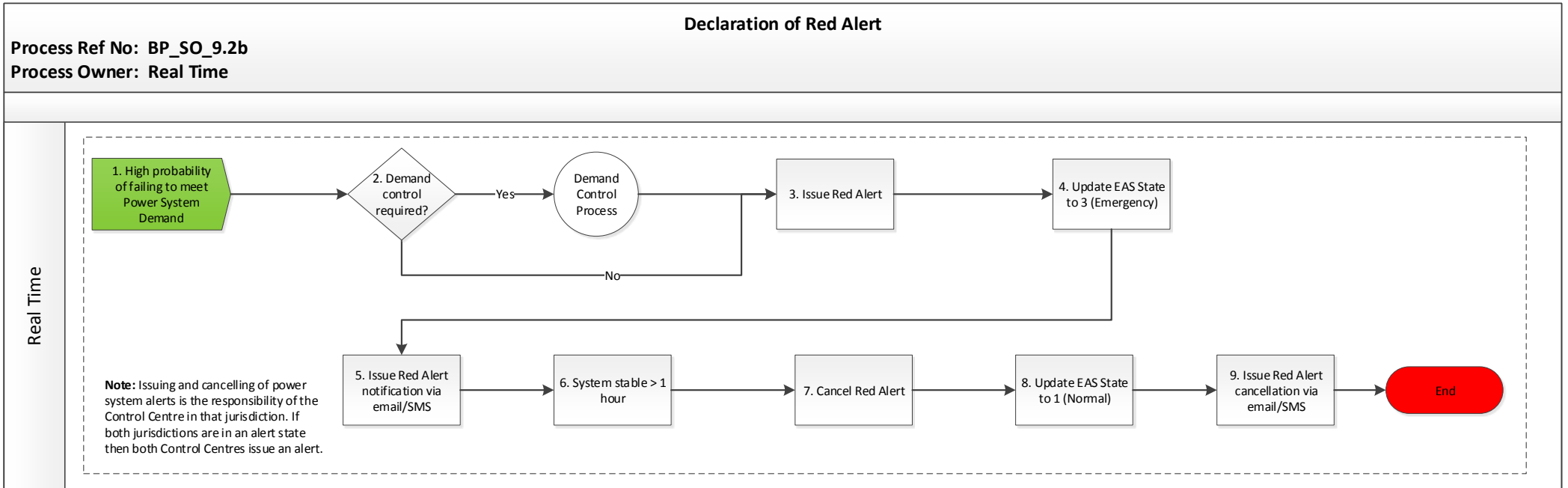


6.1.2 PROCESS STEPS – DECLARATION OF AMBER ALERT

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
1	Single Event may result in failure to meet Power System Demand	<p>The following may act as a trigger to this process:</p> <ol style="list-style-type: none"> 1. A Single Event would give rise to a reasonable possibility of failure to meet Power System Demand 2. If frequency or voltage departing significantly from normal, or 3. If multiple Events are probable due to prevailing weather conditions <p><i>Power system alerts are issued jurisdictionally, so if both jurisdictions are in an alert state the following steps are completed by both jurisdictions.</i></p>	N/A	N/A	As required	N/A
2	Issue Amber Alert to all locations	An Amber Alert is issued to all applicable stations	Real Time	Alert	As required	EMS Alerts
3	Update EAS State to 2 (Alert)	<p>Once an Amber Alert has been issued, the Real Time User should update the System State to 2, which corresponds to the Alert or YELLOW state in the ENTSO-E Awareness System. This is done manually via the EMS Alerts page.</p> <p><i>Note: Ireland and Northern Ireland are treated as a common system so updating the EAS alert state impacts both jurisdictions.</i></p>	Real Time	EAS Update	As required	EMS Alerts
4	Margin less than jurisdictional	Is the system margin is less than the jurisdictional primary spinning reserve?	Real Time	Decision	As required	N/A

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
	spinning reserve?	If yes, go to Step 5 If no, go to Step 6				
5	Issue Amber Level 2 notification via email/SMS	The Amber Level 2 Alert email template is issued to a pre-defined list, including the Market Operator, and also issues an SMS to a pre-defined list.	Real Time	Notification	As required	Email
6	System stable > 1 hour	Once the system has been stable for more than one hour and there is low risk of further alerts being issued then the alert can be cancelled. Note: This may take a number of hours after it is first issued.	Real Time	N/A	As required	N/A
7	Cancel Amber Alert	The Amber Alert is cancelled via EMS	Real Time	Alert	As required	EMS Alerts
8	Update EAS State to 1 (Normal)	Once the Amber Alert has been cancelled the Real Time User should update the System State to 1, which corresponds to the Normal or GREEN state in the ENTSO-E Awareness System. This is done manually via the EMS Alerts page.	Real Time	EAS Update	As required	EMS Alerts
9	Amber Level 2 alert cancelled?	Amber Level 2 alert cancelled? If no, no further action required. If yes, proceed to Step 10	Real Time	Alert	As required	EMS Alerts
10	Issue Amber Alert Level 2 cancellation via email / SMS	The Amber Level 2 Alert cancellation email template is issued to a pre-defined list, including the Market Operator, and also issues an SMS to a pre-defined list.	Real Time	Notification	As required	N/A

6.1.3 PROCESS MAP – DECLARATION OF RED ALERT

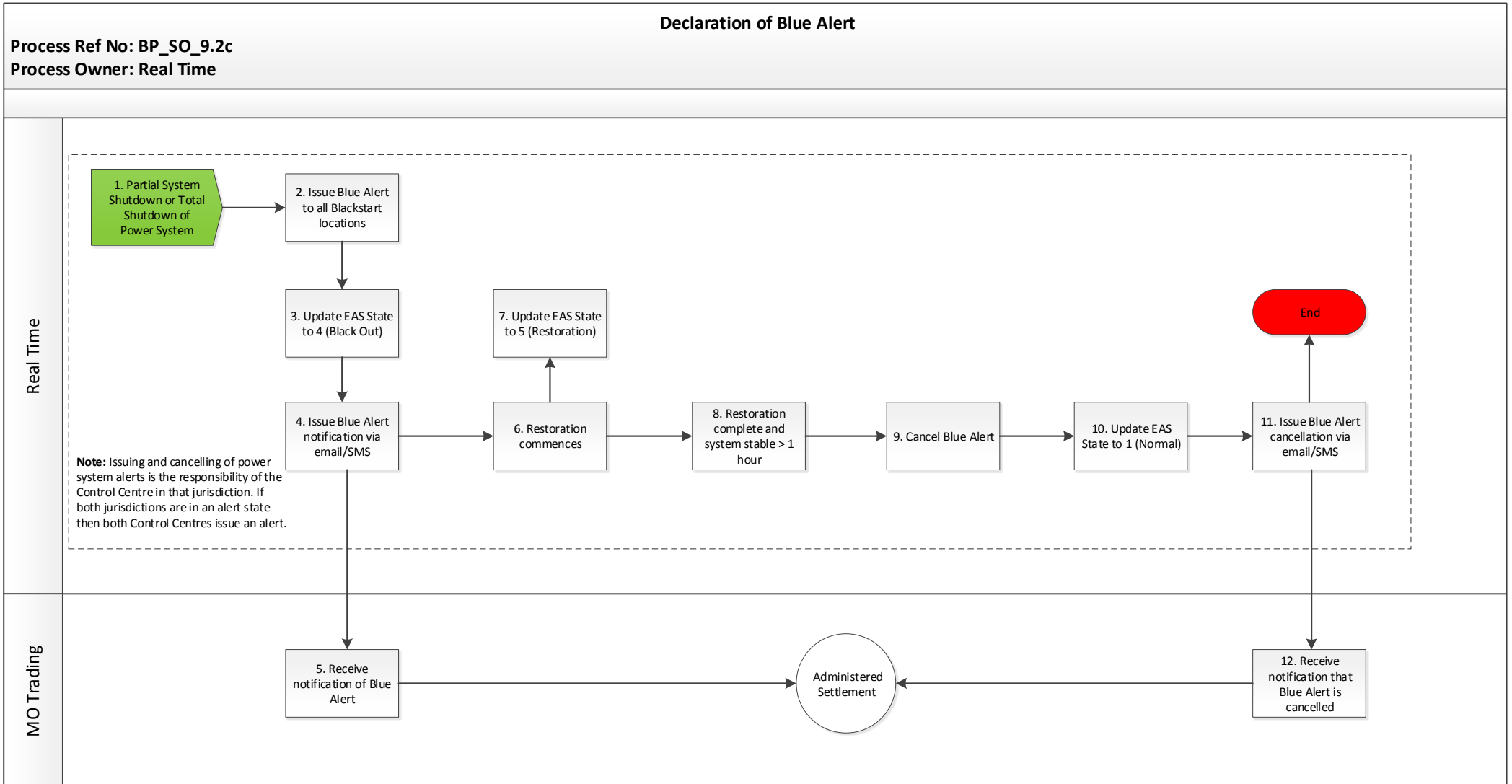


6.1.4 PROCESS STEPS – DECLARATION OF RED ALERT

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
1	High probability of failing to meet Power System Demand	<p>The following may act as a trigger to this process:</p> <ol style="list-style-type: none"> 1. The frequency or voltage has deviated significantly from normal 2. User's demand has been disconnected 3. Or in the period immediately ahead there is a high probability of failing to meet Power System Demand or to maintain normal Voltage <p><i>Power system alerts are issued jurisdictionally, so if both jurisdictions are in an alert state the following steps are completed by both jurisdictions.</i></p>	N/A	N/A	As required	N/A
2	Demand Control required?	<p>Is demand control required?</p> <p>If yes, implement Demand Control Process and then proceed to Step 3</p> <p>If no, proceed directly to Step 3</p>	Real Time	Decision	As required	N/A
3	Issue Red Alert	A Red Alert is issued to all locations	Real Time	Alert	As required	EMS Alerts
4	Update EAS State to 3 (Emergency)	<p>Once a Blue Alert has been issued, the Real Time User should update the System State to 3, which corresponds to the Emergency or Red state in the ENTSO-E Awareness System. This is done manually via the EMS Alerts page.</p> <p><i>Note: Ireland and Northern Ireland are treated as a common system so updating the EAS alert state impacts both jurisdictions.</i></p>	Real Time	EAS Update	As required	EMS Alerts

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
5	Issue Red Alert notification via email/SMS	The Red Alert email template is issued to a pre-defined list, including the Market Operator, and also issues an SMS to a pre-defined list.	Real Time	Notification	As required	Email / Text
6	System stable > 1 hour	Once the system has been stable for more than one hour and there is low risk of further alerts being issued then the alert can be cancelled.	Real Time	N/A	As required	N/A
7	Cancel Red Alert	The red alert is cancelled.	Real Time	Alert	As required	EMS Alerts
8	Update EAS State to 1 (Normal)	Once the Red Alert has been cancelled the Real Time User should update the System State to 1, which corresponds to the Normal or GREEN state in the ENTSO-E Awareness System. This is done manually via the EMS Alerts page.	Real Time	EAS Update	As required	EMS Alerts
9	Issue Red Alert cancellation via email / SMS	The Red Alert cancellation email template is issued to a pre-defined list, including the Market Operator, and also issues an SMS to a pre-defined list.	Real Time	Notification	As required	N/A

6.1.5 PROCESS MAP – DECLARATION OF BLUE ALERT



6.1.6 PROCESS STEPS – DECLARATION OF BLUE ALERT



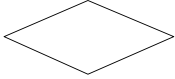




#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
1	Partial System Shutdown or Total Shutdown of Power System	<p>Partial system shutdown or total shutdown of power system acts as the trigger for declaring a Blue Alert</p> <p><i>Power system alerts are issued jurisdictionally, so if both jurisdictions are in an alert state the following steps are completed by both jurisdictions.</i></p>	N/A	N/A	As required	N/A
2	Issue Blue Alert to all 'Blackstart' locations	A blue alert is issued to all 'blackstart' locations by issuing a Global Blue Alert	Real Time	Alert	As required	EMS Alerts
3	Update EAS State to 4 (Black Out)	<p>Once a Blue Alert has been issued, the Real Time User should update the System State to 4, which corresponds to the Black Out state in the ENTSO-E Awareness System. This is done manually via the EMS Alerts page.</p> <p><i>Note: Ireland and Northern Ireland are treated as a common system so updating the EAS alert state impacts both jurisdictions.</i></p>	Real Time	EAS Update	As required	EMS Alerts
4	Issue Blue Alert notification via email/SMS	The Blue Alert email template is issued to a pre-defined list, including the Market Operator, and also issues an SMS to a pre-defined list.	Real Time	Notification	As required	Email / Text
5	Receive notification of Blue Alert	Receives notification from Real Time that a blue alert has been issued. This is the trigger for the Administered Settlement process.	MO Trading	N/A	As required	N/A

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
6	Restoration commences	Following declaration of a Blue Alert, Real Time prepares a restoration plan in accordance with the Power System Restoration Plan. This signifies the start of restoration.	Real Time	N/A	As required	N/A
7	Update EAS State to 5 (Restoration)	Once restoration has commenced, the Real Time User should update the System State to 5, which corresponds to the Restoration or BLUE state in the ENTSO-E Awareness System. This is done manually via the EMS Alerts page. <i>Note: Ireland and Northern Ireland are treated as a common system so updating the EAS alert state impacts both jurisdictions.</i>	Real Time	EAS Update	As required	EMS Alerts
8	Restoration complete and system stable > 1 hour	Once all system demand has been restored and the system has been stable for more than one hour and there is low risk of further alerts being issued then restoration can be considered complete.	Real Time	N/A	Up to 24 Hours after restoration commences	N/A
9	Cancel Blue Alert	Once restoration is complete then the Blue Alert is cancelled via EMS	Real Time	Alert	As required	EMS Alerts
10	Update EAS State to 1 (Normal)	Once the Blue Alert has been cancelled the Real Time User should update the System State to 1, which corresponds to the Normal or GREEN state in the ENTSO-E Awareness System. This is done manually via the EMS Alerts page.	Real Time	EAS Update	As required	EMS Alerts
11	Issue Blue Alert cancellation via	The Blue Alert cancellation email template is issued to a pre-defined list, including the Market Operator,	Real Time	Notification	As required	N/A

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
	email / SMS	and also issues an SMS to a pre-defined list.				
12	Receive notification that Blue Alert is cancelled	Receives notification from Real Time that the Blue Alert has been cancelled. This signifies the end of the Administered Settlement period.	MO Trading	N/A	As required	N/A

7 APPENDICES

7.1 PROCESS FLOWCHART KEY

FLOWCHART KEY	
	Trigger
	Process step
	Process decision / question
	Reference to another process
	Another business process to be implemented following current step (current step is a trigger for another process)
	Process end
	System (automatic step)