

Market Rule Amendment Proposal Form

Part 1 - Market Rule Information

Identification No.:	MR-00449-R04
Subject:	Remedial Action Schemes
Title:	Clarifications to the Market Rules (Omnibus 2021)
Nature of Proposal:	<input checked="" type="checkbox"/> Alteration <input checked="" type="checkbox"/> Deletion <input checked="" type="checkbox"/> Addition
Chapter:	Chapter 5 Chapter 11
Appendix:	Chapter 4
Sections:	Chapter 5, Sections 8 & 14 Chapter 4, Appendices 4.3, 4.15, 4.16, 4.17, 4.23
Sub-sections proposed for amending:	Various
Current Market Rules Baseline	Issue 78, Baseline 45.0, February 26, 2021

Part 2 - Proposal History

Version	Reason for Issuing	Version Date
1.0	Draft for Technical Panel Review and Comment	June 22, 2021
2.0	Posted for stakeholder review and comment	June 29, 2021
3.0	Submitted for Technical Panel vote to recommend	July 20, 2021
4.0	Recommended by Technical Panel	October 5, 2021

5.0	Approved by IESO Board of Directors	October 20, 2021
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Approved Amendment Publication Date:	October 21, 2021
Approved Amendment Effective Date:	December 1, 2021

Part 3 Explanation for Proposed Amendment

Provide a brief description of the following:

- The reason for the proposed amendment and the impact on the *IESO-administered markets* if the amendment is not made.
- Alternative solutions considered.
- The proposed amendment, how the amendment addresses the above reason and impact of the proposed amendment on the *IESO-administered markets*.

Summary

The various system operators across North America used two different terms to describe the protection systems that are designed to automatically take corrective action when abnormal system conditions are observed. The IESO used the defined term *special protection system (SPS)*, described as the equipment as outlined in section 8 of Chapter 5. Other system operators used the term Remedial Action Schemes (RAS). The North American Electric Reliability Corporation has recommended that a single term be used to promote consistency across the ISOs, and has recommended that RAS be used as it is “descriptive of the purpose for which the scheme is installed”¹. In December 2020, the Northeast Power Coordinating Council (NPCC) adopted the term RAS in place of the term SPS. This package of the omnibus will modify the IESO’s market rules to adopt NERC’s and NPCC’s recommended use of the term RAS, and will include in Chapter 11 a reference to SPS to provide for future updates to IESO’s market manuals, procedures and other documentation. As this package deals only with this change in terminology, it would be considered a minor amendment as it “effects a change of a non-material procedural nature”. It is split into its own package due to the volume of changes required.

Background

The IESO proposes a number of market rule amendments in this year’s omnibus process. The IESO is proposing that a suite of rule amendments be considered that includes two amendments that may not be considered minor according to the defined term *minor amendment*, as they impact the obligations of some market participants. In both cases however, the impact is expected by the IESO to be non-material. As such, their inclusion in an existing amendment process will reduce the effort involved by Technical Panel members and the IESO in administering separate initiatives. These amendment proposals are included in proposal packages R01 and R02 along with a rationale in each of why they are being included

¹ See NERC’s “Remedial Action Scheme” Definition Development, https://www.nerc.com/pa/Stand/Prjct201005_2SpclPrctnSstmPhs2/FAQ_RAS_Definition_0604_final.pdf

in this amendment process. Proposal R00 includes the other amendments that would typically be considered minor amendments. Minor market rule amendments are defined in Chapter 11 of the market rules as: “.....an amendment to the market rules to correct a typographical or grammatical error, or to effect a change of a non-material procedural nature;”. Proposals R03 and R04 are also considered minor amendments, however they are included as separate packages due to the volume of changes entailed in each.

Discussion

Chapter 11

The defined term *special protection system* in Chapter 11 will be replaced with a new defined term remedial action scheme. Included in this definition will be a reference that for existing documentation, the term RAS or SPS may be used.

Appendices to Chapter 4

All references to Special Protection Systems will be updated to refer to Remedial Action Schemes. This will require changes to;

- Appendix 4.3
- Appendix 4.15
- Appendix 4.16
- Appendix 4.17
- Appendix 4.24

Chapter 5

Section 8; All references to Special Protection Systems (SPS) will be replaced with Remedial Action Schemes (RAS)

Section 14.1.3; replace reference to special protection systems with remedial action schemes.

Part 4 Proposed Amendment

Chapter 11

~~*special protection system or SPS means the equipment described in section 8 of Chapter 5;*~~

remedial action schemes or RAS means an automatic protection system designed to detect abnormal or predetermined system conditions, and take corrective actions other than and/or in addition to the isolation of faulted components to maintain system reliability. The term special protection system or SPS shall have the same meaning.

Appendix 4.3 – Requirements for Connected

Wholesale Customers and Distributors Connected to the IESO-Controlled Grid

3. ~~Special Protection Systems Remedial Action Schemes~~

Connected wholesale customers and distributors connected to the IESO-controlled grid may be required to participate in ~~special protection systems remedial action schemes~~.

Appendix 4.15 – IESO Monitoring Requirements: Generators

Major generation facility	Monitored Quantities
	<p>1. Active Power (MW) and Reactive Power (MX)</p> <ul style="list-style-type: none"> a) The standard requirement for active and reactive power is the provision of <i>net MW and net</i> or <i>gross MX</i>. <i>Gross MW and gross</i> or <i>net MX</i> are also to be provided, if designated by the IESO as required for: <ul style="list-style-type: none"> (i) determination of operating <i>security limits</i>; (ii) to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i>; (iii) for compliance monitoring purposes; or (iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating <i>security limits</i>. b) For <i>generation units</i> rated greater than or equal to 100 MVA, the standard requirement as defined in part a) for each <i>generation unit</i> shall be provided, and <i>gross MW and gross</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the IESO as required using the criteria listed above in part a). c) For <i>generation units</i> rated at less than 100 MVA: <ul style="list-style-type: none"> (i) for a group of <i>generation units</i> if those <i>generation units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these <i>generation units</i>, and total <i>gross MW and gross</i> or <i>net MX</i> shall be provided if designated by the IESO as required using the criteria listed above in part a); or (ii) if designated by the IESO as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i> or for compliance monitoring purposes, the standard requirement as defined in part a) for each <i>generating unit</i> shall be provided, and <i>gross MW and gross</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the IESO as required using the criteria listed above in part a). d) For <i>generation facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3: <ul style="list-style-type: none"> (i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total <i>gross MW and gross</i> or <i>net MX</i> shall be provided if designated by the IESO as required using the criteria listed above in part a); or (ii) if so designated by the IESO as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i> or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each <i>generating unit</i> shall be provided, and <i>gross MW and gross</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the IESO as required using the criteria listed above in part a). e) For frequency changers: <ul style="list-style-type: none"> (i) total MW and MX at either frequency; or (ii) if so designated by the IESO as required for determination of operating <i>security limits</i>, total MW and MX at both frequencies. f) For synchronous condensers: <ul style="list-style-type: none"> (i) total MX.

	<p>2. Voltage:</p> <p>a) For each <i>generation unit</i>, unit terminal voltage, except if <i>generation units</i> are connected to a common low voltage bus section, then the bus section voltage is adequate for those <i>generation units</i>.</p> <p>3. Frequency:</p> <p>a) For each <i>generation unit</i> or <i>generation facility</i> providing <i>black start capability</i>, frequency of the applicable <i>generation unit</i> or <i>generation facility</i>.</p> <p>4. Equipment Status</p> <p>a) Unit mode (i.e. generator, condenser, pump) for each <i>generation unit</i> capable of different modes of operation.</p> <p>b) AGC status for each <i>generation unit</i> providing <i>regulation</i>.</p> <p>c) AVR and Stabilizer Status for each <i>generating unit</i> with a rated capacity ≥ 100 MVA. Stabilizer status reporting is only required if it can be switched off by <i>generation facility</i> personnel remotely or at the <i>facility</i>.</p> <p>d) AVR and Stabilizer status for each <i>generation unit</i> with a rated capacity ≤ 100 MVA if the status of this equipment is designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i>. Stabilizer status reporting is only required if it can be switched on or off by <i>market participant</i> operating personnel remotely or at the <i>facility</i>.</p> <p>e) Synchronizing Breaker status for each <i>generation unit</i>. Where a <i>generation facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>generation unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the <i>generation unit</i> must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.</p> <p>Where a <i>generation facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p> <p>f) Special Protection System Remedial Action Scheme status for each applicable <i>generation unit</i>.</p>
<p>Significant generation facility and minor generation facility connected to IESO-controlled grid</p>	<p>Monitored Quantities</p> <p>1. Active Power (MW) and Reactive Power (MX):</p> <p>a) The standard requirement for active and reactive power is the provision of net MW and net or gross MX. Gross MW and gross or net MX are also to be provided, if designated by the IESO as required for:</p> <p>(i) determination of operating security limits;</p> <p>(ii) to maintain reliable operation of the IESO-controlled grid;</p> <p>(iii) for compliance monitoring purposes; or</p> <p>(iv) if provision of only the standard requirement values as defined above would have a negative impact on other market participants through reduced operating security limits.</p> <p>b) For generation facilities that have not been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) for a group of generation units if those generation units are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these generation units, and total gross MW and gross or net MX shall be provided if designated by the IESO as required using the criteria listed above in part a);</p> <p>(ii) if designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid or for compliance monitoring purposes, the standard requirement as defined in part a) for each generating unit shall be provided, and gross MW and gross or net MX for</p>

each generation unit shall be provided if designated by the IESO as required using the criteria listed above in part a).

c) For generation facilities that have been aggregated pursuant to Chapter 7 section 2.3:

(i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total gross MW and gross or net MX shall be provided if designated by the IESO as required using the criteria listed above in part a); or

(ii) if so designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each generating unit shall be provided, and gross MW and gross or net MX for each generation unit shall be provided if designated by the IESO as required using the criteria listed above in part a).

d) For frequency changers:

(i) total MW and MX at either frequency; or

(ii) if so designated by the IESO as required for determination of operating security limits, total MW and MX at both frequencies.

e) For Synchronous Condensers:

(i) Total MX.

2. Voltage:

a) For generation units that are VAR dispatchable, unit terminal voltage, except if the generation units are connected to a common low voltage bus section, then the bus section voltage is adequate for those generation units.

3. Frequency:

a) For each generation unit or generation facility providing black start capability, frequency of the applicable generation unit or facility.

4. Equipment Status

a) Unit mode (i.e. generator, condenser, pump) for each generation unit capable of different modes of operation.

b) AVR and Stabilizer Status for each generation unit if the status of this equipment is designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid. Stabilizer status reporting is only required if it can be switched on or off by market participant operating personnel remotely or at the facility.

c) Synchronizing Breaker Status for each generation unit. Where a generation facility is designed such that no low voltage synchronizing breaker is installed for each generation unit, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the generation unit must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.

	<p>Where a generation facility is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p> <p>d) Special Protection System<u>Remedial Action Scheme</u> status for each applicable generation unit.</p>
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Appendix 4.16 – IESO Monitoring Requirements: Transmitters

Equipment Type	Voltage Level	Monitored Status	Monitored Quantities
Special Protection Systems <u>Remedial Action Scheme (SPSRAS)</u>	50 kV and higher	As directed by the <i>IESO</i> on a case-by-case basis. Where so directed, must include all associated capacitors and reactors breaker status.	As directed by the <i>IESO</i> on a case-by-case basis.

Appendix 4.17 – IESO Monitoring Requirements: Connected Wholesale

Customers and Distributors

<p><i>Distributor connected to the IESO-controlled grid or designated pursuant to section 7.5.2</i></p>	<ul style="list-style-type: none"> • Where high voltage (HV) Potential Transformers (PTs) are available: <p>Circuits: (where applicable)</p> <ul style="list-style-type: none"> • Megawatt (MW), megavars (MVARs) and direction of power flow at each terminal connected to the <i>IESO-controlled grid</i>. <p>Transformers:</p> <ul style="list-style-type: none"> • MW, MVARs • phase to ground voltages for each HV winding as specified by the <i>IESO</i> • Where only low voltage PTs are available: • MW, MVARs for each Low Voltage (LV) winding, and • phase to phase voltage for each LV winding as specified by the <i>IESO</i>. • Under Load Tap Changer (ULTC) tap positions. • Off Load Tap Changer (OLTC) tap positions may be required, as directed by the <i>IESO</i> • Status of breakers or isolating switches for low voltage capacitors that are part of the <i>IESO-controlled grid</i>, or that are subject to a contracted ancillary services contract including by means or within the scope of an agreement similar in nature to an <i>operating agreement</i> entered into with the connected <i>wholesale customer</i> • Status of: <ul style="list-style-type: none"> • All breakers 50 kV and above. • All line disconnect switches 50 kV and above. • All transformer disconnect and by-pass switches 50 kV and above. • All bus sectionalising switches 50 kV and above. • transformer LV winding breakers and bus tie breakers for DESN type step-down transformers connected to the <i>IESO-controlled grid</i> <p>The status of breaker isolating switches is not required.</p> <ul style="list-style-type: none"> • <i>Special Protection Systems</i> <i>Remedial Action Schemes</i> as directed by the <i>IESO</i> on a case by case basis.
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Connected wholesale customers

For:

- All dispatchable loads; and

Each *non-dispatchable load facility* that includes a *non-dispatchable load* rated at 20 MVA or higher or is comprised of *non-dispatchable loads* the ratings of which in the aggregate equals or exceeds 20 MVA, in each case where directed by the *IESO* if transmitter data is not adequate the following shall be monitored:

Where high voltage PTs are available:

Circuits: (where applicable)

- Megawatts (MW), and Megavars (MVAR) and direction of power flow at each terminal connected to the *IESO-controlled grid*.

Transformers:

- Megawatts (MW), and Megavars (MVAR) and
- phase to ground voltages for each HV winding as specified by the *IESO*.

Where only low voltage PTs are available:

- MW, MVARs from each LV winding, and
- phase to phase voltages for each LV winding as specified by the *IESO*.
- Under Load Tap Changer (ULTC) tap positions.
- Off Load Tap Changer (OLTC) tap positions may be required, as directed by the *IESO*
- Status of:
- All breakers 50 kV and above.
- All line disconnect switches 50 kV and above.
- All transformer disconnect and by-pass switches 50 kV and above.
- All bus sectionalising switches 50 kV and above.
- Transformer LV winding breakers and bus tie breakers for DESN type step-down transformers connected to the *IESO-controlled grid*
- Breakers or isolating switches for low voltage capacitors that are part of the *IESO-controlled grid* or that are subject to a contracted *ancillary services* contract including by means or within the scope of an agreement similar in nature to an *operating agreement* entered into with the *connected wholesale customer*

The status of breaker isolating switches is not required

- ~~Special Protection Systems (SPS) Remedial Action Schemes~~ as directed by the *IESO*

Appendix 4.24 – IESO Monitoring Requirements: Electricity Storage Participants

<p>Major electricity storage facility</p>	<p>Monitored Quantities</p> <ol style="list-style-type: none"> 1. Active Power (MW) and Reactive Power (MX) injected or withdrawn <ol style="list-style-type: none"> a) The standard requirement for active and reactive power is the provision of net MW and net or gross MX. Gross MW and gross or net MX are also to be provided, if designated by the <i>IESO</i> as required for: <ol style="list-style-type: none"> (i) determination of operating <i>security limits</i>; (ii) to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i>; (iii) for compliance monitoring purposes; or (iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating <i>security limits</i>. b) For <i>electricity storage units</i> with an <i>electricity storage unit size</i> greater than or equal to 100 MVA, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW and gross or net MX for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a). c) For <i>electricity storage units</i> with an <i>electricity storage unit size</i> of less than 100 MVA: <ol style="list-style-type: none"> (i) for a group of <i>electricity storage units</i> if those <i>electricity storage units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these <i>electricity storage units</i>, and total gross MW and MX shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or (ii) if designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i> or for compliance monitoring purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW and gross or net MX for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a). d) For <i>electricity storage facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3: <ol style="list-style-type: none"> (i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total gross MW and gross or net MX shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or (ii) if so designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i> or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW and gross or net MX for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a). 2. State of Charge and Charge Limit <ol style="list-style-type: none"> a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the <i>state of charge</i> of the applicable <i>electricity storage unit</i> or <i>electricity storage facility</i> b) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum charge limit and the economic minimum charge limit expressed in MWh as per the applicable <i>market manual</i>. 3. Base point <ol style="list-style-type: none"> a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, providing <i>regulation</i>, the basepoint, if applicable, of the <i>electricity storage unit</i> expressed in MW, according to the applicable <i>market manual</i>. 4. Dynamic Maximum and Minimum Power <ol style="list-style-type: none"> a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum power mode and economic minimum power mode, expressed in MW.
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	<p>5. Voltage:</p> <p>a) For each <i>electricity storage unit</i>, unit terminal voltage, except if <i>electricity storage units</i> are connected to a common low voltage bus section, then the bus section voltage is adequate for those <i>electricity storage units</i>.</p> <p>6. Equipment Status</p> <p>a) Voltage Control status and stabilizer status (if applicable) for each <i>electricity storage unit</i> with an <i>electricity storage unit size</i> > 100 MVA. When applicable, stabilizer status reporting is only required if it can be switched off by electricity storage participant personnel remotely or at the facility.</p> <p>b) AGC status for each <i>electricity storage unit</i> providing <i>regulation</i>.</p> <p>c) Voltage control status and stabilizer status (if applicable) for each <i>electricity storage unit</i> with an <i>electricity storage unit size</i> < 100 MVA if the status of this equipment is designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the <i>IESO-controlled grid</i>. When applicable, stabilizer status reporting is only required if it can be switched on or off by market participant operating personnel remotely or at the <i>facility</i>.</p> <p>d) Synchronizing Breaker status for each <i>electricity storage unit</i>. Where a <i>electricity storage facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>electricity storage unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the electricity storage unit must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.</p> <p>e) Where a <i>electricity storage facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p> <p>f) Special Protection System <u>Remedial Action Scheme</u> status for each applicable <i>electricity storage unit</i>.</p>
<p>Significant electricity storage facility and minor electricity storage facility connected to IESO-controlled grid</p>	<p>Monitored Quantities</p> <p>1. Active Power (MW) and Reactive Power (MX) injected or withdrawn:</p> <p>a) The standard requirement for active and reactive power is the provision of net MW and net or gross MX facility. Gross MW and gross or net MX are also to be provided, if designated by the IESO as required for:</p> <p>(i) determination of operating security limits;</p> <p>(ii) to maintain reliable operation of the <i>IESO-controlled grid</i>;</p> <p>(iii) for compliance monitoring purposes; or</p> <p>(iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating security limits.</p> <p>b) For <i>electricity storage facilities</i> that have not been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) for a group of <i>electricity storage units</i> if those <i>electricity storage units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these electricity storage units, and total gross MW and gross or net MX shall be provided if designated by the IESO as required using the criteria listed above in part a);</p> <p>(ii) if designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid or for compliance monitoring purposes, the standard requirement as defined in part a) for each electricity storage unit shall be provided, and gross MW and gross or net MX for each electricity storage unit shall be provided if designated by the IESO as required using the criteria listed above in part a).</p> <p>c) For <i>electricity storage facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total gross MW and gross or net MX shall be provided if designated by the IESO as required using the criteria listed above in part a); or</p> <p>(ii) if so designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each electricity storage unit shall be provided, and gross MW and gross or net MX for each <i>electricity storage unit</i> shall be provided if designated by the IESO as required using the criteria listed above in part a).</p> <p>2. Voltage:</p>

	<p>a) For <i>electricity storage units</i> that are VAR dispatchable, unit terminal voltage, except if the electricity storage units are connected to a common low voltage bus section, then the bus section voltage is adequate for those electricity storage units.</p> <p>3. State of Charge and Charge Limit</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the <i>state of charge</i> of the applicable <i>electricity storage unit</i> or <i>electricity storage facility</i></p> <p>b) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum charge limit and the economic minimum charge limit expressed in MWh as per the applicable <i>market manual</i>.</p> <p>4. Dynamic Maximum and Minimum Power</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum power mode and economic minimum power mode, expressed in MW. 5. Base point</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, providing <i>regulation</i>, the basepoint, if applicable, of the storage unit expressed in MW, according to the applicable <i>market manual</i>.</p> <p>5. Equipment Status</p> <p>a) Automatic Voltage Control and stabilizer status (if applicable) for each <i>electricity storage unit</i> if the status of this equipment is designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid. When applicable, stabilizer status reporting is only required if it can be switched on or off by the <i>market participant</i> operating personnel remotely or at the facility.</p> <p>b) Synchronizing Breaker Status for each <i>electricity storage unit</i>. Where an <i>electricity storage facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>electricity storage unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the <i>electricity storage unit</i> must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.</p> <p>Where an <i>electricity storage facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p> <p>c) Special Protection System <u>Remedial Action Scheme</u> status for each applicable <i>electricity storage unit</i>.</p>
<p>Self-scheduling electricity storage facility with a name-plate rating of less than 10 MW</p>	<p>Monitored Quantities</p> <p>1. Active Power (MW) and Reactive Power (MX) injected or withdrawn:</p> <p>a) The standard requirement for active and reactive power is the provision of net MW and net or gross MX. Gross MW and gross or net MX are also to be provided, if designated by the IESO as required for:</p> <ul style="list-style-type: none"> (i) determination of operating <i>security limits</i>; (ii) to maintain reliable operation of the <i>IESO-controlled grid</i>; (iii) for compliance monitoring purposes; or (iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating <i>security limits</i>. <p>b) For <i>electricity storage facilities</i> that have not been aggregated pursuant to Chapter 7 section 2.3:</p> <ul style="list-style-type: none"> (i) for a group of <i>electricity storage units</i> if those <i>electricity storage units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these <i>electricity storage units</i>, and total gross MW and gross or net MX shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); (ii) if designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i> or for compliance monitoring purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW and gross or net MX for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a). <p>c) For <i>electricity storage facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3:</p> <ul style="list-style-type: none"> (i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total gross MW and gross or net MX shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or (ii) if so designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i> or for <i>dispatch</i> compliance monitoring

	<p>purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW and gross or net MX for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <ol style="list-style-type: none"> 2. Voltage: <ol style="list-style-type: none"> a) For <i>electricity storage units</i> that are VAR dispatchable, unit terminal voltage, except if the <i>electricity storage units</i> are connected to a common low voltage bus section, then the bus section voltage is adequate for those <i>electricity storage units</i>. 3. State of Charge and Charge Limit <ol style="list-style-type: none"> a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the state of charge of the applicable <i>electricity storage unit</i> or <i>electricity storage facility</i> b) For each <i>electricity storage unit</i> or <i>electricity storage facility</i> the economic maximum charge limit, the economic minimum charge limit expressed in MWh 4. Dynamic Maximum and Minimum Power <ol style="list-style-type: none"> a) For each <i>electricity storage unit</i>, the economic maximum power mode and economic minimum power mode, expressed in MW. 5. Base point <ol style="list-style-type: none"> a) For each <i>electricity storage unit</i>, providing <i>regulation</i>, the basepoint of the applicable <i>electricity storage unit</i> expressed in MW according to the applicable <i>market manual</i>. 6. Equipment Status <ol style="list-style-type: none"> a) Automatic Voltage Control status and Stabilizer status (if applicable) for each <i>electricity storage unit</i> if the status of this equipment is designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i>. When applicable, stabilizer status reporting is only required if it can be switched on or off by <i>market participant</i> operating personnel remotely or at the <i>facility</i>. b) Synchronizing Breaker Status for each <i>electricity storage unit</i>. Where an <i>electricity storage facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>electricity storage unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the <i>electricity storage unit</i> must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration. Where an <i>electricity storage facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required. c) Special Protection System <u>Remedial Action Scheme</u> status for each applicable <i>electricity storage unit</i>.
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Chapter 5

8. ~~Special Protection System~~ Remedial Action Schemes (SPSRAS)

8.1 Objectives

8.1.1 ~~Special protection system~~ Remedial Action Schemes (“SPSRAS”) have been installed in a number of locations on the *IESO-controlled grid* which automatically initiate one or more of the following control actions:

8.1.1.1 load rejection; _____

- 8.1.1.2 generation rejection;
- 8.1.1.3 generation runback;
- 8.1.1.4 shunt capacitor switching;
- 8.1.1.5 shunt reactor switching; and
- 8.1.1.6 cross-tripping.

For further certainty, any of the control actions listed above may be applied by the *IESO* to *electricity storage facilities* if and as applicable.

- 8.1.2 The *IESO* shall direct the arming of *SPSRASs* installed on the *IESO-controlled grid* as necessary to:
 - 8.1.2.1 increase the capability of power transfers on the *IESO-controlled grid*; or
 - 8.1.2.2 provide additional *security* beyond that required to manage *contingency events* in a *normal operating state*.
- 8.1.3 New *SPSRASs* shall be installed and utilized on the basis of agreements between and/or among the parties involved.

8.2 Responsibilities of the IESO

- 8.2.1 The *IESO* shall classify all *SPSRASs* and obtain approval for their use in accordance with all applicable *reliability standards*.
- 8.2.2 The *IESO* shall determine the need for utilizing an *SPSRAS* for *security* reasons.
 - 8.2.2A The *IESO* shall direct the arming of all *SPSRASs* installed on the *IESO-controlled grid* in accordance with applicable *reliability standards* and applicable agreements including those negotiated under section 8.4.3.
- 8.2.3 The *IESO* shall direct the arming of an *SPSRAS* to mitigate the adverse effects of specific extreme *contingency events* and to mitigate congestion provided that there are no overriding concerns related to the *security* of the *IESO-controlled grid*.
- 8.2.4 The *IESO* shall establish and *publish* criteria for arming and activation of *SPSRASs* in sufficient detail and precision to allow a *market participant* whose *facility* forms part of an *SPSRAS* to understand the conditions under which that *SPSRAS* would be armed and activated. Prior to establishing changes to such criteria, the *IESO* shall consult with, and, where practicable, gain the agreement of, the *market participant* whose *facility* is part of the *SPSRAS* to the intended changes. In the event that agreement cannot be reached, the *IESO* may change the criteria for the *SPSRAS* if necessary to maintain *reliable* operation of the *IESO-controlled grid*.

8.2.5 The *IESO* shall from time to time review or cause to be reviewed the performance of SPSRASs.

8.2.6 In the event that a *market participant* applies to the *IESO* for compensation under section 8.4.1, the *IESO* shall, upon verification that the amount being claimed is correct, pay such compensation by crediting the *market participant's preliminary settlement statement* for the last day of the month in which the application for compensation was received.

8.3 Responsibilities of SPSRAS Equipment Owners

8.3.1 Owners of SPSRAS equipment shall:

8.3.1.1 maintain SPSRAS equipment in accordance with all applicable *reliability standards*;

8.3.1.2 test and report operating statistics associated with an SPSRAS to the *IESO* on an annual basis;

8.3.1.3 report the performance of an SPSRAS when requested to do so by the *IESO*;

8.3.1.4 evaluate and notify the *IESO* of any request from affected *market participants* for permanent exemptions from *connection* to the SPSRAS; and

8.3.1.5 provide written notice to the *IESO* of any proposal to install a new, or modify an existing, SPSRAS, which notice shall be provided with sufficient lead time and in sufficient detail for the *IESO* to review and seek, if necessary, approval from the relevant *standards authorities* for such new or modified SPSRAS; and

8.3.1.6 specify to the *IESO* and *market participants* whose *facilities* form part of an SPSRAS the means used to arm the SPSRAS.

8.4 Responsibilities of Market Participants Whose Facilities Form Part of an SPSRAS

8.4.1 A *market participant* with a *dispatchable generation facility* or a *dispatchable electricity storage facility* that is not a *quick start facility* and that is part of an SPSRAS may, in the time and manner specified in the applicable *market manual*, apply to the *IESO* for compensation, if that *facility* is tripped offline as a result of the activation of the SPSRAS. The amount of compensation that may be claimed shall be determined in accordance with the applicable *market manual* and shall be the equivalent of up to the first two hours of constrained off congestion management *settlement* credit payments that would otherwise be calculated if the *facility* had been constrained down to zero and its circuit breaker had remained closed.

8.4.2 Section 8.4.1 shall apply only as long as section 3.5 of Chapter 9 is in effect.

- 8.4.3 *Market participants* whose *facilities* form part of an existing SPSRAS or may form part of a new SPSRAS may request notification and/or status annunciation of SPSRAS arming, disarming and activation and may enter into agreements with the SPSRAS equipment owner/operator and the *IESO* to determine the appropriate status annunciation and notification. The *market participant*, SPSRAS equipment owner/operator and the *IESO* shall use the following criteria in determining and implementing the appropriate status annunciation and/or notification:
- 8.4.3.1 licensing/legal requirements of the *market participant* related to the operation of its *facility* that is part of the SPSRAS;
 - 8.4.3.2 practicality of status annunciation and/or notification;
 - 8.4.3.3 cost-effectiveness of status annunciation and/or notification;
 - 8.4.3.4 the status annunciation and/or notification does not adversely impact the intended use of the SPSRAS; and
 - 8.4.3.5 comparison to the notification and annunciation of SPSRAS arming and activation provided to other *market participants* whose *facilities* form part of an SPSRAS.

In the event that they cannot agree on the status annunciation and notification requirements and implementation, the SPSRAS owner/operator, the *IESO* and the *market participant* shall use the dispute resolution provisions in section 2 of Chapter 3 to resolve the issue.

- 8.4.4 *Market participants* whose *facilities* form part of an SPSRAS shall notify the *IESO* in accordance with the applicable *market manual* or applicable agreements including those negotiated under section 8.4.3 if the *facility* is unavailable for SPSRAS arming.
- 8.4.5 If an SPSRAS has been armed and the *market participant* whose *facility* forms part of the SPSRAS reasonably believes that a subsequent activation of that SPSRAS would endanger the safety of any person, damage equipment or violate any *applicable law*, the *market participant* whose *facility* is part of that SPSRAS may take action in accordance with applicable agreements including those negotiated under section 8.4.3 or may request that the *IESO* disarm the SPSRAS. Upon such a request, the *IESO* shall, as soon as the *IESO* can take action to maintain reliable operation of the *IESO*-controlled grid, disarm the SPSRAS.

14. Information and Reporting

Requirements

14.1.3 The *IESO* shall establish a catalogue of reporting requirements listing the *reliability*-related information to be exchanged between the *IESO* and *market participants*. Such reporting requirements shall include, but not be limited to, the following:

14.1.3.3 each *market participant* shall report to the *IESO* a list of all of its equipment for which periodic maintenance has been performed on ~~*special-protection system*~~ *remedial action schemes* in the previous 12 months, as required by relevant *standards authorities*. This information shall be reported no later than the first day of December in each year;