

Appendix A: Emergency Operating State Control Actions

The following tables reflect the hierarchy of control actions available to the *IMO* leading up to and during an “*emergency operating state*”. Section E.1 addresses the actions initiated both in advance of the declaration of and during the *Emergency Operating State* where only the *IMO Control Area* is deficient. Section E.2 however addresses the scenario where the *IMO* and an external *control area* are both faced with generation deficiency.

While the tables provide the anticipated order of control actions, **the *IMO* may initiate control actions at any point in the hierarchy depending on the specific circumstances and conditions of the *IMO* or external *control area*.** In addition, the *IMO* may alter the order in which the control actions are implemented to respond to *reliability* concerns.

It should also be stressed that as a general principle the *IMO* will not take any control actions that do not provide a **net** benefit to the operating condition. Adherence to this principle may lead to scenarios where exports from congested regions within Ontario continue to flow while *non-dispatchable load* elsewhere in Ontario is being curtailed. Legend applied to the last 4 columns of the table, indicating the status of the *IMO-controlled grid* associated with each control action:

- ❶ 30-minute *operating reserve*, 10-minute *operating reserve* and *AGC* reserve maintained
- ❷ 10-minute *operating reserve* and *AGC* reserve maintained
- ❸ 10-minute synchronized *operating reserve* and *AGC* reserve maintained
- ❹ *AGC* reserve maintained

E.1 Actions in Advance of and During the IMO Controlled Grid Emergency Operating State

No.	Action	Description	References	❶	❷	❸	❹
1	Issue Weekly Security and Adequacy Assessment (SAA)	These assessments are published 15-34 days out and would identify any forecast capacity and/or <i>energy</i> deficiencies.	<i>Market Rules</i> – Chapter 5 sections 7.3.1.3 & 7.4.3 Market Manual Part 7.2 – Near-Term Assessments and Reports	Y			
2	Issue Daily Security and Adequacy Assessment (SAA)	This assessment comes 3-14 days out and would identify any forecast capacity and/or <i>energy</i> deficiencies.	<i>Market Rules</i> – Chapter 5 sections 7.3.1.4 & 7.4.4 Market Manual Part 7.2 – Near-Term Assessments and Reports	Y			

No.	Action	Description	References	1	2	3	4
3	<i>Outage</i> Management Process – reject <i>outage</i> applications	This rejection applies only to those <i>outages</i> that have not received advance approval. Advance approval is received 2 <i>business days</i> prior to the start of an <i>outage</i> .	<i>Market Rules</i> – Chapter 5 section 6.4.4.1 <i>Market Manual</i> Part 7.3 - <i>Outage Management</i>	Y			
4	Issue System Advisory for undergeneration in System Status Report (SSR) Note: Where appropriate, the SSR may be issued after each control action.	This report is produced between 0-2 days in advance and would include the undergeneration advisory (report could be issued very close to real-time if needed). In this instance the advisory would indicate a lack of installed resources.	<i>Market Rules</i> – Chapter 7 section 12.1.3.2 <i>Market Manual</i> Part 7.2 – Near-Term Assessments and Reports	Y			
5	Issue General or Public Appeal	This is a public appeal for the general populous to conserve <i>energy</i> and is usually a media based appeal. The <i>IMO</i> will normally issue an appeal only if the situation is expected to progress to the point that a 5% voltage reduction would also be expected to be activated.	<i>IMO</i> internal procedures	Y			
6	Issue System Advisory for undergeneration in System Status Report (SSR) Note: Where appropriate, the SSR may be issued after each control action.	This report is produced no more than 1 day in advance and would include the undergeneration advisory. The report could be issued very close to real-time if needed. In this case the advisory would indicate a lack of <i>offers</i> and <i>bids</i> .	<i>Market Rules</i> – Chapter 7 section 12.1.3.2 <i>Market Manual</i> Part 7.2 – Near-Term Assessments and Reports	Y			
7	<i>Outage</i> Management Process – revoke approved <i>outages</i>	Revoke impactive <i>outages</i> that have received advance approval (from 2 <i>business days</i> in advance of <i>outage</i> start up to real-time). This may trigger compensation of <i>generators</i> .	<i>Market Rules</i> - Chapter 5 sections 6.4.4.1 and 6.4.9 <i>Market Manual</i> Part 7.3 – <i>Outage Management</i>	Y			
8	Manage Inadvertent Payback	When inadvertent is owed by the <i>IMO</i> , the <i>IMO</i> may unilaterally or bilaterally payback the inadvertent. To the extent that this payback is contributing to the deficiency, such payback shall be discontinued. If the payback benefits the situation in the <i>IMO control area</i> , it will continue.	<i>IMO</i> internal procedures	Y			

No.	Action	Description	References	1	2	3	4
9	Manage Time Error Correction	When time-error correction requires an over-generation of <i>IMO control area</i> resources, time-error correction shall be discontinued.	<i>IMO</i> internal procedures	Y			
10	<i>Outage</i> management process – recall <i>outages</i>	<i>Outages</i> that can be recalled in a timely fashion will be recalled. This may trigger compensation of <i>generators</i> .	<i>Market Rules</i> - Chapter 5 sections 6.4.4.1, 6.4.11 <i>Market Manual</i> Part 7.3 – Outage Management	Y			
11	Issue <i>NERC</i> Energy Emergency Alert 1 (EEA-1)	The <i>IMO control area</i> has (or expects to have) all available resources in use. The EEA alerts are posted on the <i>NERC</i> public web-site.	<i>NERC</i> Policy 9 Appendix 9B	Y			
12	Issue System Emergency Advisory in System Status Report (SSR) Note: Where appropriate, the SSR may be issued after each control action.	This SSR will be accompanied by a System Emergency Advisory indicating the <u>potential for the declaration of an emergency operating state</u> .	<i>Market Rules</i> - Chapter 7 section 12.1.3.3	Y			
13	Constrain Dispatch of internal resources to alleviate current or future ramping issues	These control actions, where available and implemented, are intended to <u>avoid the declaration of an emergency operating state</u> . Daily Energy Limited Resources would only be constrained on at this point if other resources were not available.	<i>Market Rules</i> : Chapter 5 Sections 1.2.1 and 2.3.2 Chapter 7 Sections 7.2.1.1, 7.2.5.1 and 11.3.3	Y			
14	Discontinue Commissioning Tests	During the commissioning of a <i>generation unit</i> the <i>IMO</i> may be required to carry additional reserve due to the increased likelihood of unit failure. The <i>IMO</i> may request that all commissioning tests halt so that the reserve requirement is returned to normal levels.	<i>Market Rules</i> – Chapter 5 section 4.5.1.3	Y			
15	During the transaction checkout process, include remaining Exports, <u>as recallable</u> to maintain 30-minute operating reserve.	This pertains to those Exports that were not needed to be made recallable previously	<i>Market Rules</i> - Chapter 7, Appendix 7.5 IMO Internal Procedures	Y			

16	Include any 3% voltage reductions not already included through market mechanisms as 30-minute <i>operating reserve</i>	This action will help to maintain the 30-minute <i>operating reserve</i> and will only be included if all available offers for OR are utilized and exports have been identified as recallable for 30-minute reserve.	<i>Market Rules</i> – Chapter 5 section 10.3	Y			
17	The following 7 control actions can be used only if the 30-minute <i>operating reserve</i> shortfall is forecasted to last beyond 4 hours from the time the shortfall was first identified. Implement control actions 17b through 17f in a timely manner as to resolve the 30-minute shortfall prior to the end of the 4 hour period.						
17a	Issue <i>NERC</i> Energy Emergency Alert 2 (EEA-2)	The <i>IMO control area</i> has or is about to initiate load management procedures. The EEA alerts are posted on the <i>NERC</i> public web-site.	<i>NERC</i> Policy 9 Appendix 9B	Y			
17b	Include remaining Exports that are flowing within the hour, <u>as recallable</u> to maintain 30-minute <i>operating reserve</i> .	Exports that are flowing within the hour will be allowed to flow and considered recallable. This pertains to those Exports flowing within the hour that were not needed to be made recallable previously	<i>Market Rules</i> - Chapter 7, Appendix 7.5 IMO Internal Procedures	Y			
17c	Constrain Dispatch of Resources	These control actions, where available and implemented, are intended to <u>avoid the declaration</u> of an <i>emergency operating state</i> . Use of Daily Energy Limited resources, constraining on imports and off exports may be used at this point.	<i>Market Rules</i> : Chapter 5 Sections 1.2.1 and 2.3.2 Chapter 7 Sections 7.2.1.1, 7.2.5.1 and 11.3.3	Y			
17d	Include 5% voltage reductions as 30-minute <i>operating reserve</i> if not already included through market mechanisms as 30-minute <i>operating reserve</i> .	This action will help to maintain the 30-minute <i>operating reserve</i> requirement	<i>Market Rules</i> – Chapter 5 section 10.3	Y			
17e	Issue System Emergency Advisory in System Status Report (SSR) Note: Where appropriate, the SSR may be issued after each control action.	This SSR will be accompanied by a System Emergency Advisory that will include the <u>declaration</u> of the <i>emergency operating state</i> .	<i>Market Rules</i> – Chapter 7 section 12.1.3.3	Y			

17f	Purchase <i>emergency energy</i> and request <i>emergency assistance</i>	Purchase resources not made available through market mechanisms to eliminate the deficiency. These purchases are made to maintain 30-minute <i>operating reserve</i> and are not providing support to the exports that may be flowing at the time. The source of the purchases must be the seller's surplus <i>energy</i> .	Market Rules - Chapter 5 Section 2.3.3A	Y			
The <i>IMO</i> is now no longer able to operate to respect the 30-minute <i>operating reserve</i> requirement. The preceding control actions are insufficient to meet the full 30-minute reserve requirement.							
18	Include remaining Exports, <u>as recallable</u> for 10-minute non-synchronized reserve.	Exports will be made recallable for 10-minute non-synchronized <i>operating reserve</i> activation during the transaction checkout process or earlier as required to maintain the 90/105 minute <i>operating reserve</i> requirement.	<i>Market Rules</i> - Chapter 7, Appendix 7.5		Y		
19	Constrain Dispatch of Resources including Daily Energy Limited resources and imports	These control actions, where available and implemented, are intended to <u>avoid the declaration</u> of an <i>emergency operating state</i> .	<i>Market Rules</i> : Chapter 5 Sections 1.2.1 and 2.3.2 Chapter 7 Sections 7.2.1.1, 7.2.5.1 and 11.3.3		Y		
20	Give advance warning to the Ministry of the Environment Spills Action Centre (by phone 1-800-268-6060) of potential for Environmental Variance request from <i>market participants</i>	This will allow MOE time to alert their Regional Offices and be prepared to approve Environmental Variance Requests. The <i>IMO</i> will only provide this notification if the situation is expected to progress to the point environment variance requests (step 26) will be required.	<i>IMO</i> internal procedures		Y		
21	Include any 3% voltage reductions not already included through market mechanisms as 10-minute <i>operating reserve</i> .	This action will help to maintain the 10-minute <i>operating reserve</i> and will only be utilized if all exports have been identified as recallable for 10-minute reserve.	<i>Market Rules</i> – Chapter 5 section 10.3		Y		
22	Issue <i>NERC Energy</i>	The <i>IMO control area</i> has or is	<i>NERC Policy 9 Appendix</i>		Y		

	Emergency Alert 2 (EEA-2)	about to initiate load management procedures. The EEA alerts are posted on the <i>NERC</i> public web-site.	9B				
23	Include any 5% voltage reductions as 10-minute <i>operating reserve</i> not already included through market mechanisms as 10-minute <i>operating reserve</i> .	This action will help to maintain the 10-minute <i>operating reserve</i> and will only be utilized if all exports identified as recallable and 3% voltage reduction are insufficient to maintain the 10-minute non-synchronized requirement.	<i>Market Rules</i> – Chapter 5 section 10.3			Y	
24	Issue System Emergency Advisory in System Status Report (SSR) Note: Where appropriate, the SSR may be issued after each control action.	This SSR will be accompanied by a System Emergency Advisory that will include the <u>declaration</u> of the <i>emergency operating state</i> .	<i>Market Rules</i> – Chapter 7 section 12.1.3.3			Y	
25	Request <i>market participants</i> to seek prior approval of environmental variances	The <i>IMO</i> will request <i>market participants</i> to seek prior approval for environmental variances. The environmental variances will be utilized only if implementing 5% voltage reduction is insufficient to maintain 10-minute synchronized <i>operating reserve</i> .	<i>IMO</i> internal procedures			Y	
26	Purchase <i>emergency energy</i> and request <i>emergency assistance</i>	Purchase resources not made available through market mechanisms. These purchases are made to maintain 10-minute <i>operating reserve</i> and are not providing support to the exports that may be flowing at the time. The source of the purchases should be the seller's surplus <i>energy</i> or 30 minute reserve.	<i>Market Rules</i> – Chapter 5 section 2.3.3A			Y	
<p>The <i>IMO</i> is no longer operating to respect the 10-minute non-synchronized <i>operating reserve</i> requirement and has only enough resources available to meet the 10-minute synchronized reserve and minimum <i>automatic generation control</i> (AGC) requirements. The preceding control actions are insufficient to maintain 10-minute non-synchronized reserve.</p>							
27	Exports identified as recallable for 10-minute non-	Exports that bid MMCP (or are flowing within the hour) will not be scheduled (or are recalled) to	<i>IMO</i> internal procedures			Y	

	synchronized reserve are recalled. Note: Should the recall of an identified export cause a jurisdiction to enter into (or aggravate a jurisdiction in) the emergency operating state the IMO will, in accordance good utility practice, take additional steps to support the dependent jurisdiction on a reciprocal step by step basis. This support is described in section E.2.	maintain 10-minute synchronized <i>operating reserve</i> . Note: There will be no exports flowing prior to implementing the next control action.					
28	Implement 3% voltage reductions	The IMO has reduced voltage by 3% at the distribution level. Power quality affected but no “real” load cut.	Market Rules – Chapter 5 section 10.3				Y
29	Disregard High-Risk Limits	This action will allow the IMO to make additional bottled <i>energy</i> available at the expense of increased risk to system <i>security</i> .	IMO internal procedures				Y
30	Purchase <i>emergency energy</i> and request <i>emergency assistance</i>	Purchase resources not made available through market mechanisms. The source of the purchases should be the seller’s surplus <i>energy</i> or 30-minute reserve made available by Step 29: Disregard High Risk Limits.	Market Rules – Chapter 5 section 2.3.3A				Y
The IMO is no longer operating to respect the 10-minute synchronized <i>operating reserve</i> requirement and has only enough resources available to meet the minimum <i>automatic generation control</i> (AGC) requirements.							
31	Implement 5% voltage reductions	The IMO has reduced voltage by 5% at the distribution level. Power quality affected but no “real” load cut. Expect significant customer complaints and requests for <i>exemption</i> .	Market Rules – Chapter 5 section 10.3				Y
32	Implement environmental variances	The IMO will request <i>market participants</i> to implement available environmental variances.	IMO internal procedures				Y
33	Issue NERC Energy Emergency Alert 3 (EEA-3)	This publishes to all that “Firm Load interruption is imminent or in process”. These alerts are posted on the NERC public web-site.	NERC Policy 9 Appendix 9B				Y
34	Operate to Emergency Condition Limits	This action will allow the IMO to make additional bottled <i>energy</i> available at the expense of	IMO internal procedures				Y

		increased risk to system <i>security</i> .				
35	Purchase <i>emergency energy</i> and request <i>emergency assistance</i>	Purchase resources not made available through market mechanisms. The source of the purchases should be the seller's surplus <i>energy</i> or <i>operating reserve</i> including 10-minute reserve made available by Step 34: Operate to Emergency Condition Limits.	<i>Market Rules</i> – Chapter 5 section 2.3.3A			Y
36	Implement Emergency Demand Response Program (EDRP)	EDRP is a <i>reliability</i> -based program intended to mitigate the adverse impacts of shortages when all commercial mechanisms in the market have been exhausted.	<i>Market Rules</i> – Chapter 5 section 4.8A			Y
37	Curtail <i>non-dispatchable load</i>	Curtailement achieved through <i>emergency</i> block or rotational load shedding.	<i>Market Rules</i> – Chapter 5 section 10.3			Y

E.2 Emergency Operating State Actions (IMO and External Control Area Deficiency)

Legend applied to the last 4 columns of the table, indicating the status of the *IMO-controlled grid* associated with each control action:

- ❶ 30-minute *operating reserve*, 10-minute *operating reserve* and *AGC* reserve maintained
- ❷ 10-minute *operating reserve* and *AGC* reserve maintained
- ❸ 10-minute synchronized *operating reserve* and *AGC* reserve maintained
- ❹ *AGC* reserve maintained

No.	Action	Description	References	❶	❷	❸	❹
<u>Initial actions</u>							
The IMO will:							
<ul style="list-style-type: none"> • Utilize all dispatchable resources including Ontario dispatchable load/generation, bid at +MMCP to satisfy demand and reserve requirements. • Provide notices of expected supply shortfall, reject, revoke and recall outages, cancel commissioning test and take all other acceptable control actions as articulated in the section E.1 to minimize the deficiency. • Include exports identified as recallable for <i>operating reserve</i> (30-minute and 10-minute non-synchronized) and voltage reduction as sources of <i>operating reserve</i> 							
<i>At this point all remaining exports would be supplying non-dispatchable load in the deficient jurisdiction and it would be in a state comparable to the Ontario “Emergency Operating State”. The following actions will be taken as long as the deficient area remains in a comparable or more severe state:</i>							
1	Curtail exports to jurisdictions not purchasing <i>emergency energy</i> or taking equivalent action.		<i>Market Rules</i> – Chapter 5 section 2.3 <i>IMO</i> internal procedures				Y
2	Purchase Emergency Energy and request <i>emergency</i> assistance.	Purchase resources not made available through market mechanisms.	<i>Market Rules</i> – Chapter 5 section 2.3.3A				Y
3	Curtail exports to jurisdictions not implementing 3% voltage reduction or taking equivalent action.		<i>Market Rules</i> – Chapter 5 section 2.3 <i>IMO</i> internal procedures				Y
4	Implement 3% voltage reductions in Ontario.	The <i>IMO</i> has reduced voltage by 3% at the distribution level. Power quality affected but no “real” load cut.	<i>Market Rules</i> – Chapter 5 section 10.3				Y

No.	Action	Description	References	1	2	3	4
5	Curtail exports to jurisdictions not implementing 5% voltage reduction or taking equivalent action.		<i>Market Rules</i> – Chapter 5 section 2.3 <i>IMO</i> internal procedures			Y	
6	Implement 5% voltage reductions in Ontario.	The <i>IMO</i> has reduced voltage by 5% at the distribution level. Power quality affected but no “real” load cut. Expect significant customer complaints and requests for exemption.	<i>Market Rules</i> – Chapter 5 section 10.3				Y
7	Curtail exports to jurisdictions not operating to <i>emergency</i> condition limits (or disregarding high-risk limits).		<i>Market Rules</i> – Chapter 5 section 2.3 <i>IMO</i> internal procedures				Y
8	Operate to <i>emergency</i> condition limits (or disregard high risk) in Ontario.		<i>IMO</i> internal procedures				Y
9	Curtail remaining exports.		<i>Market Rules</i> – Chapter 5 section 2.3				Y
10	Implement Emergency Demand Response Program (EDRP)	EDRP is a reliability-based program intended to mitigate the adverse impacts of shortages when all commercial mechanisms in the market have been exhausted.	<i>Market Rules</i> – Chapter 5 section 4.8A				Y
11	Curtail Ontario non-dispatchable loads.	Curtailment achieved through <i>emergency</i> block or rotational load shedding.	<i>Market Rules</i> – Chapter 5 section 10.3				Y

– End of Section –