Terms and definitions to be amended for use in the Energy Market ISO rules:

"acceptable operational reason" means, any 1 or more of the following:

(i) a circumstance related to the operation of a generating source asset or load sink asset which if it operated could reasonably be expected to affect the safety of the asset, the environment, personnel working at the asset or the public;

(ii) re-positioning a generating source asset or load sink asset, within the energy market due to the need to meet a dispatch given to that asset from the ISO to serve the stand-by operating reserves market;

(iii) re-positioning a generating source asset or load sink asset within the energy market to manage physical or operational constraints associated with the asset;

(iv) re-positioning a pool asset that is an import asset or an export asset within the energy market if all or a portion of the requested transmission service cannot be procured, or the transmission service is curtailed by any transmission service provider other than the ISO

(v) a circumstance directly resulting in the generating source asset or load sink asset not being capable of operation, which circumstance was solely caused by an occurrence of force majeure;

(vi) re-positioning a generating source asset for electric energy that is:

(a) produced on the property of which a person is the owner or a tenant; and

(b) consumed solely by that person and solely on that property;

(vii) re-positioning a generating source asset within the energy market in response to:

(a) a distribution constraint that causes a limitation to the normal economic merit operation of the generating source asset, or to the flow of electrical energy from the generating source asset from one part of the electric distribution system or an electric system within the service area of the City of Medicine Hat to the other; or

(b) a transmission outage that results in the generating source asset being electrically disconnected from the transmission system or an electric system within the service area of the City of Medicine Hat; or

(viii) re-positioning a load sink asset within the energy market to reflect a capacity commitment.

"adequacy" means the ability of the interconnected electric system to supply the aggregate electrical demand and energy requirements of electricity market participants receiving system access service, taking into account delist outages, planned outages and reasonably expected delayed forced outages and automatic forced outages of system elements.

"agent" includes:

(i) a representative of a pool participant duly appointed and authorized by the pool participant under Section 201.2 of the ISO rules, Appointment of Agent to act on behalf of and bind the pool participant with regard to transactions and other activities on the Energy Trading System and the automated dispatch and messaging system; or

(ii) a representative of a market participant or a pool participant, as the case may be, duly appointed and authorized to act on behalf of and bind that person with regard to other ISO activities, procedures and requirements, which such appointment is made under and in accordance with the applicable ISO rules, authorizations and procedures.
“allowable dispatch variance” means:

(i) for each generating source asset, other than a wind or solar aggregated generating facility, as measured from the dispatch quantity, plus or minus the dispatch tolerance, in MW;

(ii) for each wind or solar aggregated generating facility:

a) the dispatch tolerance, in MW, greater than the dispatch quantity, and the dispatch tolerance, in MW, less than the potential real power capability, if the potential real power capability is less than the dispatch quantity; or

b) plus or minus the dispatch tolerance, in MW, from the dispatch, if the potential real power capability is greater than or equal to the dispatch quantity;

(iii) for each load sink asset that is providing a firm consumption level, as measured between:

a) that receives a dispatch for 0 MW, there is no limit on consumption; or

b) that receives a dispatch for greater than 0 MW, as measured between:

i. the qualified baseline minus the dispatch quantity plus the dispatch tolerance, and

ii. 0 MW.

(iv) for each load sink asset providing guaranteed load reduction, as measured from the dispatch quantity, plus or minus the dispatch tolerance, in MW:

a) that receives a dispatch for 0 MW, measured as no less than the available capability; or

b) that receives a dispatch that is greater than 0 MW, as measured between:

i. the instantaneous amount of real power of the pool asset at the time of the dispatch plus the change in dispatch volume, plus the dispatch tolerance; and

ii. the available capability minus the dispatch volume.

“available capability” means:

(i) for a generating source asset or load sink asset, the maximum MW that the source asset or load sink asset is physically capable of providing; or

(ii) for an import source asset, the MW that the pool participant submits in an offer.

“bid” means:

(i) in respect of a pool asset in a settlement interval, a pool participant submission to purchase:

a) electric energy and includes all of the operating blocks the pool participant uses for that submission; or

b) operating reserves from applicable Alberta markets; or

(ii) in respect of an asset in a rebalancing auction, a capacity market participant's submission to buy back all or a portion of its capacity commitment, and includes all of the capacity blocks the capacity market participant uses for that submission.

“business day” means as defined in the Act means a day other than a Saturday or a holiday as defined in the Interpretation Act.
“constraint effective factor” means a ratio, based on the results of load flow studies conducted by the ISO, of the change in the flow of electric energy through a transmission market constraint to a change in energy production, energy consumption or an electric energy flow across an interconnection.

“downstream constraint side” means, in relation to the transmission elements that comprise the transmission market constraint, those elements of the interconnected electric system more proximate to the load or consumption side of the transmission market constraint than to the supply side of the transmission market constraint.

“flexible block” means:

(i) an operating block in an energy offer or bid for which the ISO may issue a dispatch for full or partial MW; or

(ii) a capacity block in an offer or bid for capacity that the ISO may partially or fully clear in a base auction or rebalancing auction.

“steady state” means the state of operation that begins the first 10 minute clock period following the period in which a generating source asset’s output or a load sink asset’s consumption has reached the MW specified in an energy market dispatch, plus or minus the allowable dispatch variance for that generating source asset or load sink asset.

“incremental generation costs” means, where the ISO has issued a directive:

(i) for energy from a long lead time asset; or

(ii) to cancel, in the case of a generating source asset, any one (1) or more of a planned outage, a delist outage, a delayed forced outage or an automatic forced outage, requiring that a long lead time asset or a generating source asset, be made available to, or to actually, operate, exchange electric energy or provide ancillary services, those reasonable costs incurred that are reasonably attributed to compliance with the directive and which would have been avoided but for the directive, and include:

(iii) in the case of compliance with a directive for energy from a long lead time asset:

(a) the actual costs of all variable charges from Rate STS of the ISO tariff, including any applicable loss factors charge or credit;

(b) variable operational and maintenance charges;

(c) fuel costs to start and run the long lead time asset or the generating source asset; and

(d) other related reasonable costs;

(iv) in the case of compliance with a directive canceling a planned outage, a delist outage, a delayed forced outage or an automatic forced outage for a generating source asset, those costs incurred:

(a) to plan, prepare for and execute the outage, from initial planning and inception to the date of the directive canceling the outage;

(b) subsequent to the date of the directive cancelling the outage and in accordance with good electric industry practice;

(c) for re-scheduling personnel, equipment and other materials required for the performance of the work originally to be completed or performed pursuant to the cancelled outage;

(d) in the form of verified damages or liquidated claims dollar amounts or claimed by third parties pursuant or related to:

(A) any third party contract terms and conditions for performing repair, retrofit, upgrade or maintenance work on or directly related to the source asset during
the outage, which third party work has been cancelled or otherwise cannot be performed due to the outage cancellation; and

(B) any third party market or hedging transactions directly related to participation in the energy or **ancillary services** market by the **source asset** which is the subject of the **directive**; and

(e) as other related reasonable costs.

"inflexible block" means:

(i) an **operating block** in an energy **offer** or **bid** for which the ISO may issue a **dispatch** for only the full amount of MW in the **operating block**; or

(ii) a **capacity block** in an **offer** or **bid** for **capacity** that the ISO may not partially clear in a **base auction** or **rebalancing auction**.

"market participant" as defined in the **Act** means an **electricity market participant** or a **capacity market participant**.

"maximum capability" means:

(i) for a **generating unit** or **aggregated generating facility**, the maximum MW that it is physically capable of providing under optimal operating conditions while complying with all applicable ISO rules and terms and conditions of the ISO tariff; or

(ii) for a **source asset** that is an import asset, the **available capability**—maximum MW that it is permitted to import into Alberta; or

(iii) for a load **sink asset**, the **capacity** that a load **sink asset** is capable of providing during an **obligation period**.

"offer" means:

(i) in respect of a **pool asset** in a **settlement interval**, a **pool participant** submission to sell, updated to reflect mitigationSection 203.5 of the ISO rules, **Energy Market Mitigation**, as applicable:

   a) electric energy or **dispatch down service** and includes all of the **operating blocks** the pool participant uses for that submission; or

   b) **operating reserves** to applicable Alberta markets; or

(ii) in respect of an asset in a **base auction** or **rebalancing auction**, a capacity market participant’s submission to sell **uniform capacity value** and includes all of the **capacity blocks** the capacity market participant uses for that submission.

"offer control information" means the identity of any **person** who has ultimate control and determination of the price and quantity of **offers** or **bids** as applicable.

"operational deviation" means:

(i) a generating **source asset** or load **sink asset** is unable to comply with the ramping requirements set out in Section 203.4 of the ISO rules, **Delivery Requirements for Energy**; or

(ii) a generating **source asset** or load **sink asset** operating in **steady state** varies outside its **allowable dispatch variance**, due to force **majeure** or any other circumstances related to the operation of the generating **source asset** or load **sink asset** which could reasonably be expected to affect the **available capability** or safety of the generating **source asset**, load **sink**
**Terms and definitions to be added for use in the Energy Market ISO rules:**

- **asset**, third party facilities, contracts or arrangements, the environment, personnel working at the generating **source asset**, load **sink asset** or the public.

- “planned outage” means the full or partial unavailability of a facility which is anticipated as part of a legal owner’s regular maintenance, including for the purposes of construction, **commissioning** or testing, and occurs as a result of a deliberate manual action, but excludes a **delist outage**.

- “point of delivery” means the point at which electricity is transferred from **transmission facilities** to facilities owned by an **electricity market participant** receiving **system access service** under the ISO **tariff**, including an **electric distribution system**.

- “point of supply” means the point at which electricity is transferred to **transmission facilities** from facilities owned by an **electricity market participant** receiving **system access service** under the ISO **tariff**, including a **generating unit**, aggregated **generating facility** or an **electric distribution system**.

- “pool participant” means an **electricity market participant** who is registered to transact, listed in the **pool participant** list.

- “ramp rate” means the rate at which a **pool asset** is able to change its level of production or consumption, in MW per minute, in response to a **dispatch** or **directive**.

- “ramping” means changing the production of a generating **source asset** or consumption of a load **sink asset**, and begins at the effective time specified in the most current **dispatch** and continues until the time the generating **source asset** or load **sink asset** has reached the MW specified in the **dispatch**, plus or minus the **allowable dispatch variance** for that generating **source asset** or load **sink asset**.

- “system access service” means as defined in the Act means the service obtained by **market participants** through a connection to the **transmission system**, and includes
  
  (i) access to exchange electric energy and **ancillary services**, and
  
  (ii) access to capacity.

- “steady state” means the state of operation that begins the first 10 minute clock period following the period in which a generating **source asset**’s output or a load **sink asset**’s consumption has reached the MW specified in an energy market **dispatch**, plus or minus the **allowable dispatch variance** for that generating **source asset** or load **sink asset**.

- “transmission constraint rebalancing” means the delivery of energy from a **pool asset** on the **downstream constraint side** of a **transmission market constraint** in response to that portion of an energy market **dispatch** it receives to restore the energy balance on the **interconnected electric system** due to measures taken to mitigate a **transmission market constraint**.

- “upstream constraint side” means, in relation to the transmission elements that comprise the **transmission market constraint**, those elements of the **interconnected electric system** more proximate to the supply side of the **transmission market constraint** than to the load or consumption side of the **transmission market constraint**.
“delist outage” means a derate or an outage for a source asset or load sink asset associated with a temporary delist referred to in section Section 206.9 of the ISO rules, Delisting.

“dispatch tolerance” means:

(i) 1 MW for each pool asset with a maximum capability less than 5 MW;

(ii) 5 MW for each pool asset with a maximum capability greater than or equal to 5 MW and less than or equal to 200 MW; or

(iii) 10 MW for each pool asset with a maximum capability greater than 200 MW.

“electricity market participant” means

(i) any person that supplies, generates, transmits, distributes, trades, exchanges, purchases or sells electricity, electric energy, electricity services or ancillary services, or

(ii) any broker, brokerage or forward exchange that trades or facilitates the trading of electricity, electric energy, electricity services or ancillary services

“supply obligation” means for a fixed period of time, a person’s fixed price physical and financial obligations in a settlement interval, in MW, that have the net effect of reducing the person’s exposure to the pool price by the amount of the obligation in that settlement interval.

“transmission market constraint” means an exceedance of a reliability limit on 1 or more elements of the transmission system, where:

(i) the ISO must take action to prevent or mitigate the exceedance; and

(ii) the action results in an impact to the normal economic merit operation of generation, load, or interchange transactions, excluding a circumstance where the capability limits referenced in Section 303.2 of the ISO rules, Available Transfer Capability are exceeded.

Terms and definitions to be removed for use in the Energy Market ISO rules:

“transmission constraint” means a limitation imposed by one (1) or more transmission elements to normal economic merit operation of generation, load and interchange transactions or to the flow of electrical energy from one part of the interconnected electric system to the other.

[replaced with “transmission market constraint”]

“long term adequacy (LTA)” means the ability of future electric system energy supply to meet expected aggregate electrical demand requirements over several years.

[replaced with “resource adequacy standard”]

“LTA metrics” means all adequacy information related items, including historical data and forecasts that the ISO will regularly capture, calculate and report on.

“LTA threshold” means the magnitude measured issued for consultation with respect to one of the LTA metrics that, if exceeded, would indicate a need for the consideration of preventative action...
"LTA threshold actions" means out-of-market measures the ISO may choose to implement to remedy an actual or impending LTA issue, where for the purpose of this definition, out-of-market measures are actions that either create revenue or cost impacts outside the energy market for market participants. LTA threshold actions are intended to preserve LTA until new generation capacity is built or load decreases.
ISO Rules
Part 100 General
Division 103 Administration
Section 103.2 Dispute Resolution

External Consultation Draft
October 22, 2018

Applicability

1 Section 103.2 applies to:
   (a) a market participant, except for:
      (i) a market participant that is the legal owner of a transmission facility where the person who is eligible to apply for the construction and operation of the transmission facility was determined by a competitive process developed by the ISO in accordance with the Act;
      (ii) a person who has received an ISO decision pursuant to the categories listed as ISO reviewable decisions in the Capacity Market Regulation; and
   (b) the ISO.

Requirements

Informal Dispute Resolution

2(1) The first step a market participant must take to resolve a dispute with the ISO is to make reasonable efforts to informally resolve the dispute with the appropriate representative of the ISO.

(2) If a market participant is unsure of the appropriate representative of the ISO to contact about the dispute it may call the ISO main reception telephone number posted on the ISO website.

Submission of a Written Dispute

3(1) If a market participant does not receive a satisfactory or timely resolution to its informal dispute resolution efforts, it may proceed to the second step of the dispute resolution process and submit a written dispute to the ISO.

(2) The subject matter for a written dispute may include a concern about:
   (a) an ISO rule, reliability standard or ISO tariff provision;
   (b) the ISO’s interpretation or application of an ISO rule, reliability standard or ISO tariff provision;
   (c) an ISO board decision relating to the ISO’s budget review process; or
   (d) the operation and conduct of the ISO in carrying out its duties and responsibilities under the Act or other legislation where a market participant is concerned about:
      (i) specific and measurable error by the ISO;
      (ii) the ISO not having considered complete information in reaching a determination; or
      (iii) an element of unfairness in the process used by the ISO in reaching a determination.

(3) A written dispute must:
   (a) include the full legal name of the market participant directly affected by the matter and the
contact information the market participant will use for receipt of all notices and communications;

(b) include the nature and basis of the dispute, a proposed solution to the dispute and any other material previously submitted to or received from the ISO;

(c) be signed by an officer of the market participant if it is a corporation, one of its partners if a partnership, or by the market participant personally if an individual person;

(d) be submitted to the ISO at its head office, attention “ISO General Counsel”; and

(e) be submitted to the ISO within thirty (30) business days of an ISO board decision, if the dispute is regarding a decision concerning the ISO’s budget review process.

Acknowledgement of Receipt

4 Within ten (10) business days of receiving the written dispute, the ISO general counsel must respond to the market participant in writing, acknowledging receipt of the written dispute and identifying the ISO vice president accountable for handling the dispute.

Review of a Written Dispute

5(1) In the case of a written dispute related to the budget review process, the ISO board must, within thirty (30) business days of the ISO general counsel issuing the acknowledgment of receipt, review the dispute and advise the market participant in writing of its decision regarding the matter in dispute.

(2) In the case of all other written disputes, the ISO vice president accountable for the dispute must, within thirty (30) business days of the ISO issuing the acknowledgment of receipt, review the dispute and advise the market participant in writing of the ISO decision, including reasons, regarding the matter in dispute.

(3) If a written dispute is not resolved to the market participant’s satisfaction, the market participant may:

   (a) agree with the ISO to seek resolution through a mediation or arbitration process; or

   (b) pursue any other remedies available to it under the law, including filing a complaint with the Commission or Market Surveillance Administrator, or commencing a court action.

Assumption of Resolution

6(1) If a market participant does not object to the ISO’s written decision regarding a dispute within thirty (30) business days of the delivery of the written decision, the ISO may close the dispute file.

(2) The file closing does not prevent the market participant or the ISO from initiating discussions regarding the matter in the future.

No Delay

7 The initiation of a dispute resolution process under this section will not entitle a market participant to withhold or delay payment of any amounts due and owing to the ISO, nor will it stay the implementation of an ISO determination pending resolution of the dispute.

Record Retention

8 The market participant and the ISO must each create and maintain their own records in relation to a dispute.
Revision History

<table>
<thead>
<tr>
<th>Effective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Revisions to the Applicability section.</td>
</tr>
<tr>
<td>2016-11-29</td>
<td>Revisions to the Applicability section</td>
</tr>
<tr>
<td>January 5, 2010</td>
<td>Supersedes October 1, 2009 Version</td>
</tr>
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</table>
Applicability

1 Section 103.3 applies to:
   (a) a market participant with any financial obligation to the ISO, except where the market participant is the legal owner of a transmission facility where the person who is eligible to apply for the construction and operation of the transmission facility was determined by a competitive process developed by the ISO in accordance with the Act; and
   (b) the ISO.

Requirements

Provision of Financial Security

2(1) A market participant must provide to the ISO, or cause its guarantor to provide to the ISO, financial security equal to or greater than the total dollar amount of all financial obligations of the market participant, minus any unsecured credit limit granted to the market participant as determined in accordance with either subsections 5 or 6.

(2) All financial security a market participant provides or causes to be provided to the ISO in accordance with this section 103.3, must remain in force and in effect for so long as the market participant has any outstanding financial obligations to the ISO.

Determination of Financial Obligations Total Amounts

3(1) The ISO must calculate the total dollar amount of all financial obligations of a market participant to the ISO, including:
   (a) subject to subsection 3(2) if the market participant is a pool participant, a dollar amount based upon a determination by the ISO of:
       the energy the pool participant consumes for any two (2) consecutive settlement periods, adjusted for any updated information and estimates;
       minus
       the energy the pool participant purchases from another pool participant through any net settlement instructions during any two (2) consecutive settlement periods;
       minus
       the energy the pool participant produces during any two (2) consecutive settlement periods;
       plus
       the energy the pool participant sells to another pool participant through any net settlement instructions during any two (2) consecutive settlement periods;
       multiplied by
       a pool price the ISO estimates;
(b) if the market participant is receiving system access service, or if the market participant has applied for but not yet received system access service under any rate in the ISO tariff, a dollar amount equal to the estimate of the ISO of the charges for two (2) settlement periods;

(c) if the market participant is required to provide financial security as counterparty to a Construction Commitment Agreement for a connection project under the ISO tariff, a dollar amount equal to the financial security as required under any such Construction Commitment Agreement;

(d) if a market participant is required to provide security as a counterparty to one or more agreements for ancillary services with the ISO, a dollar amount equal to the financial security as required under any such ancillary services agreements;

(e) if a market participant is also capacity market participant, a dollar amount equal to the financial security as required per Section 103.11 of the ISO rules, Capacity Market Financial Security Requirements; and

(f) any other dollar amounts the ISO reasonably determines in respect of the requirement for financial security for any other services the ISO provides to the market participant.

(2) If the market participant referred to in subsection 3(1)(a) is registering as a pool participant under section 201.1 of the ISO rules, Pool Participant Registration, then the market participant must provide to the ISO, as a part of its application, an estimate of the net energy that will be consumed for two (2) consecutive settlement periods.

Unsecured Credit

4 A market participant may request that the ISO grant to the market participant an unsecured credit limit in accordance with either subsections 5 or 6.

Unsecured Credit Limit for Rated Entities

5(1) The unsecured credit limit referred to in subsection 4 may be granted based on the long-term unsecured credit rating of the market participant or its guarantor from an acceptable credit rating agency determined in accordance with subsection 5(2).

(2) The credit rating agencies acceptable to the ISO are the Dominion Bond Rating Service, Standard & Poor’s, Moody’s Investor Service, and any other credit rating agency which a market participant tenders to the ISO for the market participant or its guarantor and that is acceptable to the ISO in its sole discretion.

(3) If more than one (1) acceptable credit rating agency provides a credit rating for a market participant or its guarantor, then the ISO must establish the unsecured credit limit for the market participant based on the lowest credit rating the agencies provide.

(4) If a market participant or its guarantor has a credit rating from an acceptable credit rating agency, then the ISO may grant an unsecured credit limit to the market participant up to the maximum amount specified in the second column of the following Table 1, based on the long term unsecured credit rating for the market participant or its guarantor specified in the first column of Table 1:
Table 1
Subsection 5 Unsecured Credit Limit

<table>
<thead>
<tr>
<th>Credit Rating</th>
<th>Unsecured Credit Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>$25,000,000</td>
</tr>
<tr>
<td>AA+, AA, AA-</td>
<td>$20,000,000</td>
</tr>
<tr>
<td>A+, A, A-</td>
<td>$15,000,000</td>
</tr>
<tr>
<td>BBB+, BBB</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>&lt;BBB</td>
<td>$0</td>
</tr>
</tbody>
</table>

Unsecured Credit Limit for Non Rated Entities

6(1) If a market participant or its guarantor does not have a credit rating from an acceptable credit rating agency as referenced under subsection 5(2), then the market participant may request that the ISO grant to the market participant an unsecured credit limit based on a proxy credit rating of the market participant or its guarantor.

(2) The ISO may at its sole discretion accept or reject a request made under subsection 6(1) to grant a market participant an unsecured credit limit based on a proxy credit rating.

(3) For the ISO to determine whether initially to grant a proxy credit rating, or to approve of maintaining a proxy rating once it has been granted pursuant to this subsection 6, the market participant or its guarantor must provide the ISO the financial information the ISO requests, which must include:

(a) the most recent audited annual financial statements and, if the proxy rating is granted, subsequent audited annual financial statements to be provided within one hundred and twenty (120) days after each fiscal year-end of the market participant or its guarantor;

(b) the most recent unaudited quarterly financial statements and, if the proxy rating is granted, subsequent audited quarterly financial statements to be provided within sixty (60) days after each fiscal quarter of the market participant or its guarantor;

(c) a general description of the business and business risks of the market participant or its guarantor, how the market participant or the guarantor manages such business risks and, if the proxy rating is granted, an annual update of all such information; and

(d) any other information that the ISO may require to enable the ISO to more fully understand and assess the financial risks of the market participant or its guarantor.

(4) Subject to the provisions of this subsection 6, the ISO may grant an unsecured credit limit up to the maximum amount specified in the second column of the following Table 2, based on the proxy credit rating, if any, the ISO grants for the market participant or its guarantor, as the case may be:
Table 2
Subsection 6 Unsecured Credit Limit

<table>
<thead>
<tr>
<th>Proxy Credit Rating</th>
<th>Unsecured Credit Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>AA+, AA, AA-</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>A+, A, A-</td>
<td>$2,500,000</td>
</tr>
<tr>
<td>BBB+, BBB</td>
<td>$1,250,000</td>
</tr>
<tr>
<td>&lt;BBB</td>
<td>$0</td>
</tr>
</tbody>
</table>

(5) Any unsecured credit limit granted under this subsection 6 must not exceed zero point five percent (0.5%) of the tangible net worth of the market participant or its guarantor, as the case may be, determined by the ISO as follows:

the total assets of the market participant or its guarantor; minus
the total liabilities of the market participant or its guarantor; minus
intangible assets, including goodwill and trademarks, of the market participant or its guarantor.

(6) If the market participant or its guarantor fails to provide any financial information requested or required under subsection 6(3), then in addition to any other rights or remedies, the ISO may provide written notice to the market participant and the guarantor, as applicable:

(a) reducing any previously granted unsecured credit limit; and

(b) demanding that the market participant or its guarantor provide the ISO with additional or replacement financial security, no later than the close of business on the second (2nd) business day following the delivery of the demand by the ISO.

(7) The ISO must review the proxy credit rating the ISO grants and the financial information of each non-rated market participant and its guarantor at least once per year.

(8) Upon completion of the yearly review referenced under subsection 6(7), the ISO must provide written notice to the market participant and its guarantor, as the case may be, of any changes in the assigned proxy credit rating, unsecured credit limit or financial security requirements.

Unsecured Credit for Parent, Subsidiary and Affiliated Companies

7(1) A market participant who is a subsidiary or affiliate of a parent company with an unsecured rating from a credit rating agency approved under subsection 5(2) may make an application to the ISO for an unsecured credit limit under subsection 6.

(2) The ISO may, in accordance with subsection 6 may, grant the market participant an unsecured credit limit, based on the lower of the proxy credit rating for the market participant and that of its subsidiary or affiliate parent company.
(3) If a market participant or its guarantor is one of two (2) or more affiliated companies, and the ISO has granted any one of those companies an unsecured credit limit, then the ISO may not grant any other of those companies an unsecured credit limit.

Acceptable Forms of Financial Security

8(1) Subject to subsection 8(2), the form of any financial security to be provided to the ISO under this section 103.3 must be a letter of credit, a cash collateral deposit or third party written guarantee.

(2) A market participant may request that the ISO approve of an alternative form of financial security to those specified under subsection 8(1), and the ISO may at its sole discretion accept or reject the alternative form of financial security.

(3) An approved letter of credit form must:
   (a) contain provisions to the effect that it is an unconditional and irrevocable standby letter of credit, payable on demand with the ISO as beneficiary; and
   (b) be issued from a Canadian chartered bank, or other acceptable and comparable financial institution, with at least an A minus rating from an acceptable credit rating agency referred to under subsection 5(2).

(4) If a proposed letter of credit referred to in subsection 8(3) is from a bank or other financial institution with a head office outside of Canada, then the ISO may at its sole discretion accept or reject the letter of credit.

(5) The ISO must be able to register any cash collateral deposit as a first security interest held by the ISO under the Personal Property Act, and if the ISO requests, the market participant must provide the ISO with registerable written waivers or postponements in favour of the ISO provided by all third parties who have a registerable security interest in priority to the security interest the ISO may register.

(6) An approved written guarantee from the guarantor of a market participant must contain provisions to the effect that it is:
   (a) an irrevocable, continuous and unconditional guarantee of payment and other performance obligations of the market participant; and
   (b) payable on a demand by the ISO.

(7) The ISO may, at any time after initially approving the creditworthiness of a guarantor of the market participant and the maximum dollar amount under any approved form of guarantee, reassess and reduce that creditworthiness regardless of the credit rating of the guarantor, and after that reassessment and reduction the ISO must notify in writing the market participant and its guarantor of the reduced creditworthiness.

(8) The market participant must provide the ISO with additional or replacement financial security which the ISO must receive no later than the close of business on the second (2nd) business day following the delivery of the notice from the ISO in accordance with subsection 8(7).

ISO Review and Reassessment of Financial Security Adequacy

9(1) From time to time the ISO may review and reassess any financial security, unsecured credit limits, financial information and standing, creditworthiness and credit rating, and generally the ability of
a market participant and its guarantor to meet the financial obligations of the market participant and other performance obligations to the ISO.

(2) Upon completion of the review and reassessment, the ISO may at its sole discretion by written notice reduce any unsecured credit limit of the market participant or demand that the market participant provide replacement or additional financial security.

(3) Without limiting the generality of subsection 9(1), if at any one time:

- the total dollar amount of all financial obligations of the market participant calculated under subsection 3;
- exceeds
- any unsecured credit limit granted to the market participant under subsection 5 or 6, plus the financial security the market participant or its guarantor provides to the ISO pursuant to subsection 2;

then the ISO may demand in writing replacement or additional financial security from the market participant in a dollar amount sufficient to provide security for the calculated difference, and the market participant must deliver the replacement or additional financial security to the ISO no later than the close of business on the second (2nd) business day after the business day upon which the ISO delivered the demand.

(4) A market participant may request in writing that the ISO reduce the financial security required from and provided by the market participant to the ISO, and upon receipt of that request, the ISO may at its sole discretion reduce the financial security of the market participant if after review and reassessment the ISO determines that:

(a) any unsecured credit limit granted to the market participant plus the financial security the market participant provides exceeds all financial obligations of the market participant for two (2) settlement periods as the ISO estimates; or

(b) the credit rating of the market participant or its guarantor, as the case may be, determined in accordance with subsection 5 has been upgraded.

Material Adverse Change

10(1) If a market participant or its guarantor experiences a material adverse change, or is aware of a likely material adverse change occurring, then the market participant or its guarantor, as the case may be, must give notice in writing to the ISO of the matter.

(2) The ISO must receive the notice no later than the close of business on the second (2nd) business day after the day the market participant or its guarantor experiences, or becomes aware of the likely occurrence of, the material adverse change.

(3) The ISO must determine the impact of the material adverse change on any unsecured credit limit of the market participant and the overall creditworthiness of the market participant or its guarantor.

(4) If the ISO determines that replacement or additional financial security is required after determining the impact of the material adverse change, then the ISO may make a written demand on the market participant specifying the dollar amount and form of that replacement or additional financial security.

(5) The market participant must deliver to the ISO any specified replacement or additional, financial security demanded in accordance with subsection 10(4) no later than the close of business on the
second (2nd) business day after the business day upon which the ISO delivered the demand.

Costs and Expenses Related to Financial Security

All costs and expenses of a market participant associated with the implementation of any financial security and any related obligations of the market participant under this section 103.3 are the responsibility and to the sole account of that market participant.

Confidential Financial Information

The ISO must treat all information and records a market participant or a guarantor provides under this section 103.3 as confidential, in accordance with subsection 2(1) of section 103.1 of the ISO rules, Confidentiality.

ISO Recourse to Section 103.7 Financial Default and Remedies

The failure of a market participant to comply with its obligations to provide financial security under this section 103.3, or to keep the financial security in force and effect, is deemed to be a default event which will allow the ISO to have recourse to the rights and remedies of the ISO under section 103.7 of the ISO rules, Financial Default and Remedies.

Revision History

<table>
<thead>
<tr>
<th>Effective</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Addition of subsection Added section 3(1)(e)</td>
</tr>
<tr>
<td>2016-11-29</td>
<td>Revisions to the Applicability section</td>
</tr>
<tr>
<td>2011-07-01</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
Applicability
1 Section 201.1 applies to:
   (a) an electricity market participant; and
   (b) the ISO.

Requirements

Mandatory Registration as a Pool Participant
2 In order to exchange electric energy through the power pool or provide ancillary services, an electricity market participant must be registered with the ISO as a pool participant.

Application by an Electricity Market Participant
3 An electricity market participant seeking to register as a pool participant must provide the ISO with the following:
   (a) a completed pool participant application form, available on the AESO website; and
   (b) at the time of submitting the application, the non-refundable pool participation fee as set out in the Schedule of ISO Fees.

Registration Eligibility Criteria
4 The ISO must process a pool participant application from an electricity market participant who has submitted the application form and fee referred to in subsection 3 and satisfied the following eligibility criteria:
   (a) has provided any financial information and financial security, and has the ability to meet any financial obligations under the ISO rules as applicable to the pool participant;
   (b) has an agreement with a meter data manager, load settlement agent or any other such agent or person the ISO otherwise approves to provide metered energy data to the ISO or, if the electricity market participant intends to act as an importer, an exporter or both, has a valid system access service agreement with the ISO;
   (c) has satisfied any outstanding financial obligations attributable to any previous pool participant registration; and
   (d) in the case of an application to facilitate the provision of ancillary services, has entered into a contract to trade such products, either with the ISO or with an approved agent of trading services or both, and has met the technical requirements the ISO has set for the provision of ancillary services.

Receipt and Approval or Rejection of an Application
5(1) The ISO must acknowledge in writing the receipt of a pool participant application, including any supporting documents and the non-refundable pool participation fee within five (5) business days of the ISO receiving them.
(2) The ISO must review the pool participant application and any supporting documents to ensure completeness, and may request additional clarification or information from the electricity market participant.

(3) Within twenty (20) business days of receiving the application, the ISO must process it and provide written notification to the electricity market participant of approval or rejection of the application, or of any requested clarification or information deficiencies in the application, including any deficiencies regarding financial information, financial security or supporting documents.

(4) The twenty (20) business day review deadline date will be extended while the ISO is waiting for the electricity market participant to provide any further information or clarification, or to remedy any deficiencies referenced in subsection 5(3), if applicable.

(5) If, in the ISO’s opinion, the application is complete and the electricity market participant has satisfied the eligibility requirements, then the ISO must approve the application.

(6) If the application is deficient, then the ISO’s remedy is to reject it.

(7) If the ISO approves the application, then on the condition that the pool participant continues to meet the eligibility criteria set out in subsection 4, the registration remains in force and effect until December 31 of that same calendar year.

ISO Requirement to Maintain Lists

6 The ISO must maintain one or more lists containing current pool participant information including all pool assets, the status of such pool assets, the names of the pool participant associated with pool assets and any agents, and must make the lists available on the AESO website.

Pool Participant Registration Updates

7(1) A pool participant must provide updated information regarding its pool participant registration, its agents and its pool assets by following the procedures set out on the AESO website.

(2) The ISO must process updates to registration information:

(a) within twenty (20) business days of receiving such information, if the update is one that requires the pool participant to meet additional technical requirements; or

(b) within ten (10) business days of receiving such information if the update is not one that requires the pool participant to meet additional technical requirements.

Requirements toAggregate Load Pool Assets Providing Guaranteed Load Reduction

8 The pool participant for a load pool asset providing guaranteed load reduction must, if the load pool asset was qualified in accordance with Section 206.1, Qualification of Capacity as part of an aggregated asset, aggregate the load pool assets less than 1 MW from the aggregated asset into a single load sink asset.

Failure of a Pool Participant to Continue to Meet Registration Requirements

8(1) At any point in time after initial registration, if the ISO has reason to believe that a pool participant has ceased to meet any eligibility criteria set out in subsection 4, then the ISO must notify the pool participant in writing of the matter and provide the pool participant an opportunity to explain the circumstances in writing.

(2) After reviewing the explanation, if the ISO continues to have reason to believe that the pool participant has ceased to meet the requirements of subsection 4, then the ISO may suspend or terminate the pool participant’s registration, and may realize on any financial security to the extent of any ISO outstanding financial exposure which results from the suspension or termination of the registration.

(3) A pool participant who has had its registration suspended or terminated under this subsection 8
may dispute the ISO’s decision under the dispute resolution provisions of Section 103.2 of the ISO rules, with ultimate recourse to the Commission or the Market Surveillance Administrator as provided for in Section subsection 4(3) of section 103.2 of the ISO rules, Dispute Resolution.

(4) Notwithstanding Section subsection 7 of section 103.2 of the ISO rules, Dispute Resolution, the initiation of a dispute resolution process will stay the suspension or termination of the pool participant’s registration pending the outcome of such dispute resolution process unless the pool participant is in default under Section section 103.7 of the ISO rules, Financial Default and Remedies.

Voluntary Termination of Registration by a Pool Participant

9 A pool participant who wishes to terminate its registration may do so by completing all of the following:

(a) notifying the ISO in writing that it wishes to terminate its registration;
(b) requesting in writing that the ISO retire any of its pool assets identified on the ISO list of pool assets;
(c) specifying in the notice a date upon which it will cease to be a pool participant; and
(d) satisfying any outstanding financial obligations to the ISO.

Effect of Termination

10(1) A pool participant that is or may become liable under these ISO rules in connection with its activities as a pool participant remains liable after the date of termination of its registration and despite ceasing to be a pool participant.

(2) After the ISO has terminated a pool participant registration, it must release any related financial security to the pool participant no later than thirty (30) days after the date the last financial obligations of such pool participant are satisfied and to the extent there is no additional outstanding financial obligation exposure for or to the ISO.

Reinstatement of Registration

11 If the ISO terminates a pool participant registration or if an electricity market participant previously has voluntarily terminated its registration under subsection 9, then the electricity market participant must submit a new application for registration under this section 201.1 in order to once again become a pool participant.

Renewal of Registration

12 The ISO must renew a pool participant’s registration effective each January 1st but, in addition to the provisions of subsection 8(2), may suspend or terminate it if the pool participant fails to pay the applicable non-refundable pool participation fee as invoiced on its December power pool statement issued in January.

Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>XXXX-XX-XX</td>
<td>Revised Update to revision to clarify “market participant” as “electricity market participant” Administrative amendments</td>
</tr>
<tr>
<td>2015-12-07</td>
<td>Update to add non-refundable to subsections 3, 5 and 12</td>
</tr>
</tbody>
</table>
Applicability
1 Section 201.3 applies to:
   (a) a pool participant who submits an offer or bid in the energy market or ancillary services market.

Requirements
Offer Control Information
2(1) A pool participant must submit offer control information to the ISO:
   (a) for any operating block submitted in an offer or bid in the energy market, including an offer for dispatch down service, that has a quantity greater than 0 MW; and
   (b) in the case of operating reserve, for all offers or bids which the ISO accepts.

2(2) A pool participant must submit to the ISO, as it relates to the offer control information submitted in subsection 2(1), the quantity, in MW, contained within such offer or bid to which associated with a market participant identified in the offer control information relates, in an operating block submitted in accordance with subsection 2(1).

Associates of a Market Participant
3(1) A pool participant must, as it relates to the offer control information submitted in subsection 2, submit any and all associates of a market participant, as identified in offer control information, where associates of a market participant is defined in subsection 5(1)(a) of the Fair, Efficient, and Open Competition Regulation, in the manner the ISO specifies:
   (a) for a generating unit or aggregated generating facility that has energized and commissioned, on or before a date the ISO specifies;
   (b) for a generating unit or aggregated generating facility that has not completed energization and commissioning, before the energization and commissioning of such generating unit or aggregated generating facility; or
   (c) for an import asset, on or before a date the ISO specifies.

3(2) A pool participant must submit an attestation by a corporate officer of the market participant referred to in subsection 3(1) that the information provided pursuant to subsection 3(1) is complete and accurate.

Changes to Associates of a Market Participant
4 A pool participant must provide the ISO with updated information, as soon as reasonably practicable, regarding any changes to any associates of a market participant referred to in subsection 3(1) and include an attestation as described in subsection 3(2).

Timely Information from a Market Participant
5 A market participant identified in offer control information, if such market participant is not the pool participant for the relevant generating unit, aggregated generating facility or import asset, must:
(a) provide such timely and complete information to the pool participant for such generating unit, aggregated generating facility or import asset to enable the pool participant to comply with pool participant's obligations under subsections 2 and 3; and

(b) provide an attestation to the pool participant from a corporate officer of the market participant identified in the offer control information for such generating unit, aggregated generating facility or import asset to enable the pool participant to comply with the pool participant's obligations under subsections 3(2) and 4.

Revision History

<table>
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<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Addition of associates of a market participant and revised submission deadline.</td>
</tr>
<tr>
<td>2013-11-08</td>
<td>Restructured to aid in compliance.</td>
</tr>
<tr>
<td>2012-12-03</td>
<td>Initial release</td>
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</tbody>
</table>
Applicability

1 Section 201.5 applies to:

(a) the ISO

when managing the energy market and dispatch down service.

Requirements

Operating Block Allocation

2(1) The ISO must allocate to each pool participant 1 pool ID per pool asset.

(2) The ISO must allocate to the pool participant for each generating source asset 7 operating blocks for energy and 1 operating block for dispatch down service.

(3) The ISO must upon request of the pool participant, allocate to the pool participant for each load sink asset 7 operating blocks for energy.

(4) The ISO must allocate to the pool participant for each import asset either:

(a) 1 operating block for energy with a $0.00 offer price; or

(b) 7 operating blocks for energy, such that the offer price may be greater than or equal to $0.01 per MWh and less than or equal to $999.99 per MWh.

(5) The ISO must allocate to the pool participant for each export asset either:

(a) 1 operating block for energy with a $999.99 bid price; or

(b) 7 operating blocks for energy, such that the bid price may be greater than or equal to $0.00 and less than or equal to $999.98.

-Revision History

<table>
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<tr>
<th>Effective</th>
<th>Description</th>
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<tr>
<td>xxxx-xx-xx</td>
<td>Revised title of rule and facilitated the allocation of 7 operating blocks to an import or export asset, and load asset.</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial release</td>
</tr>
</tbody>
</table>
Applicability

1 Section 201.6 applies to:
   
   (a) the ISO.

Requirements

Pool Asset Marginal Price

2(1) Subject to subsection 2(2), the ISO must, for each pool asset, set the pool asset marginal price for each minute of a settlement interval at the price specified for the highest priced operating block in the offer or bid which has received a dispatch.

(2) In setting the pool asset marginal price, the ISO must not use that portion of an operating block in the offer or bid for a pool asset that has received a dispatch that results in a payment for transmission constraint rebalancing.

System Marginal Price

3(1) The ISO must set the system marginal price at each minute as:

   (a) the highest pool asset marginal price, excluding an import priced at $0.00 or an export priced at $999.99, as set in accordance with subsection 4;

   (b) $1,000.00 per MWh if to maintain the reliable operation of the system the ISO has issued a directive to the legal owner of an electric distribution system to shed firm load in accordance with Section 202.2 of the ISO rules, Supply Shortfall and Short Term Adequacy; or

   (c) as prescribed in Section 202.7 of the ISO rules, Markets Suspension or Limited Markets Operations,

(2) Notwithstanding subsection 3(1)(a), the ISO must not use the transmission must-run reference price, as calculated in subsection 5, to set the system marginal price.

Pool Price

4 The ISO must set the pool price for each settlement interval based on the time weighted average of the 60 one-minute system marginal price values determined for each minute of the settlement interval.

Transmission Must-Run Reference Price

5(1) The ISO must calculate the transmission must-run reference price as follows:

   Transmission must-run reference price = (12.5 gigajoules) multiplied by (the gas price)

Where:

the gas price is the monthly Canadian natural gas price for the month in $/gigajoules at AECO C and Nova Inventory Transfer, the Alberta Bidweek Spot Price, as published on www.ngx.com, and also in the “Canadian Gas Price Reporter.”
(2) The ISO must use reasonable efforts to use the current month’s gas price beginning at midnight on the 2\textsuperscript{nd} business day of the same month but until the ISO can update the gas price for the current month, the ISO must continue to use the previous month’s Alberta Bidweek Spot Price.

(3) If the gas price is no longer available on www.ngx.com, the “Canadian Gas Price Reporter”, or otherwise, then the ISO must approve a reasonably equivalent gas price that it will use for purposes of determining the transmission must-run reference price and must subsequently, update this section of the ISO rules to indicate the new source for obtaining the gas price.

(4) If the ISO uses a price other than the gas price identified in subsection 5(1) to calculate the transmission must-run reference price, then the ISO must:

(a) correct the gas price as soon as practicable; but

(b) not modify the pool price due to any errors in the transmission must-run reference price.

Forecast Dispatch Price and Forecast Pool Asset Marginal Price

6(1) The ISO must use reasonable efforts to publish a forecast dispatch price for each settlement interval on the AESO website no later than 70 minutes prior to the start of such settlement interval.

(2) The ISO must set the forecast dispatch price for a settlement interval at the highest pool asset marginal price of all pool assets forecast to be required to meet the forecast load requirement, using the expected energy market merit order for the settlement interval including importer operating blocks and the ISO expected import available transfer capacity for the interconnections for the settlement interval.

(3) The ISO must set the forecast pool asset marginal price for a pool asset for each settlement interval at the price specified for the operating block in the offer or bid which corresponds to the forecast energy market dispatch level of the pool asset to meet the forecast load requirement.

Revision History

<table>
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<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Revised title of rule, amended subsection 3(1)(a), and amended to include transmission must-run before reference price.</td>
</tr>
<tr>
<td>2015-11-26</td>
<td>Added subsection 2(2) and related revisions to subsection 2(1).</td>
</tr>
<tr>
<td>2014-07-02</td>
<td>Added new subsection 6 for subject matter and drafting consistency.</td>
</tr>
<tr>
<td>2013-09-24</td>
<td>Updated to bold the term “firm load”.</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
Applicability

1 Section 201.7 applies to:
   (a) a pool participant; and
   (b) the ISO.

Requirements

Issuing Dispatches

2(1) The ISO may issue a dispatch to a pool participant.

(2) The ISO may issue a dispatch verbally or electronically.

Requirement to Comply

3(1) A pool participant must comply with a dispatch it receives subject to any other ISO rule or reliability standard and the exceptions in subsections 3(2).

(2) A pool participant that is a legal owner of a generating source asset or an operator of a generating source asset, must comply with a dispatch it receives subject to the following exceptions:
   (a) it considers that a real and substantial risk of damage to its generating source asset could result if it complied with the dispatch;
   (b) it considers that a real and substantial risk to the safety of its employees or the public could result if it complied with the dispatch;
   (c) it considers that a real and substantial risk of undue injury to the environment could result if it complied with the dispatch;
   (d) it has received verbal authorization from the ISO to vary the requirements of the dispatch during commissioning and testing in accordance with any one or all of Section 504.3 of the ISO rules, Coordinating Energization, Commissioning and Ancillary Services Testing, Section 504.4 of the ISO rules, Coordinating Operational Testing, Section 505.3 of the ISO rules, Coordinating Synchronization, Commissioning, WECC Testing and Ancillary Services Testing, and Section 505.4 of the ISO rules, Coordinating Operational Testing; or
   (e) those exceptions set out in subsections 5 and 6 of Section 203.4 of the ISO rules, Delivery Requirements for Energy.

Report Inability to Acknowledge a Dispatch

4(1) If a pool participant is unable to acknowledge a dispatch electronically due to an unavailability at its facilities of the Automated Dispatch and Messaging System or other electronic or communication systems, then the pool participant must verbally notify the ISO of the unavailability immediately after becoming aware of the unavailability and as soon as practicable, must also:
   (a) provide the reasons for the unavailability;
   (b) provide an estimate of the duration of the unavailability;
   (c) provide the details of an action plan to resolve the unavailability; and
(d) notify the ISO when the unavailability is over.

(2) A pool participant must, if the unavailability is longer than expected, keep the ISO updated with current information regarding the expected duration of the unavailability.

Acknowledging Dispatches

5 A pool participant must acknowledge receipt of a dispatch:

(a) in the case of an automated message and unless the pool participant has notified the ISO of an unavailability in accordance with subsection 4(1) by responding via the Automated Dispatch and Messaging System within 2 minutes; and

(b) in the case of contract load shed service for imports, within the time frame set out in the contract; or a voice dispatch, by repeating the dispatch to the ISO.

Revision History

<table>
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<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Updated to require acknowledgement of a dispatch within 2 minutes for interchange transactions. Removed the requirement to acknowledge a dispatch for load shed service for imports within the time frame set out in the contract.</td>
</tr>
<tr>
<td>2014-07-02</td>
<td>Updated the references in subsection 3(2)(d) to the energization, commissioning and testing sections of the ISO rules; deleted the word “outages” in subsections 4 and 5 and replaced it with “unavailability”.</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial Release</td>
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</table>
ISO Rules
Part 200 Markets
Division 202 Dispatching the Markets
Section 202.3 Issuing Dispatches for Equal Prices

Applicability

1 Section 202.3 applies to:
   (a) the ISO
when operating the energy market and managing dispatch down service.

Requirements

Equally-Priced Operating Blocks

2(1) Subject to subsection 2(3), the ISO must, if the price of an operating block in an offer or bid for a pool asset is identical to the price of 1 or more operating blocks in an offer or bid in respect of another pool asset for the same settlement interval issue dispatches on a pro rata basis amongst the flexible blocks within the settlement interval.

2(2) Subject to subsection 2(3), the ISO must, if 1 or more of the equally-priced operating blocks is an inflexible block, attempt to accommodate the inflexible blocks and minimize the issuing of dispatches for operating blocks higher in the energy market merit order.

2(3) Notwithstanding subsection 2(1) and 2(2), the ISO must, when issuing dispatches in the energy market merit order where there are 1 or more equally-priced operating blocks in an offer or bid consisting of both source assets and load sink assets, attempt to accommodate the source assets before issuing dispatches for the load sink assets, attempt to:
   (a) issue dispatches for an increase in supply in the following order:
       (i) generating source assets;
       (ii) import assets;
       (iii) export assets; and
       (iv) load sink assets; and
   (b) issue dispatches for a decrease in supply in the reverse order specified in subsection 2(3)(a).

2(4) Notwithstanding subsections 2(1), 2(2), and 2(3), the ISO must:
   (a) determine dispatch volumes for a pool asset that is an import asset or an export asset in accordance with the procedures set out in Section 303.3 of the ISO rules, Intertie Path OperationsOPP 301, Alberta – BC Interconnection Scheduling and OPP 302, Alberta-Saskatchewan Interconnection Scheduling; and
   (b) issue dispatches for equally priced $0.00 offers in accordance with Section 202.5 of the ISO rules, Supply Surplus.

Revision History

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<th>Date</th>
<th>Description</th>
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<tr>
<td>xxxx-xx-xx</td>
<td>Added subsection 2(3) and revised reference in subsection 2(4)(a).</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial release</td>
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</table>

Issued for Consultation: 2018-10-22
Applicability

Section 202.5 applies to:

(a) a pool participant; and
(b) the ISO.

Requirements

State of Supply Surplus and Multiple Zero Dollar ($0) Offers

2(1) If during a current hour the ISO determines that the interconnected electric system will experience a state of supply surplus in the next hour or already exists, and the supply of electricity available from these offers exceeds the system load, then the ISO may curtail next hour $0.00 import interchange transactions to balance system supply and system load.

(2) Subject to subsection 2(3), if during a current hour the ISO determines that a state of supply surplus is imminent in the current hour or already exists, then the ISO must comply with the following procedures:

(a) initiate curtailment of $0.00 import interchange transactions;

(b) allow pool participants to submit bids to increase export interchange transactions within 2 hours of the start of a settlement interval;

(c) allow pool participants to submit offers to decrease import interchange transactions within 2 hours of the start of a settlement interval;

(d) allow pool participants to submit restatements reducing generating source asset output, or increasing load sink asset consumption, within 2 hours of the start of a settlement interval;

(e) issue dispatches in accordance with Section 202.3 of the ISO rules, Issuing Dispatches for Equal Prices;

(f) notwithstanding subsection 2(2)(e1)(d), if there are generating source assets with $0.00 offers for inflexible blocks stating volumes greater than their declared minimum stable generation, then issue directives to curtail those generating source assets to their declared minimum stable generation, starting with the generating source assets having the greatest difference in MW between the then current dispatch level and minimum stable generation and continuing in descending order until all those generating source assets have received directives; and

(g) issue directives for any other necessary actions, including shutting down generating source assets, to ensure system reliability.

(32) If the ISO determines that a generating source asset is running at a generation level higher than its minimum stable generation in order to provide regulating reserve, then the ISO may, as part of the effective execution of the procedures set out in subsection 2(21), issue a dispatch to curtail delivery of regulating reserve from that generating source asset and issue a dispatch for regulating reserve to another generating source asset which can provide regulating reserve while operating at a lower generation level at or above minimum stable generation.
(43) If during a current hour the present, real time operating conditions change such that the ISO determines that following the procedural sequence set out in subsections 2(21) and 2(32) would put the ISO in contravention of any reliability standard requirement by failing to achieve compliance within the operating limits or required response time specified in that reliability standard, then the ISO may alter the procedural sequence.

(54) If the ISO alters the procedural sequence as set out in subsection 2(43), then once the ISO is assured that the interconnected electric system is operating in a safe and reliable mode, the ISO must recommence the procedural sequence set out in subsections 2(21) and 2(32).

**Transitioning Out of a State of Supply Surplus**

3 When the ISO determines that the interconnected electric system is transitioning out of a state of supply surplus, the ISO must reverse any actions taken under subsection 2(21), in reverse order, to balance system supply and system load.

**Revision History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Clarified references to import interchange transactions, added reference to load, added reference to section 202.3, and administrative revisions.</td>
</tr>
<tr>
<td>2018-09-01</td>
<td>Revised “source asset” to “generating unit or aggregated generating facility”; clarified subsections 2 and 3; and administrative revisions.</td>
</tr>
<tr>
<td>2012-03-28</td>
<td>Initial release</td>
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Applicability
Section 202.6 applies to:
(a) the ISO.

Requirements
Adequacy Assessments
The ISO must, in order to assist in determining whether to cancel a planned outage, delayed forced or unplanned outage, automatic forced outage, of generation or delist outage, under section 306.9 of the ISO rules, Outage Cancellation, assess the adequacy of supply by, at a minimum, completing a supply and load forecast using the peak demand hour of every day for a minimum 2 year period, calculated as the sum of the following:

(a) the maximum capability that is associated with offers in the Alberta energy market, from all generating units and aggregated generating facilities, excluding wind and solar aggregated generating facilities in Alberta;  
   plus  
   (b) the maximum capability that is associated with offers in the Alberta energy market, from load sink assets;  
   plus  
   (c) an estimate of the output from wind or solar aggregated generating facilities;  
   plus  
   (d) import available transfer capability on interconnections with a program that increases available transfer capability;  
   minus  
   (e) declared generating unit, aggregated generating facility, and load maximum capability derates from a generating unit, or load;  
   minus  
   (f) any capacity of generating units and aggregated generating facilities which are affected by transmission market constraints;  
   minus  
   (g) anticipated generating unit, aggregated generating facility, and load maximum capability derates from a generating unit or load;  
   minus  
   (h) the daily forecast Alberta internal load;  
   minus  
   (i) operating reserves requirements;
ISO Rules
Part 200 Markets
Division 202 Non-Routine Conditions in the Markets
Section 202.6 Adequacy of Supply

plus

(j) price responsive load, excluding the maximum capability of a load sink asset referred to in subsection 2(b);

plus

(k) aggregate planned outage, unplanned outage and forced outage records for load;

plus

(l) load for demand opportunity service.

Short Term Adequacy Assessments

3 The ISO must, every hour, assess the short term adequacy of supply by, at a minimum, completing a real time adequacy assessment for each settlement interval of the current day and for the 6 remaining days of the forecast scheduling period on the day preceding that current day, calculated as the sum of the following:

(a) available capability that is associated with offers in the Alberta energy market, from all load sink assets, generating units, and aggregated generating facilities, excluding wind and solar aggregated generating facilities and generating units with a start-up time less than or equal to 1 hour or with a submitted start time at or before the period being assessed;

plus

(b) estimated output from wind or solar aggregated generating facilities;

plus

(c) estimated amount of price responsive load, excluding the available capability of a load sink asset referred to in subsection 3(a);

plus

(d) estimated amount of demand opportunity service load that is to be curtailed;

plus

(e) on-site generation that supplies behind-the-fence load and submits available capability as a net-to-grid value;

plus

(f) import available transfer capability on the interties;

minus

(g) the peak forecast load from the day-ahead forecast of Alberta internal load;

minus

(h) the ISO’s spinning reserve requirement;

minus

(i) constrained down generation, with the exception of constrained down wind or solar aggregated generating facilities.
Resource Adequacy Standard Assessment

4 The ISO must, if the ISO determines that:
   (a) the normalized expected unserved energy in 1 year on average exceeds the resource adequacy standard; and
   (b) the percentage of the total load on the interconnected electric system in a year in MWh that is not expected to be served indicates a need for the ISO to consider taking preventative action,

undertake further studies to verify the likely cause, magnitude and timing of the potential adequacy issue.

Resource Adequacy Standard Threshold Actions

5 The ISO may, if the resource adequacy standard threshold is exceeded and the ISO deems that a potential adequacy issue requires preventative action, procure any 1 or more of the following services:
   (a) load shed;
   (b) self-supply and back-up generation that would not otherwise be available to participate in the energy market; and
   (c) emergency portable generation;

being resource adequacy standard threshold actions.

Procurement of Resource Adequacy Standard Threshold Actions

6 The ISO must procure resource adequacy standard threshold actions using established ISO procurement procedures and, where possible and practical, in a manner that encourages competition.

Recovery of Resource Adequacy Standard Threshold Actions Costs

7(1) The ISO must, if it procures resource adequacy standard threshold actions, establish a methodology that results in the recovery of the costs of resource adequacy standard threshold actions.

(2) The ISO must institute a charge to load, primarily directed to the pool participants who consume energy during higher priced hours, which recovers the costs of resource adequacy standard threshold actions.

Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Revised to accommodate load that offers, replaced “long term adequacy” with “resource adequacy standard”, removed long term adequacy reporting requirements.</td>
</tr>
<tr>
<td>2018-09-01</td>
<td>Revised references to “wind aggregated generating facilities” to “aggregated generating facilities”; replaced “wind” with “wind and solar generation”; administrative revisions.</td>
</tr>
<tr>
<td>2014-10-01</td>
<td>Amendment to the short term adequacy assessments calculation to include the ISO’s spinning reserve requirement.</td>
</tr>
<tr>
<td>2013-12-20</td>
<td>Initial release</td>
</tr>
</tbody>
</table>
Applicability
1 Section 202.7 applies to:
   (a) an electricity market participant; and
   (b) the ISO.

Requirements
State of Limited Markets Operations
2 If, due to:
   (a) the unavailability of ISO merit order related tools; or
   (b) the ISO being required to completely evacuate ISO personnel from the ISO’s System Coordination Centre due to an emergency or disaster event, resulting in the ISO using its Back Up Coordination Centre;

   the ISO cannot access the ordinary course energy market merit order, which lack of access materially impedes the ISO’s ability to accurately and substantially issue dispatches and operate any one or all of the merit orders, then the ISO may, by the issuance of a declaration in accordance with subsection 3:
   (c) declare that a state of limited markets operations is in effect; and
   (d) invoke the limited markets operations procedures set out in this section 202.7.

Declaration Invoking a State of Limited Markets Operations
3(1) The ISO must issue a declaration if it is invoking a state of limited markets operations.
(2) The declaration must include:
   (a) the reasons that the ISO is invoking the state of limited markets operations; and
   (b) the commencement date and time of the state of limited markets operations; and
   (c)(b) a reasonable estimate of the anticipated date and time of termination of the state of limited market operations, and the return to ordinary course markets operations.

(3) The ISO must use all reasonable efforts to issue the declaration as simultaneously as is possible to electricity market participants who may reasonably be anticipated to be affected by the state of limited markets operations.
(4) The ISO from time to time may issue a subsequent declaration updating electricity market participants on limited markets operations developments as the circumstances warrant.
(5) The ISO may select one or more of the following methods to issue a declaration, depending on which is the most practical and effective method under the circumstances:
   (a) the real time AIES Event Log or other message communications posted on the AESO website;
Dispatches During a State of Limited Markets Operations

4 During a state of limited markets operations:
   (a) the ISO must use the most current and reasonably accurate merit orders then available to the ISO under the circumstances, to continue to issue dispatches in a manner which is as close as possible to ordinary course operations;
   (b) subject to subsection 4(c), the ISO must use all reasonable efforts to ensure that any dispatches the ISO has issued for dispatch down services and ancillary services at the commencement of the state of limited markets operations remain in effect until termination of the state of limited markets operations; and
   (c) if the system marginal price exceeds the transmission must-run reference price during the state of limited markets operations, then the ISO may determine that any one or all of the dispatch down services must be terminated until the termination of the state of limited markets operations.

Energy Market Pricing During a State of Limited Markets Operations

5(1) During a state of limited markets operations and subject to subsection 5(2), the ISO must determine the energy market pool price as the system marginal price at each minute, which must be the highest eligible pool asset marginal price of all pool assets to meet system load in the energy market merit order referred to in subsection 4(a).

(2) The system marginal price during a state of limited markets operations must be one thousand dollars ($1,000) per MWh under the circumstances set out in subsection 3(1)(b) of section 201.6 of the ISO rules, Pricing.

Other Pricing During a State of Limited Markets Operations

6 During a state of limited markets operations:
   (a) the ISO must make dispatch down service payments based on the system marginal price in each minute, in accordance with subsection 8 of section 103.4 of the ISO rules, Power Pool Financial Settlement;
   (b) the ISO must make ancillary services payments based on the pool price, which such price is determined in accordance with subsection 4 of section 201.6 of the ISO rules, Pricing;
   (c) the ISO may suspend uplift payments under subsection 6 of in accordance with section 103.4 of the ISO rules, Power Pool Financial Settlement; and
   (d) the ISO may suspend payments for transmission constraint rebalancing required under subsection 7 of in accordance with section 103.4 of the ISO rules, Power Pool Financial Settlement.
7(1) The ISO, by issuing a declaration, must terminate a state of limited markets operations as soon as it restores ordinary course access to the merit orders.

(2) The ISO must use the most practical and effective communication method referenced in subsection 3(5) to issue a declaration to electricity market participants that the ISO has terminated a state of limited markets operations and ordinary course merit order operations are to recommence by the date and time specified in the declaration.

State of Markets Suspension

8(1) If:

(a) the interconnected electric system is experiencing a blackout;

(b) the interconnected electric system is breaking up into two or more electrical islands causing transmission market constraints that significantly limit or prohibit markets operations; or

(c) the ISO is unable to continue in a state of limited markets operations under this section 202.7 because:

(i) the ISO no longer can use the most current and reasonably accurate energy market merit order due to material variances between that energy market merit order and the energy production capabilities of the pool assets associated with the energy market merit order; or

(ii) the ISO no longer can perform and operate merit order functions at the Back Up Coordination Centre as referenced in subsection 2(b);

then once an approval is granted under subsection 8(2), the ISO may issue a declaration in accordance with subsection 9 invoking a state of markets suspension for the energy market, the ancillary services market and the dispatch down service market, and implementing the markets suspension procedures set out in this section 202.7.

(2) The ISO may not issue a declaration invoking a state of markets suspension without the approval of the Chief Executive Officer of the ISO or a designee, but if the interconnected electric system is experiencing a blackout as referenced under subsection 8(1)(a), then the ISO may, by declaration in accordance with subsection 9, invoke a state of markets suspension without Chief Executive Officer approval.

Declaration Invoking a State of Markets Suspension

9(1) The ISO must issue a declaration if it is invoking a state of markets suspension.

(2) The declaration must include:

(a) the reasons that the ISO is invoking the state of markets suspension; and

(b) the commencement date and time of the state of markets suspension; and,

(c) a reasonable estimate of the anticipated date and time of the termination of the state of markets suspension, and the return to ordinary course markets operations.

(3) The ISO must use all reasonable efforts to issue the declaration as simultaneously as is possible to
electricity market participants who may reasonably be anticipated to be affected by the state of markets suspension.

(4) The ISO from time to time may issue a subsequent declaration updating electricity market participants on markets suspension developments as the circumstances warrant.

(5) The ISO may select one or more of the following methods to issue the declaration, depending on which is the most practical and effective method under the circumstances:

(a) the real time AIES Event Log or other message communications posted on the AESO website;

(b) Automated Dispatch and Messaging System communications; or

(c) pre-recorded telephone notifications, followed up by written confirmation.

Effect of a State of Markets Suspension

10 During the period of time a state of markets suspension is in effect, the ISO:

(a) is not required to follow the merit orders; and

(b) must determine the system marginal price in accordance with subsection 11.

System Marginal Pricing during a State of Markets Suspension

11(1) During a state of markets suspension and subject to subsection 11(2), the ISO must determine the system marginal price at each minute, which price must be either the prior thirty (30) day average on peak price or off peak price, depending on the hour of day the state of markets suspension is in effect.

(2) The system marginal price during a state of markets suspension must be one thousand dollars ($1,000) per MWh under the circumstances set out in subsection 3(1)(b) of section 201.6 of the ISO rules, Pricing.

Operating Costs Recovery for Certain Electricity Market Participants

12(1) If for a state of markets suspension an electricity market participant does not recover from energy receipts revenue all operating costs, as specified in subsection 12(2) below, for any pool asset that operated during that state of market suspension, then the ISO must pay to the electricity market participant an additional amount up to, but not in excess of, those operating costs, net of the energy receipts revenue.

(2) Subject to subsection 12(3), the operating costs referred to in subsection 12(1) may include:

(a) variable supply transmission service charges which are the actual cost of all variable charges from Rate Schedule STS of the ISO tariff, including the applicable loss factor charge or credit;

(b) variable operating and maintenance charges;

(c) fuel cost to operate the pool asset; and

(d) other related reasonable costs the ISO approves.

(3) If during a state of markets suspension an electricity market participant incurs start-up costs for
a pool asset as the result of receiving a directive to start-up the pool asset, and then subsequently the electricity market participant:

(a) receives a directive to shut down the same pool asset; or

(b) is received a dispatched directive to terminate energy delivery or consumption for the same pool asset upon the termination of the markets suspension and the return to ordinary course operations;

then the electricity market participant may include those start-up costs in the operating costs to be recovered in accordance with subsection 12(2).

(4) The ISO must include as a line item in a power pool statement any charge to a pool participant under subsection 8 of section 103.6 of the ISO rules, ISO Fees and Charges for the ISO to recover any costs associated with the payment of operating costs net of energy receipts revenue due to a markets suspension under this section 202.7.

Termination of a State of Markets Suspension

13(1) The ISO, by issuing a declaration, must terminate a state of markets suspension as soon as it restores ordinary course markets operations.

(2) The ISO must use the most practical and effective communication methods referenced in subsection 9(5) to issue a declaration to electricity market participants that the ISO has terminated a state of markets suspension and ordinary course markets operations are to recommence by the date and time specified in the declaration.

(3) The ISO must publish a preliminary report on the AESO website, no later than five (5) business days following the last day of a state of markets suspension, containing a summary of events and circumstances which led to the ISO invoking the state of markets suspension.

(4) The ISO must publish a final report on the AESO website, no later than twenty (20) business days following the termination of a state of markets suspension, containing details on how the ISO managed the markets suspension situation and the interconnected electric system during the state of markets suspension, and the efforts the ISO undertook to return the markets to ordinary course markets operations.

Revision History

<table>
<thead>
<tr>
<th>Effective</th>
<th>Description</th>
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</table>
| 20XX-XX-XX    | Inclusion of “transmission must-run” in subsection 4(c); Updated “transmission constraint” to “transmission market constraint”; Revision to clarify “market participant” as “electricity market participant”;
<p>|               | Deletion of specific subsection references                                   |
|               | Deletion of subsections 3(2)(c) and 9(2)(c)                                |
| 2015-11-26    | Addition of subsection 6(d) to refer to new subsection 7 of section 103.4 of the ISO rules. |
| 2013-01-08    | Previously defined terms have been un-defined and so the words have been un-bolded. |</p>
<table>
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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>2011-10-13</td>
<td>Updated to refer to section 201.6 <em>Pricing.</em></td>
</tr>
<tr>
<td></td>
<td>Initial release</td>
</tr>
</tbody>
</table>
Applicability
1 Section 203.1 applies to:
   (a) a pool participant when participating in the energy market; and
   (b) the ISO.

Requirements
Submission Method and Timing
2(1) A pool participant may only submit an offer or a bid to the power pool in respect to an active pool asset listed opposite their name in the ISO list of pool assets.
(2) A pool participant submitting an offer or bid for a generating source asset or load sink asset, respectively, must submit such offer or bid:
   (a) before 12:00 hours on the day before the day that the offer or bid is effective, subject to any extension of time granted pursuant to subsection 3 of section 201.4 of the ISO rules, Submission Methods and Coordination of Submissions; and
   (b) no earlier than 00:00 hours, 7 days prior to the day that the offer or bid is effective.
(3) A pool participant submitting an offer or bid for an import asset or export asset, respectively, must submit such offer or bid:
   (a) no later than 2 hours prior to the start of the settlement interval; and
   (b) no earlier than 00:00 hours, 7 days prior to the day that the offer or bid is effective.

Must-Offer and May-Offer
3(1) A pool participant must submit offers in the energy market for each settlement interval, for each of its pool assets, that are:
   (a) generating source assets with a maximum capability of 5 MW or greater;
   (b) load sink assets subject to a capacity commitment with a maximum capability of 5 MW or greater, or providing guaranteed load reduction;
   (c) import load sink assets subject to a capacity commitment;
   (d) (2) A pool participant may submit offers in the energy market for each settlement interval, for any providing firm consumption level with a maximum capability of its pool assets that are import assets, 5 MW or greater; or
(3) import assets.
(2) A pool participant may submit offers in the energy market, for any of its pool assets that are:
   (a) generating source assets subject to a capacity commitment with a maximum capability greater than or equal to 1 MW and less than 5 MW; or
(b) load sink assets subject to a capacity commitment providing firm consumption level with a maximum capability greater than or equal to 1 MW and less than 5 MW.

(43) A pool participant that chooses to submit offers in accordance with subsection 3(32) must notify the ISO, in the manner the ISO specifies.

(54) The ISO must, upon receiving a notification in accordance with subsection 3(43), provide the pool participant with the ability to submit offers.

(65) A pool participant with a pool asset that is provided the ability to submit offers in accordance with subsection 3(54) must submit offers in the energy market for each settlement interval.

(7) Notwithstanding subsections 3(1), 3(2), and 3(65), a pool participant must not submit offers for energy that is committed under a contract for resource adequacy standard threshold actions referred to in section 202.6 of the ISO rules, Adequacy of Supply.

Offer Content

4(1) A pool participant must include in each operating block in an offer;

(a) a price in $/MWh to the nearest cent per MWh which:

(b)(i) in the case of a generating source asset or a load sink asset, is greater than or equal to zero dollars ($0) per MWh and less than one thousand dollars ($1000) per MWh;

(ii) in the case of an import asset that has been only allocated 1 operating block in accordance with section 201.5 of the ISO rules, Energy Market Block Allocation, $0.00 per MWh; or

(ii) in the case of an import asset that has been allocated 7 operating blocks in accordance with section 201.5 of the ISO rules, Energy Market Block Allocation is greater than or equal to $0.01 per MWh and less than or equal to $999.99 per MWh;

(c) a quantity in MW; and

(d) an indication of whether the operating block is a flexible block or an inflexible block.

(2) A pool participant that submits an offer must also submit the minimum stable generation for a generating source asset.

(3) A pool participant that submits an offer must ensure that:

(a) the cumulative total MW, as entered for the highest priced operating block in the offer for the settlement interval, equals the maximum capability of the pool asset; and

(b) the minimum stable generation submitted for the generating source asset does not exceed the MW of the operating block with the lowest offer price for the source asset and a quantity greater than 0 MW, including when submitted as part of a restatement under section 203.3 of the ISO rules, Energy Restatements.

Offers During Commissioning and Testing

5 Notwithstanding subsection 4(1)(a)(i), a pool participant that submits an offer for a generating source asset which is undergoing commissioning and testing under section 505.3 of the ISO rules, Coordinating Synchronization, Commissioning, WECC Testing and Ancillary Services Testing must, until the ISO otherwise authorizes in writing, submit a price for the offer of $0.00.
Available Capability

6 A pool participant that submits an offer must also submit the available capability, in MW, for each source asset or load sink asset, which where:

(a) such available capability must equal the maximum capability of the generating source asset or load sink asset, unless the pool participant has submitted an acceptable operational reason with the offer; or

(b) such available capability for an import asset must:

(i) if the import asset is subject to a capacity commitment, be greater than or equal to the capacity commitment associated with the import asset, unless the pool participant has submitted an acceptable operational reason with the offer; or

(ii) the import asset is not subject to a capacity commitment, greater than or equal to 0 MW.

Operating Constraints for Offers

7(1) A pool participant that submits an offer must also submit the following operating constraints:

(a) for a generating source asset or a load sink asset, a ramp rate;

(b) for a generating source asset or a load sink asset, a ramp table in the manner the ISO specifies; and

(c) for a generating source asset, the initial start-up time.

(2) A pool participant must submit to the ISO any changes to the operating constraints of a source asset or a load sink asset as soon as reasonably practicable.

Option to Bid

8 A pool participant may, for a settlement interval, submit a bid for any of its sink assets.

Bid Content

9(1) A pool participant must include in each operating block in a bid:

(a) a price in $/MWh to the nearest cent per MWh which is greater than or equal to $0.00 per MWh and less than or equal to $999.99 per MWh; and

(i) in the case of load sink asset, is greater than or equal to $0.00 per MWh and less than or equal to $999.99 per MWh; and

(ii) in the case of export asset that has been only allocated 1 operating block in accordance with section 201.5 of the ISO rules, Energy Market Block Allocation, $999.99 per MWh; and

(iii) in the case of an export asset that has been allocated 7 operating blocks in accordance with section 201.5 of the ISO rules, Energy Market Block Allocation, is greater than or equal to $0.00 per MWh and less than or equal to $999.98 per MWh; and

(b) a quantity in MW.
(2) A pool participant that submits a bid must ensure that the total MW in the bid do not exceed the peak load of the load sink asset.

Standing Submission

10(1) A pool participant may create a standing submission, being an offer or bid that remains in place until the pool participant changes it.

(2) The ISO must use the data contained in the standing submission for the pool asset for the day following the forecast scheduling period.

Validation

11 The ISO must, as soon as reasonably practicable following the receipt of an offer or bid, send to the pool participant who submitted the offer or bid:

(a) acknowledgment of receipt of the offer or bid;

(b) notification that the offer or bid is either valid or invalid with respect to this section 203.1 of the ISO rules; and

(c) if an offer or bid is invalid, an explanation as to why the offer or bid is not accepted.

Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Revised to include requirements for load, imports, and assets subject to a capacity commitment. Added requirement to submit ramp table in subsection 7(1)(b).</td>
</tr>
<tr>
<td>2013-12-20</td>
<td>Updated subsections 3(1) and 3(2) to clarify offers in the context of capacity that is committed under a contract for long term adequacy.</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
Applicability

1 Section 203.2 applies to:

(a) the ISO

when operating the energy market.

Requirements

Dispatch Considerations

2 During normal system conditions, the ISO must, when a change in demand or supply requires a dispatch in order to balance the system, issue dispatches for the next operating block in the merit order, subject to any restrictions created by inflexible blocks, or limits referenced in Section 303.2 of the ISO rules, Available Transfer Capability.

Import and Export Operating Blocks

3 The ISO must treat the energy component of a scheduled interchange transaction of an import asset with an offer of $0.00 or an export asset with a bid of $999.99 as a dispatch in accordance with the applicable energy market merit order.

Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Added reference to section 303.2 and subsection 3.</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial release</td>
</tr>
</tbody>
</table>
Applicability

1 Section 203.3 applies to:

(a) a pool participant;
when participating in the energy market.

Requirements

Available Capability Restatements for Offers

2(1) A pool participant must only submit an available capability restatement revising the available capability of a generating source asset or a load sink asset if such revision is:

(a) as a result of an acceptable operational reason;
(b) in relation to an operational deviation and required under Section 203.4 of the ISO rules, Delivery Requirements for Energy;
(c) in order to reflect the output of the source asset which is restricted during either 1 or both of commissioning and testing under Section 505.3 of the ISO rules, Coordinating Synchronization, Commissioning, WECC Testing and Ancillary Services Testing or under Section 505.4 of the ISO rules, Coordinating Operational Testing; or
(d) in order to reflect the output of the load sink asset which is restricted during either 1 or both of commissioning and testing under Section 504.3 of the ISO rules, Coordinating Energization, Commissioning, and Ancillary Services Testing or under Section 504.4 of the ISO rules, Coordinating Operational Testing.

2(2) A pool participant must only submit an available capability restatement revising the available capability of an import asset if such revision is as a result of an acceptable operational reason, if such restatement is submitted within 2 hours of the start of the settlement interval or within the current settlement interval.

3 A pool participant that submits an offer must, if there is a change to the available capability of the source asset or load sink asset as a result of any of the circumstances outlined in subsection 2(1), submit an available capability restatement revising the available capability for the applicable hours, as soon as reasonably practicable.

34 A pool participant must submit the reason or reasons for submitting an available capability restatement for a source asset or a load sink asset.

Price Restatements for Offers

3 A pool participant that submits an offer may submit a price restatement but must only do so prior to 2 hours before the start of a settlement interval.

MW Restatements for Offers

4(1) A pool participant that submits an offer may submit a MW restatement prior to 2 hours before the start of a settlement interval.

4(2) A pool participant that submits an offer must submit a MW restatement redistributing the MW to represent the operating state of the source asset or load sink asset, as soon as reasonably practicable, if the source asset or load sink asset cannot comply with the current offer where:
(a) an available capability restatement under subsection 2 cannot reasonably accommodate the operating state of the source asset or load sink asset and the operating state is a result of an:
   (i) acceptable operational reason; or
   (ii) operational deviation and such restatement is required under Section 203.4 of the ISO rules, Delivery Requirements for Energy;
(b) the source asset is carrying out either 1 or both of commissioning and testing under Section 505.3 of the ISO rules, Coordinating Synchronization, Commissioning, WECC Testing and Ancillary Services Testing or under Section 505.4 of the ISO rules, Coordinating Operational Testing; or
(c) the load sink asset is carrying out either 1 or both of commissioning and testing under Section 504.3 of the ISO rules, Coordinating Energization, Commissioning, and Ancillary Services Testing or under Section 504.4 of the ISO rules, Coordinating Operational Testing.

(3) A pool participant must submit the reason or reasons for submitting a MW restatement in accordance with subsection 4(2)(a) if such MW restatement is submitted within 2 hours of the start of the settlement interval or within the current settlement interval.

(4) If a pool participant is responding to the ISO under subsections 2(2)(c) and 2(2)(d) of Section 202.5 of the ISO rules, Supply Surplus, then the pool participant must submit a restated offer for its source asset within the current hour which reduces the quantity of only the $0.00 operating block of the source asset.

Minimum Stable Generation Restatements for Offers

5(1) A pool participant that submits an offer for a generating source asset must, if there is a change to the minimum stable generation as a result of any acceptable operational reason, submit a minimum stable generation restatement for the generating source asset for the applicable hours, as soon as reasonably practicable.

(2) If the restated minimum stable generation:
   (a) is lower than the previously submitted minimum stable generation; and
   (b) the restatement is submitted within 2 hours of the start of the settlement interval,
then the pool participant must not restate the MW of the operating block with the lowest offer price for the generating source asset.

(3) If the restated minimum stable generation:
   (a) is higher than the previously submitted minimum stable generation; and
   (b) the restatement is submitted within 2 hours of the start of the settlement interval,
then the pool participant, when restating an increase to the MW of the operating block with the lowest offer price for the generating source asset in order to comply with Section 203.1 of the ISO rules, Offers and Bids for Energy, must take any such additional MW from the operating blocks with the next highest offer price in ascending order.

(4) A pool participant must submit the reason or reasons for submitting a minimum stable generation restatement under subsection 5(1).

Price Restatements for Bids
6 A pool participant that submits a bid may submit a price restatement but must only do so prior to 2 hours before the start of a settlement interval.

MW Restatements for Bids

7(1) A pool participant that submits a bid may submit a MW restatement prior to 2 hours before the start of a settlement interval.

(2) A pool participant that submits a bid must submit a MW restatement redistributing, or in the case of exports reducing, the MW to represent the operating state of the sink asset, as soon as reasonably practicable, if the sink asset cannot comply with the current bid as a result of an acceptable operational reason.

(3) A pool participant must submit the reason or reasons for submitting a MW restatement under subsection 7(2) if such MW restatement is submitted within 2 hours of the start of the settlement interval or within the current settlement interval.

(4) If a pool participant is responding to the ISO under subsection 2(2)(b) of Section 202.5 of the ISO rules, Supply Surplus, then the pool participant must submit a MW restatement for its bid for the applicable sink asset in the current hour, increasing the MW of the export interchange transaction.

Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Revised to accommodate load assets, priced imports and exports, and administrative revisions.</td>
</tr>
<tr>
<td>2014-07-02</td>
<td>Corrected typos in subsection 2(1)(b) by updating the references to be “section 203.4” of the ISO rules instead of “section 203.3”.</td>
</tr>
<tr>
<td>2013-11-08</td>
<td>Amended subsection 4(2), added clarity to “the operating block” in subsections 5(2) and 5(3), and corrected a subsection reference.</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
Applicability

1 Section 203.4 applies to:

(a) a pool participant with a generating source asset that has an associated current offer when participating in the energy market; and

(b) a pool participant with a load sink asset that has an associated current offer when participating in the energy market; and

(c) the ISO.

Requirements

Compliance Responsibilities

2(1) A pool participant may only deliver energy to the interconnected electric system from a generating source asset pursuant to a dispatch or a directive the ISO issues.

(2) A pool participant must:

(a) operate its generating source assets or load sink assets, or cause them to be operated; and

(b) respond to dispatches from the ISO, using good electric industry practice, including the design, implementation and use of reasonable dispatch protocols, together with personnel and software systems designed to detect and address errors or omissions in a timely fashion.

Steady State Compliance

3(1) Subject to subsection 3(3), a pool participant must not, during steady state, vary the average MW it delivers from a generating source asset or consumes from a load sink asset, in any 10 minute clock period from the dispatch MW by more than the allowable dispatch variance.

(2) Subject to subsection 3(3), a pool participant that is supplying regulating reserve from a generating source asset or a load sink asset must ensure that the MW delivered in any 10 minute clock period is:

(a) not less than the dispatch MW minus the allowable dispatch variance; and

(b) not greater than the dispatch MW plus the regulating reserve plus the allowable dispatch variance.

(3) A pool participant, after a load sink asset that is subject to a dispatch for 0 MW has met the requirements for the first 10 minute clock period as described in subsections 3(1) and 3(2), is no longer subject to the requirements of subsections 3(1) and 3(2).

Ramping Compliance

4(1) A pool participant must move the output of a generating source asset or the consumption of a load sink asset which is:

(a) the subject of a dispatch; and
ISO Rules  
Part 200 Markets  
Division 203 Energy Market  
Section 203.4 Delivery Requirements for Energy

(b)  **ramping** towards the MW level indicated in that dispatch within 10 minutes of the time specified in the dispatch but not prior to the time specified in the dispatch.

(2)  A **pool participant** must ensure that each generating **source asset** or load **sink asset** reaches the MW specified in an energy market dispatch, plus or minus the allowable dispatch variance for that generating **source asset** or load **sink asset** in:

   (a)  no longer than the period of time calculated as follows:
         (i)  divide the change in dispatch MW by the ramp rate the **pool participant** submits;
         (ii) add 40% of the time calculated in subsection 4(2)(a)(i) or 5 minutes, whichever is greater; and
         (iii) add the 10 minutes referred to in subsection 4(1); and

   (b)  no sooner than the period of time calculated as follows:
         (i)  divide the change in dispatch MW by the ramp rate the **pool participant** submits; and
         (ii) subtract 40% of the time calculated in subsection 4(2)(b)(i) or 5 minutes, whichever is greater.

**Operational Deviation**

5(1)  A **pool participant** must, if a generating **source asset** or load **sink asset** experiences an operational deviation in excess of 50 MW, verbally inform the **ISO** as soon as practical of the occurrence of the operational deviation and provide a description of the cause if known.

(2)  A **pool participant** must inform the **ISO** of the information required under subsection 5(1) on a telephone line the **ISO** designates, which must contain a voice recording system.

(3)  A **pool participant** must, if an operational deviation extends for 20 minutes or longer, submit an available capability restatement or MW restatement for the generating **source asset** or load **sink asset** that represents the operational capability of the generating **source asset** or load **sink asset**, and must do so no later than 20 minutes after the commencement of the operational deviation.

**Exceptions to Non-Compliance**

6  Notwithstanding the provisions set out in subsections 3, 4 and 5, the **ISO** must not determine that a **pool participant** is non-compliant with a dispatch for a generating **source asset** or load **sink asset** if the **pool participant** has met its responsibilities as set out in subsection 2 and 1 or more of the following circumstances occur:

   (a)  the generating **source asset** or load **sink asset** is ramping into position to provide operating reserve in response to a dispatch in the 15 minutes before the time indicated in that dispatch;

   (b)  the generating **source asset** is operating below the minimum stable generation level indicated in the Energy Trading System, but only if that generating **source asset** is:
         (i)  synchronizing and its available capability the **pool participant** submitted is equal to its minimum stable generation and it has received a dispatch for that quantity, in MW;
(ii) going off line and its available capability the pool participant submitted is equal to 0 and it has received a dispatch for that quantity, in MW;

(iii) unable to follow the ramp rate the pool participant submitted when its output is being increased to its minimum stable generation and the pool participant has submitted a verbal plan to the ISO indicating a proposal for ramping to minimum stable generation, which verbal plan must provide an estimate of the time required to achieve the ramp rate and be updated for deviations of greater than 30 minutes or 50 MW; or

(iv) stopped at an output level not identified in the verbal plan referenced in subsection 6(1)(b)(iii) above, but which is below minimum stable generation for more than 30 minutes for an operational reason and the pool participant has submitted a restatement of the available capability accordingly;

(c) the generating source asset is responding to abnormal frequency through automatic governor or governor system action;

(d) the load sink asset is responding to abnormal frequency;

(e) an operational deviation has occurred and the pool participant has complied with subsection 5; and

(f) energy is being delivered to the interconnected electric system from a generating source asset or load sink asset while it is being tested or commissioned or both, in accordance with applicable provisions of the ISO rules.

Concurrent Energy and Operating Reserve Requirements

7(1) The ISO must, when assessing a pool participant’s compliance with section 205.2 of the ISO rules, Issuing Dispatches and Directives for Operating Reserve in a situation where there are concurrent energy and spinning reserve requirements or energy and supplemental reserve requirements, consider the time of the energy dispatch to be:

(a) 15 minutes after the directive for spinning reserve or supplemental reserve in the case of subsection 4(3); and

(b) the time the pool asset is providing the amount of real power described in of section 205.5 of the ISO rules, Spinning Reserve Technical Requirements and Performance Standards, or section 205.6 of the ISO rules, Supplemental Reserve Technical Requirements and Performance Standards, in the case of subsection 4(4);

(c) the later of 15 minutes after the directive for spinning reserve or supplemental reserve or the time of the dispatch in the case of subsection 4(5); and

(d) the time the pool asset is providing the amount of real power described in of section 205.5 of the ISO rules, Spinning Reserve Technical Requirements and Performance Standards, or section 205.6 of the ISO rules, Supplemental Reserve Technical Requirements and Performance Standards, in the case of subsection 4(6).

(2) The ISO must, when assessing a pool participant’s compliance with section 205.2 of the ISO rules, Issuing Dispatches and Directives for Operating Reserve in a situation where there are concurrent energy and spinning reserve requirements or energy and supplemental reserve requirements, consider the MW quantity to be the energy dispatch quantity plus the spinning reserve or supplemental reserve quantity while the directive remains in effect.
## Revision History

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>xxxx-xx-xx</td>
<td>Revised to accommodate load assets, replaced “generating asset steady state” with “steady state”, amended subsection 5(1) with 50 MW threshold, and administrative revisions.</td>
</tr>
<tr>
<td>2014-12-23</td>
<td>Added subsection 7 to address requirements in section 205.2 of the ISO rules related to concurrent energy and operating reserve</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Initial release</td>
</tr>
</tbody>
</table>
Applicability

Section 203.5 applies to:

(a) a pool participant that submits offers in the energy market for a source asset;
(b) the legal owner of a generating unit or aggregated generating facility; and
(c) the ISO.

Requirements

Expected Supply Cushion for Mitigation

2(1) The ISO must:

(a) publish the method for calculating the expected supply cushion on the AESO website; and

(b) provide 120 days’ notice to pool participant before changing to the method for calculating the expected supply cushion published in accordance with subsection 2(1)(a).

\[
\text{expected supply cushion}_t = \text{expected supply in merit order}_t - \text{expected demand met by merit order}_t
\]

where:

(a) \(\text{expected supply in merit order}_t\) is the sum of the expected available MW in the merit order for the forecast settlement interval \(t\); and

(b) \(\text{expected demand met by merit order}_t\) is the sum of the available MW of each operating block of each source asset in the merit order that is expected to be dispatched to meet the best available forecast of demand for the forecast settlement interval \(t\).

(2) The ISO must, for each settlement interval:

(a) calculate the expected supply cushion using the method published in accordance with subsection 2(1)(a);

(b) publish the expected supply cushion on the AESO website no later than 2 hours prior to the settlement interval;

(c) update the expected supply cushion as soon as reasonably practicable upon a change to 1 or more of the inputs to the calculation of the expected supply cushion;

(d) select the value of the expected supply cushion observed during the two as close to as reasonably practicable to the settlement interval but no earlier than 2 hours immediately prior to the settlement interval; and

(e) publish the value of the expected supply cushion which is selected for each settlement interval -under subsection 2(2)(d) as soon as reasonably practicable after such selection is made.

Asset-Specific Cost Information –for a Thermal Generating Unit or Aggregated Generating Facility
3(1) A pool participant must submit to the ISO, in the manner the ISO specifies, expected annual average of the following cost information related to the short-run marginal costs for a thermal generating unit or aggregated generating facility:

(a) heat rate in GJ/MWh;

(b) if the source asset's thermal generating unit's or aggregated generating facility's fuel is not natural gas, fuel cost in $/GJ; and

(c) financial exposure to greenhouse gas emissions costs, exposed to a carbon price levied by a public authority in tonnes CO₂-equivalent/MWh.

(4) any further cost information the ISO specifies.

(2) A pool participant must, in relation to the cost information submitted pursuant to subsection 3(1):

(a) submit the cost information to the ISO:

   (i) for a thermal generating unit or aggregated generating facility that has energized and commissioned, on or before a date the ISO specifies; or

   (ii) for a thermal generating unit or aggregated generating facility that has not completed energization and commissioning, before the energization and commissioning of such thermal generating unit or aggregated generating facility;

(b) determine the values of such cost information assuming that the thermal generating unit or aggregated generating facility is operating under normal operating conditions at maximum capability; and

(c) submit updated cost information to the ISO as soon as reasonably practicable upon becoming aware of any material change in the cost information submitted in accordance with subsection 3(1), that is greater than 1% different from the information provided in accordance with subsection 3(1), as soon as reasonably practicable; and

(d) submit an attestation by a corporate officer of the pool participant that legal owner of the thermal generating unit or aggregated generating facility that the information provided pursuant to subsection 3(1) is complete and accurate.

(3) The ISO may, with respect to cost information submitted pursuant to subsection 3(1), exclude costs determined by the ISO to be unreasonable.

(4) The ISO must select alternate values for the cost information submitted pursuant to subsection 3(1) if such costs have been excluded pursuant to information determined by the ISO to be unreasonable, after requesting additional information in accordance with subsection 3(3).

(5) The ISO must notify the pool participant of alternative values selected in accordance with subsection 3(4).

(6) The ISO must:

(a) identify the current carbon price in $/tonne CO₂-equivalent from the appropriate public authority;

(b) identify the natural gas price in $/GJ for each daysettlement interval on a day-ahead basis, or as close to a day-ahead basis as reasonably practicable; and

(c) estimate the variable operations and maintenance costs in $/MWh for a thermal generating unit or aggregated generating facility on a class-specific basis.
Asset-Specific Reference Price – for a Generating Unit or Aggregated Generating Facility

4(1) The ISO must, using the cost information derived pursuant to in accordance with subsection 3, calculate an estimated simplified short-run marginal cost for producing power, measured in dollars per MWh, for each generating unit or aggregated generating facility for each settlement interval as a sum of the following formula:

\[
\text{simplified short run marginal cost} = (\text{heat rate} \times \text{fuel price}) + (\text{greenhouse gas exposure} \times \text{carbon price}) + \text{estimated variable operations and maintenance costs}
\]

where:

(a) simplified short run marginal cost, is the short run marginal cost measured in $/MWh for a settlement interval;

(b) heat rate multiplied by is:

(i) the fuel price, heat rate provided in accordance with subsection 3(1)(a) if applicable;

(ii) the generating unit or aggregated generating facility is thermal; or

(ii) 0 GJ/MWh if the generating unit or aggregated generating facility is not thermal;

(c) fuel price is:

(i) the natural gas price in subsection 3(6)(b), if the thermal generating unit’s or aggregated generating facility’s fuel is natural gas;

(ii) the price provided in accordance with subsection 3(1)(b), if the thermal generating unit’s or aggregated generating facility’s fuel type is not natural gas; or

(iii) $0, if the generating unit or aggregated generating facility is not thermal;

(d) greenhouse gas exposure tois the greenhouse gas emissions costs multiplied by the exposed to a carbon price from the appropriatelevied by a public authority, if applicable; provided in accordance with subsection 3(1)(c);

(e) carbon price is the carbon price identified in accordance with subsection 3(6)(a);

and

(f) estimated variable operations and maintenance costs are the estimated variable operations and maintenance cost costs determined by the ISO in accordance with subsection 3(6)(c).

(2) The ISO must, using the estimated simplified short-run marginal costs derived pursuant to calculated in accordance with subsection 4(1), set the asset-specific reference price for each generating unit or aggregated generating facility for each settlement interval as an amount equal to:

(a) the estimated simplified short run marginal cost multiplied by 3, if the expected supply cushion selected for the settlement interval under subsection 2(2)(d) is 1,000 MW or greater;

(b) the estimated simplified short run marginal cost multiplied by 6, if the expected supply cushion selected for the settlement interval under subsection 2(2)(d) is 250 MW or greater and less than 1,000 MW; and

(c) the maximum permissible price for an offer made under section 203.1 of the ISO rules, Offers and Bids for Energy, if the expected supply cushion selected for the settlement interval is less than 250 MW; and
interval under subsection 2(2)(d) is less than 250 MW.

**Asset-Specific Reference Price – Prescribed for a Designated Non-Thermal Generating Source Asset**

5(1) The ISO may prescribe designate a set of non-thermal generating source assets to which this subsection 5 is applicable, provided that each generating source asset is capable of storing its fuel.

5(2) The ISO must, if the ISO designates any generating source assets in accordance with subsection 5(1), publish the list of such designated generating source assets on the AESO website:

(a) the list of such designated generating source assets; and

(b) the designated reserves quantity for each designated generating source asset, based on the minimum quantity of offers in each ancillary services market set out in Appendix 1.

5(3) The ISO must, subject to subsection 5(4), set the asset-specific reference price for a generating source asset prescribed pursuant to subsection 5(1) for each settlement interval as an amount equal to:

(a) the 30-day rolling average pool price most recently published by the ISO at the time the ISO calculates the expected supply cushion multiplied by 3, if the expected supply cushion selected for the settlement interval under subsection 2(2)(d) is 1,000 MW or greater;

(b) the 30-day rolling average pool price most recently published by the ISO at the time the ISO calculates the expected supply cushion multiplied by 6, if the expected supply cushion selected for the settlement interval under subsection 2(2)(d) is 250 MW or greater and less than 1,000 MW; and

(c) the maximum permissible price for an offer made under section 203.1 of the ISO rules, Offers and Bids for Energy, if the expected supply cushion selected for the settlement interval under subsection 2(2)(d) is less than 250 MW.

5(4) Notwithstanding subsection 5(3), if a pool participant, for any generating source asset prescribed pursuant to subsection 5(1) for a settlement interval, has satisfied the asset-specific requirements for participation in the ancillary services market referred to in subsection 5(5), then the ISO must set the asset-specific reference price for such generating source asset for the settlement interval as an amount equal to the maximum permissible price for an offer made under Section 203.1 of the ISO rules, Offers and Bids for Energy, if a pool participant has made the minimum quantity of offers in each ancillary services market published in accordance with subsection 5(2)(b).

5(5) The ISO must:

(a) publish the asset-specific requirements for participation in the ancillary services market on the AESO website; and

(b) provide 120 days’ notice to pool participants before changing to the asset-specific requirements published in accordance with subsection 5(5)(a).

**Asset-Specific Reference Price – for an Import Source Asset**

6(4) The ISO must set the asset-specific reference price for each import source asset for each settlement interval as an amount equal to:

(a) \( \text{MidC}(\text{on peak}) + \min\{100, 3 \times \text{MidC}(\text{on peak})\}, 100, 3 \times \text{MidC}(\text{on peak}) \}, \) if the expected
supply cushion selected for the settlement interval under subsection 2(2)(d) is 1,000 MW or greater;

(b) \( \text{MidC(on peak)} + \min\{100, 6 \times \text{MidC(on peak)}\}\{100, 6 \times \text{MidC(on peak)}\} \), if the expected supply cushion selected for the settlement interval under subsection 2(2)(d) is 250 MW or greater and less than 1,000 MW;

where:

(i) \( \text{MidC(on peak)} \) is the day-ahead, on-peak price in the Mid-Columbia market for delivery on the same day as the energy market in Alberta;

or

(c) the maximum permissible price for an offer made under section 203.1 of the ISO rules, Offers and Bids for Energy, if the expected supply cushion selected for the settlement interval under subsection 2(1)(d) is less than 250 MW.

Limitations and Exemptions for Asset-Specific Reference Price—Limitations and Exemptions

7(1) Notwithstanding subsections 4, 5 and 6, the ISO must not set the asset-specific reference price for any source asset for any settlement interval as an amount:

(a) less than $25/MWh; or

(b) greater than the maximum permissible price for an offer made under section 203.1 of the ISO rules, Offers and Bids for Energy.

(2) A pool participant may request that the ISO provide a variance from any asset-specific reference price determined pursuant to subsections 4, 5, or 6.

(3) The ISO may, upon receiving a request pursuant to subsection 7(2), assign for use on a prospective basis a different asset-specific reference price than the asset-specific reference price determined pursuant to subsections 4, 5, 6 or 67, as applicable, if the ISO is satisfied that the pool participant would not be able to reasonably recover the short run marginal costs and cycling costs of the source asset within the scope of the asset-specific reference price determined pursuant to subsections 4, 5, 6 or 67.

Market Power Screen

8(1) The ISO must identify those persons, using the methodology for the calculation of market share offer control described in section 5 of the Fair, Efficient, and Open Competition Regulation, identify those persons that have offer control over one or more source assets for the purposes of identifying a person as having market power.

(2) A person identified under subsection 8(1) may submit to the ISO, in the manner the ISO specifies, supply obligations in MW equal to or less than the person's actual supply obligations for each settlement interval, at least 2 hours prior to the start of the settlement interval, for the purposes of the expected residual supply index.

(3) A person who submits supply obligations must, if the person's actual supply obligations for a settlement interval change prior to 2 hours before the start of the settlement interval such that the supply obligations submitted in accordance with subsection 8(2) exceed the actual supply obligations, re-submit a value that is equal to or less than the person's actual supply obligations in accordance with subsection 8(2).

(4) The ISO must, for each person identified under subsection 8(1) and in the offer control information for an operating block in respect of a settlement interval, calculate a value called the...
expected residual supply index for each settlement interval for the person identified under subsection 8(1) as follows:

\[
\text{expected residual supply index}_{it} = \text{expected supply in merit order}_t - (\text{expected supply in merit order}_t - \text{supply obligations}_t)\text{expected demand met by merit order}_t
\]

where:

(i) expected residual supply index \( s \) is the expected residual supply from all source assets \( i \) for settlement interval \( t \);

(ii) expected supply in merit order \( s \) is the sum of the expected available MW of each operating block of each source asset in the merit order for the forecast settlement interval \( t \);

(iii) expected supply in merit order \( s \) is the sum of the part of the expected available MW of each operating block of each source asset under asset in the offer control of a merit order that is controlled by person identified under as defined by subsection 8(1), net of the for the forecast settlement interval \( t \);

(iv) supply obligations of the person identified under \( s \) are the supply obligations for person \( i \) for settlement interval \( t \) submitted in accordance with subsection 8(1), for the settlement interval \( t \);

(v) expected demand from all sink assets met by merit order \( s \) is the sum of the available MW of each operating block of each source asset in the merit order that is expected to be dispatched to meet the best available forecast of demand for the forecast settlement interval \( t \).

(54) The ISO must select the expected residual supply index referenced in subsection 8(1) during the as close to as reasonably practicable to the settlement interval but no earlier than 2 hours immediately prior to the settlement interval.

(65) The ISO must identify a person with an expected residual supply index of less than 1 for a given settlement interval as having market power in that interval.

(76) The ISO must not reconsider the conclusion drawn under subsection 8(45) if market conditions change at any time after the expected residual supply index is selected for the settlement interval under subsection 8(34).

Mitigation of Market Power

9(1) The ISO must, for each settlement interval, identify each operating block associated with a source asset under the offer control of a person identified under subsection 8(45) that has an offer price that is greater than the asset-specific reference price of the related source asset which was determined pursuant to subsections 4, 5, 6 or 67, as applicable.

(2) Subject to subsection 9(3), the ISO must change the offer price of an operating block identified under subsection 9(1) to the asset-specific reference price of the associated source asset as determined under subsection 4, 5, 6 or 67, as applicable, if the operating block is:

(a) controlled by a single person that has been identified as having market power under subsection 8(4-5).
(b) controlled by multiple persons which have all been identified as having market power under subsection 8(45); or

(c) declared to be inflexible in accordance with Section 203.1 of the ISO rules, Offers and Bids for Energy, and is at least partially controlled by a person that has been identified as having market power under subsection 8(45).

(3) The ISO must, if an operating block identified under subsection 9(1) is declared to be flexible under Section 203.1 of the ISO rules, Offers and Bids for Energy, and is partially, but not fully, controlled by one or more persons identified as having market power under subsection 8(45), split the existing operating block into two operating blocks as follows:

(a) create a new operating block that contains the quantity of the existing operating block that is controlled by the person identified as having market power under subsection 8(45) and select an offer price equal to the asset-specific reference price of the associated source asset as determined under subsection 4, 5, 6 or 7, as applicable; and

(b) reduce the quantity of the existing operating block by the quantity of the newly created operating block, with no associated change made to the offer price of the operating block.

[Note to draft: The AESO is considering an exemption from the energy market mitigation scheme for portfolio sizes that are less than 250 MW in response to industry feedback.]

Timely Information from Legal Owner

10 A legal owner of a generating unit or aggregated generating facility must, if such legal owner is not the pool participant for that generating unit or aggregated generating facility:

(a) provide such timely and complete information to the pool participant for such source asset to enable the pool participant to comply with its obligations under subsection 3; and

(b) provide an attestation to the pool participant from a corporate officer of the legal owner of such generating unit or aggregated generating facility to enable the pool participant to comply with its obligations under subsection 3(2)(d).

Revision History

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<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>yyyy-mm-dd</td>
<td>Initial release.</td>
</tr>
</tbody>
</table>

Appendix 1
<table>
<thead>
<tr>
<th>Predetermined ancillary services product</th>
<th>Minimum quantity of offers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Regulating Reserves</td>
<td>The lesser of the asset's maximum qualified capacity to provide regulating reserve and its <strong>maximum capability</strong> to produce regulating reserves in the <strong>settlement interval</strong> at the time of the <strong>ancillary services</strong> auction.</td>
</tr>
<tr>
<td>Active Spinning Reserve</td>
<td>The lesser of the asset's maximum qualified capacity to provide spinning reserve and its <strong>maximum capability</strong> to produce spinning reserves in the <strong>settlement interval</strong> at the time of the <strong>ancillary services</strong> auction <strong>less</strong> the volume of cleared active regulating reserve to be provided by the asset in the same <strong>settlement interval</strong>.</td>
</tr>
<tr>
<td>Active Supplemental Reserve</td>
<td>The lesser of the asset's maximum qualified capacity to provide supplemental reserve and its <strong>maximum capability</strong> to produce supplemental reserves in the <strong>settlement interval</strong> at the time of the <strong>ancillary services</strong> auction <strong>less</strong> the volume of cleared active regulating reserve to be provided by the asset in the same <strong>settlement interval</strong> <strong>less</strong> the volume of cleared active spinning reserve to be provided by the asset in the same <strong>settlement interval</strong>.</td>
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</table>
ISO Rules
Part 200 Markets
Division 203 Energy Markets
Section 203.6 Market Requirements for Interchange Transactions

External Consultation Consultation Draft
August 31, October 22, 2018

Applicability
1 Section 203.6 applies to:
   (a) a pool participant seeking to exchange that submits an offer or transaction bid for an import or export interchange transaction in the energy market or ancillary services market; and
   (b) the ISO.

Requirements
2(1) A pool participant must submit an offer or bid for a settlement interval in the energy market or ancillary services market in order to initiate an interchange transaction.

(2) A pool participant that submits offers that are priced greater than or equal to $0.01, or bids that are priced less than or equal to $999.98 in the energy market in accordance with Section 203.1 of the ISO rules, Offers and Bids for Energy, or an offer in the ancillary services market, must initiate an interchange transaction only pursuant to a dispatch that the ISO issues.

(3) A pool participant that submits a $0.00 import offer or $999.99 export bid for a settlement interval in the energy market must initiate an interchange transaction for the start of the settlement interval in accordance with this section 203.6.

Procurement of Transmission Service by a Pool Participant
3(1) A pool participant that initiates an interchange transaction must use all reasonable efforts to procure transmission service from applicable transmission service providers in an amount in MW at least equal to the dispatch volume in accordance with subsection 2(2) or in accordance with its submission volume in subsection 2(3), order to meet the volume of a dispatch for an offer or bid, which reasonable efforts must include:

   (a) determining whether there is transmission service posted by the applicable transmission service providers and available for that interchange transaction; and

   (b) submitting a request to the applicable transmission service providers to procure the transmission service, if it has been posted and is available.

Submission of E-tags by Pool Participants
4(1) A pool participant with any import or export interchange transactions who has acquired transmission service must submit or adjust 1 or more e-tags to the ISO for the interchange transactions.

(2) A pool participant subject to an energy market dispatch in accordance with subsection 2(2) must submit or adjust an e-tag as soon as reasonably practicable with a start time that is:

   (a) equal to or later than the time the e-tag is submitted or adjusted, but no earlier than the effective time of the dispatch; and
(b) as soon as reasonably practicable, but no later than 40 minutes after the instruction time of the dispatch.

(3) A pool participant that submits an offer or bid in accordance with subsection 2(3) must submit or adjust e-tags no later than the start of the settlement interval and with a start time that is equal to the start of the settlement interval.

(4) A pool participant must, when submitting or adjusting an e-tag, identify within the e-tag the corresponding pool ID and any other information the ISO specifies.

(5) A pool participant must submit or adjust 1 or more e-tags for an interchange transaction such that the MW indicated in the e-tags aligns with:

(a) the dispatch volume indicated in subsection 2(2) for the pool asset, or as otherwise set out in the ISO rules; or

(b) the submission volume indicated in subsection 2(3) as stated at 2 hours prior to the start of the settlement interval for the pool asset, unless a restatement has been made in accordance with the provisions of this section 203.6, or as otherwise set out in the ISO rules.

[Note to draft: The content in subsection 4(5) is currently under further consideration by the AESO]

Restatements

5(1)3 If, after complying with subsection 32, the pool participant is unable to procure all or a portion of the requested transmission service, or the transmission service is curtailed by any transmission service provider other than the ISO, then the pool participant must submit, as applicable:

(a) (a) an energy restatement in accordance with Section 203.3 of the ISO rules, Energy Restatements; or

(b) (b) an ancillary services restatement in accordance with Section 205.3 of the ISO rules, Restatements for Operating Reserve.

Submission of E-tags by Pool Participants

4(1) A pool participant that submits an offer or bid for a settlement interval may submit 1 or more e-tags for the relevant settlement interval for an offer priced at $0.00 or a bid priced at $999.99.

(2) A pool participant that submits an offer or bid for a settlement interval must comply with the following:

(a) submit an e-tag only pursuant to a dispatch that the ISO issues for an offer priced between $0.01 and $999.99 and a bid priced between $0.00 and $999.98;

(b) submit or adjust an e-tag as soon as reasonably practicable upon receipt of or continuation of a dispatch;

(c) ensure that the e-tag is aligned with the dispatch volume for energy or ancillary services; and

(d) take all actions required to ensure that the start of the schedule in the e-tag begins
as soon as reasonably practicable, but no earlier than the effective time of the 
dispatch and no later than 40 minutes after the instruction time of the dispatch.

**Validation of E-Tags by the ISO**

**65(1)** The ISO must validate an **e-tag** in order to maintain **reliability** and market operations under the existing **ISO rules**.

(2) The ISO may deny an **e-tag** if:

(a) the **e-tag** is incomplete or incorrect;

(b) the **interchange transaction** is not being transacted by a **pool participant**;

(c) the **e-tag** does not comply with subsection 4; or

(d) required for the reliable operation of the **interconnected electric system**.

**Revision History**

<table>
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<tr>
<th>Date</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>xxxxx-xx-xx</td>
<td>Moved content to section 303.2 and section 303.3. Revisions to restatement requirements, validation of e-tag process, and to accommodate dispatched imports and exports. Added requirement to identify pool ID in e-tag.</td>
</tr>
<tr>
<td>2013-08-13</td>
<td>Initial release</td>
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</table>
Applicability

1 Section 204.2 applies to:
   (a) the ISO
when procuring dispatch down service.

Requirements

Eligibility

2 The ISO must not issue a dispatch for dispatch down service to a source asset if:
   (a) transmission must-run is already in use in the area in which the source asset is located unless such transmission must-run is in use solely for voltage and reactive support;
   (b) the dispatch would cause transmission must-run to be required in the area in which the source asset is located; or
   (c) the dispatch would be in an area where 1 or more source assets have been constrained down, meaning they have received directives to reduce production to a lower MW output than the in merit MW output level.

Conditions for Dispatch Down Service

3(1) The ISO must issue a dispatch instructing a source asset to reduce energy delivery for any operating block that is in merit if that source asset is the subject of an offer for dispatch down service which is eligible to receive a dispatch under subsection 2 and 1 or both of the following conditions exist:
   (a) with respect to a dispatch for the provision of dispatch down service that is issued in response to transmission must-run conditions:
      (i) the system marginal price is less than or equal to the transmission must-run reference price;
      (ii) a source asset has received a dispatch or directive for transmission must-run; and
      (iii) the calculation in subsection 5(1) results in a positive number;
   (b) with respect to a dispatch for the provision of dispatch down service that is issued in response to a directive for energy from a long lead time asset:
      (i) a pool participant has received a directive for energy from a long lead time asset;
      (ii) a long lead time asset is delivering its energy in accordance with such directive; and
      (iii) dispatches have not been issued for all of the operating blocks that are in merit in the energy market for the current settlement interval.
Equally-Priced with the Transmission Must-Run Reference Price

4 The ISO must, if an operating block in an offer or bid for MW in the energy market is priced equally with the transmission must-run reference price, consider such energy operating block to be in merit before issuing dispatches for dispatch down service.

MW in Response to a Transmission Must-Run Condition

5(1) The ISO must calculate the MW to include in a dispatch for the provision of dispatch down service that is issued in response to a transmission must-run condition as follows:

- MW of out of merit energy for transmission must-run;
- plus
- MW of out of merit energy issued a directive for energy from a long lead time asset;
- minus
- MW of energy included in a directive instructing the source asset to reduce energy production.

(2) Notwithstanding subsection 5(1), the ISO must not deduct the quantity of energy included in a directive instructing a source asset to reduce energy production if the system is in a state of supply surplus.

MW in Response to a Directive for Energy from a Long Lead Time Asset

6 The ISO must calculate the MW to include in a dispatch for the provision of dispatch down service that is issued in response to a directive for energy from a long lead time asset as follows:

- MW of out of merit energy issued a directive for energy from a long lead time asset;
- minus
- MW in a constrained down directive.

Issuing Dispatches for Lesser Quantities of Dispatch Down Service

7 Notwithstanding subsections 5 and 6, the ISO may issue a dispatch for dispatch down service in a quantity less than the MW determined in such subsections during the following periods:

(a) the period of time from when the ISO has issued dispatches for operating blocks with offer prices up to the transmission must-run reference price, instructing source assets to terminate the provision of dispatch down service but prior to issuing dispatches for operating blocks that are greater than the transmission must-run reference price; and

(b) the period of time from when the ISO has issued dispatches for operating blocks with offer prices down to the transmission must-run reference price instructing source assets to provide dispatch down service.

Terminating Dispatch Down Service

8(1) The ISO must, in the case of a source asset that has received a dispatch for termination of the provision of dispatch down service in response to a transmission must-run condition, issue a dispatch instructing the source asset to deliver energy prior to issuing a dispatch for any operating block with an offer price that is greater than the transmission must-run reference price.
(2) The ISO must, in the case of a source asset that has received a dispatch for termination of the provision of dispatch down service in response to a directive for energy from a long lead time asset, issue a dispatch instructing the source asset to deliver energy following the issuance of a dispatch for the highest priced operating block that is in merit for the current settlement interval.

Revision History

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<th>Effective</th>
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<tr>
<td>xxxx-xx-xx</td>
<td>Amended to include transmission must-run before reference price.</td>
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<tr>
<td>2014-03-27</td>
<td>Amended subsection 2(a) and 3(1)(a)(iii) to correct inadvertent errors made during the Transition of Authoritative Document project.</td>
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<tr>
<td>2013-01-08</td>
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Applicability

1 Section 301.2 applies to:
   (a) AAn electricity market participant; and
   (b) the ISO.

Requirements

Directives the ISO Issues

2(1) The ISO may issue a directive to an electricity market participant, including a directive to:
    (a) increase or decrease the real power or reactive power output, or both of them, from a facility;
    (b) increase or decrease the real power consumption at a load asset;
    (c) shut down or start up a facility; and
    (d) switch transmission system elements, alter planned outage or maintenance schedules, or load shed.

(2) The ISO may issue a directive verbally, electronically or in writing.

Requirement to Comply

3(1) AAn electricity market participant must comply with a directive it receives subject to any other ISO rule or reliability standard and the exceptions in subsections 3(2) and 3(3).

(2) AAn electricity market participant that is a legal owner of a generating unit, an aggregated generating facility or a load asset, or an operator of a generating unit, an aggregated generating facility or a load asset, must comply with a directive it receives subject to the following exceptions:
   (a) it considers that a real and substantial risk of damage to its generating unit or aggregated generating facility or load asset could result if it complied with the directive;
   (b) it considers that a real and substantial risk to the safety of its employees or the public could result if it complied with the directive; or
   (c) it considers that a real and substantial risk of undue injury to the environment could result if it complied with the directive.

(3) AAn electricity market participant that is a legal owner of a transmission facility or an operator of a transmission facility must comply with a directive it receives, subject to subsection 39(4) of the Act.

(4) AAn electricity market participant that is a pool participant must, if the instructions contained in a directive it receives require an operator to take action, immediately communicate the directive to the operator.

Report Inability to Comply or Communicate
4(1) If an electricity market participant is unable to comply with a directive or is unable to communicate it to the operator, as applicable, then it must, unless otherwise stipulated in the directive, verbally notify the ISO of the inability and provide reasons.

(2) The electricity market participant must provide notice as soon as practical but, unless otherwise stipulated in the directive or is unable to communicate a directive to the operator, as applicable.

Acknowledging Directives

5 An electricity market participant must acknowledge receipt of a directive:

(a) in the case of an automated message and unless the electricity market participant has notified the ISO of an unavailability in accordance with subsection 4(1) by responding via the Automated Dispatch and Messaging System within 2 minutes; and

(b) in the case of a voice directive, by repeating the directive to the ISO.

Revision History

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<th>Effective</th>
<th>Description</th>
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<tr>
<td>XXXX-XX-XX</td>
<td>Revisions to include load assets. Revision to clarify “market participant” as “electricity market participant”</td>
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<tr>
<td></td>
<td>Addition of subsection 5</td>
</tr>
<tr>
<td>2014-07-02</td>
<td>Bolded the word “planned” in subsection 2(1)(c).</td>
</tr>
<tr>
<td>2012-07-10</td>
<td>Initial release</td>
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Applicability

1 Section 302.1 applies to:

(a) an electricity market participant; and

(b) the ISO.

Requirements

Real Time Transmission Market Constraint Mitigation

2(1) Subject to subsection 3, the ISO must comply with the following procedures in the following sequence to mitigate a transmission market constraint in the present, real time:

(a) taking into account the constraint effective factors, determine the pool assets that would be effective in mitigating the transmission market constraint and apply the appropriate procedure set out in this subsection 2(1) to those effective pool assets;

(b) ensure that any pool assets effective in mitigating the transmission market constraint are not generating MW above their maximum capability, by cancelling any related directives;

(c) curtail by directives, any downstream constraint side service under ISO tariff rate schedules Rate XOS 1 Hour and Rate XOS 1 Month and any upstream constraint side service under ISO tariff rate schedule Rate IOS, that are effective in mitigating the transmission market constraint;

(d) curtail by directives, any loads receiving service under ISO tariff rate schedules Rate DOS 7 Minutes, Rate DOS 1 Hour and Rate DOS Term at the downstream constraint side of the transmission market constraint, that are effective in mitigating the transmission market constraint;

(e) issue a dispatch to any pool asset that is under contract with the ISO to provide transmission must-run and that is effective in mitigating the transmission market constraint at the downstream constraint side;

(f) issue a directive for transmission-must run to any pool asset that is not under contract with the ISO to provide transmission must-run and that is effective in mitigating the transmission market constraint at the downstream constraint side;

(g) issue directives to curtail any pool assets that are effective in mitigating the transmission market constraint at the upstream constraint side using the following additional procedures:

(i) the ISO must curtail using the energy market merit order with the highest priced in merit offer from the pool asset effective in mitigating the transmission market constraint being curtailed first, followed by the pool asset with the next highest priced in merit offer, if necessary, during the remainder of the then current settlement interval and the next 2 settlement intervals;

(ii) if there is a need to curtail 2 or more such pool assets having equally priced offers, then the ISO must issue directives to the pool assets to curtail using a pro-rata methodology;
(iii) if the transmission market constraint persists on a continuous basis for longer than the remainder of the then current settlement interval and the next 2 settlement intervals, then the ISO must reallocate the required curtailment, using a pro-rata methodology, to all pool assets having in merit offers that are effective in mitigating the transmission market constraint; and

(h) curtail by directives any loads receiving service under ISO tariff rate schedule Rate DTS at the downstream constraint side of the transmission market constraint, if so required by the reliability criteria, using the following procedures:

(i) the ISO must allocate the load curtailment using the energy market merit order with the lowest priced effective bid being curtailed first, followed by the next lowest priced effective bid, if necessary;

(ii) if there is a need to curtail loads with equal price bids, or there are no bids remaining, then the ISO must curtail using a pro-rata methodology.

(2) The ISO must comply with the following procedures in order to restore the energy balance to the interconnected electric system:

(a) where the procedures set out in subsection 2(1)(e) or (f) are used, issue dispatches for dispatch down service in accordance with Section 204.2 of the ISO rules, Issuing Dispatches for Dispatch Down Service;

(b) except where the procedures set out in subsection 2(1)(e) and (f) are used:

(i) in circumstances where the ISO has notice of a transmission market constraint that is anticipated to be of a significant duration and magnitude, as determined by the ISO acting reasonably, issue a dispatch to any pool asset that is effective in restoring the energy balance to the interconnected electric system and that is under contract with the ISO to provide transmission must-run in accordance with Section 205.8 of the ISO rules, Transmission Must-Run and Section 301.2 of the ISO rules, ISO Directives, and issue dispatches for dispatch down service in accordance with Section 204.2 of the ISO rules, Issuing Dispatches for Dispatch Down Service;

(ii) in all other circumstances, or where necessary to supplement the volume dispatched for transmission must-run in subsection 2(2)(b)(i), issue dispatches for transmission constraint rebalancing, in accordance with the energy market merit order, and make payment to a pool participant with a source asset that has provided energy for transmission constraint rebalancing in accordance with subsection 7(1) of Section 103.4 of the ISO rules, Power Pool Financial Settlement.

(3) With regard to any of the procedures set out in subsection 2(1) that involve pool asset or load curtailment, if the pool asset or load is supplying both ancillary services and energy production, then the ISO must first curtail ancillary services before energy production.

(4) When a transmission market constraint has activated or is expected by the ISO to activate a remedial action scheme, then after the ISO has ensured that the interconnected electric system is operating in a safe and reliable mode, the ISO must recommence the procedural sequence set out in subsection 2(1) to manage the transmission market constraint.
Additional Real Time Constraint Management Procedures

3 As the circumstances may warrant, the ISO may take into account the following alternative or complementary procedures to mitigate any present, real time transmission market constraint:

(a) if the result of following the procedures set out in subsection 2(1)(g)(i) will be to curtail any pool asset below its minimum stable generation level but the ISO expects the transmission market constraint to last only a short duration, then the ISO by directive may curtail the pool asset to above or at the minimum stable generation level of that pool asset;

(b) in circumstances where abnormal operating or market conditions exist, the ISO acting reasonably may, in implementing mitigation measures to address a transmission market constraint, take procedural steps not listed in subsection 2(1) if those steps are substantially consistent with good electric industry operating practice and the duties of the ISO under the Act to direct the safe, reliable and economic operation of the interconnected electric system;

(c) the abnormal conditions referred to in subsection 3(b) include circumstances of unusual natural risks to the interconnected electric system, and issues raised by a unique real time system configuration or reliability concerns stemming from voltage or reactive power effects;

(d) in mitigating a transmission market constraint, the ISO must follow the procedural sequence set out in subsection 2(1) and any more specific and complementary ISO rules applicable for a given regional area of the interconnected electric system, unless real time operating conditions change such that following the specified sequence would put the ISO in contravention of any reliability standard requirement by failing to achieve compliance within the operating limits or required response time specified in that reliability standard;

(e) if the ISO alters the procedural sequence as set out in subsection 2(1), or takes alternate mitigating actions because of the circumstances referred to in subsection 3(b) or 3(d) above, then once the ISO is assured that the interconnected electric system is operating in a safe and reliable mode, the ISO must recommence the procedural sequence set out in subsection 2(1).

Reporting

4(1) The ISO must use reasonable efforts to publish, as near to real time as possible, information on the location of transmission market constraints and costs of resolving these constraints.

(2) The ISO must monitor and publicly report on the costs incurred as a result of mitigating transmission market constraints on an annual basis.

Revision History

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<th>Effective</th>
<th>Description</th>
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<td>xxxx-xx-xx</td>
<td>Revised to clarify “market participant” as “electricity market participant”, and “transmission constraint” as “transmission market constraint”.</td>
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<tr>
<td>2015-11-26</td>
<td>Revisions to subsections 2(1) and 2(2). Amendment to numbering references in subsection 3(a). Addition of subsection 4 &quot;Reporting&quot;.</td>
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<td>Date</td>
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<tr>
<td>2013-01-08</td>
<td>Previously defined terms have been un-defined and the words have been un-bolded. Reference to section 6.3.6.3 <em>Determining Dispatch Down Service Dispatch Quantity</em> has been replaced with section 204.2 <em>Issuing Dispatches for Dispatch Down Service</em>.</td>
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<tr>
<td>2012-03-26</td>
<td>Initial release</td>
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Applicability

1 Section 303.1 applies to:
   (a) an electricity market participant that contracts with the ISO to provide load shed service; and
   (b) the ISO.

Requirements

Providing Data

2 The electricity market participant must provide the ISO with any information related to the provision of load shed service that the ISO requires in order to properly administer the service and must do so in real time via systems the ISO designates.

Determining Amount to Arm

3(1) The ISO must use current Alberta internal load levels and the net import schedule of the combined British Columbia and Montana transfer paths to determine the amount of load shed service that the ISO must arm.

(2) When arming the required amount of service, the ISO must prioritize the arming of available load shed service so as to minimize expected cost.

(3) The ISO must set the load shed service arming level at the beginning of the scheduling hour but may modify it if the requirement changes during the scheduling hour.

Restoring Service

4 After the operation of load shed service, while maintaining the reliability of the interconnected electric system, the ISO must restore the following in the following order:
   (a) contingency reserves; then
   (b) load shed service.

Arming and Disarming Service

5(1) The ISO will issue dispatches to arm and disarm load shed service.

(2) The electricity market participant must arm and disarm services in accordance with any dispatches the ISO issues unless the electricity market participant identifies a circumstance that, in the ISO’s opinion, amounts to an event of force majeure that would prevent the electricity market participant from complying with a dispatch.

Determining the Alberta Internal Load Range

6 If the estimated Alberta internal load falls right on, or very close to, the boundary of one of the ranges the ISO identifies, the ISO will use the lower Alberta internal load range to determine the amount
of load shed service to arm during the hour that the Alberta internal load is expected to be at, or near, the boundary.

Curtailing Import during the Scheduling Hour

7 If there is insufficient load shed service due to the unavailability of this service, the ISO must adjust the import transfer level to the level corresponding to the required amount.

Restoring Service

8 The electricity market participant must not restore load shed service that has been tripped until the earlier of one (1) hour after tripping or the ISO authorizing such restoration.

No Double-Counting

9 The electricity market participant must not use the MWs it uses to provide load shed service under this section of the ISO rules to also simultaneously provide ancillary services under any other section of the ISO rules or under any contract.

Revision History

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<th>Date</th>
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<td>20xx-xx-xx</td>
<td>Revised to clarify “market participant” as “electricity market participant”</td>
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<td></td>
<td>Revised subsection 3(3)</td>
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<tr>
<td>2013-07-01</td>
<td>Amendments made to accommodate the energization of MATL</td>
</tr>
<tr>
<td>2011-04-01</td>
<td>Initial release</td>
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Applicability

1 Section 303.2 applies to:

(a) the ISO.

Capability Limits Determinations

2(1) The ISO must determine and post on the AESO website the following capability limits in MW prior to each settlement interval, and also on an as required basis when interconnected electric system operating conditions change:

(a) the Alberta interchange capability;
(b) the import and export capability of the combined British Columbia and Montana transfer paths; and
(c) the import available transfer capability and export available transfer capability for each of the British Columbia, Montana and Saskatchewan transfer paths.

(2) Once the ISO has determined the limits under subsection 2(1), it must ensure that:

(a) the amount in MW of all transmission service for all import and export interchange transactions for all transfer paths does not exceed the Alberta interchange capability limit referenced in subsection 2(1)(a);
(b) the amount in MW of all transmission service for all import and export interchange transactions for the combined British Columbia and Montana transfer paths does not exceed the combined limit referenced in subsection 2(1)(b); and
(c) the amount in MW of all transmission service for all import and export interchange transactions for an individual transfer path does not exceed the limit for that transfer path referenced in subsection 2(1)(c).

Total Transfer Capability Determinations and Available Transfer Capability Calculations

3(1) The ISO must determine the import total transfer capability and the export total transfer capability for an individual transfer path, in order to calculate the import available transfer capability and the export available transfer capability for that transfer path.

(2) The ISO must make the determinations and calculations under subsection 3(1) with reference to the applicable provisions of any related reliability standards.

Available Transfer Capability for a Transfer Path

4(1) The ISO must use the calculated import available transfer capability and the export available transfer capability limits as referenced under subsection 2(1)(c) for an individual transfer path, for scheduling interchange transactions on that transfer path.

Available Transfer Capability Allocations for Transfer Paths

5(1) At approximately 85 minutes prior to a settlement interval the ISO must determine whether the capability limits under subsection 2(2) may be exceeded, and if so then the ISO must determine the individual transfer path available transfer capability allocations in accordance
with the following procedures:

(a) the ISO must calculate the net interchange transaction amount in MW, at each potential system marginal price, taking into account:

(i) the energy interchange transaction amounts in MW, and the prices for bids and offers;

(ii) the interchange transaction amount in MW for ancillary services; and

(iii) applicable counterflows; and

(b) the ISO may exclude any wheel through transaction amounts in MW if those amounts will not result in any limits or allocations under this section 303.2 being exceeded.

(2) The ISO must comply with the following additional procedures in the following sequence to determine the allocation of each of the individual transfer path available transfer capability allocations:

(a) the net amount in MW of all interchange transactions for the individual transfer path must be compared to the limit determined for that individual transfer path as referenced in subsection 2(1)(c), and:

(i) if that net amount is equal to or greater than the limit, then the allocation must be set at that limit; and

(ii) if that net amount is less than the limit, then the allocation must be set at that net amount;

(b) for the British Columbia and Montana transfer paths, the sum in MW of their individual transfer path allocations calculated under subsection 5(2)(a) must be compared to the combined British Columbia and Montana transfer path limit referenced in subsection 2(1)(b);

(c) if the combined transfer path limit of subsection 2(1)(b) is not exceeded, then the allocations must remain as determined in accordance with subsection 5(2)(a), but if it is exceeded, then a further allocation must be done in accordance with the following sequence in order to ensure the combined transfer path limit as determined under subsection 2(1)(b) is not exceeded:

(i) first, the British Columbia, or the Montana, or both the British Columbia and the Montana transfer path allocations must be reduced as necessary by the applicable ancillary services type interchange transaction amounts in MW;

(ii) second, the British Columbia, or the Montana, or both the British Columbia and the Montana transfer path allocations must be reduced as necessary by the applicable energy interchange transaction amounts in MW, with the reduction being in reverse merit order based on bid and offer prices; and

(iii) third, if there are equally priced British Columbia and Montana energy interchange transactions, then the British Columbia and Montana allocations must be reduced on a pro rata basis using the following formula:

the MW allocation for each of the Montana and British Columbia transfer paths as determined in accordance with subsection 5(2)(a), as may be reduced under subsections 5(2)(c)(i) and 5(2)(c)(ii);
1. the sum in MW calculated under in subsection 105(2)(b) as may be reduced under subsections 5(2)(c)(i) and 5(2)(c)(ii);

multiplied by

the amount by which that sum exceeds the combined British Columbia and Montana transfer path limit referenced in subsection 2(1)(b);

(d) the allocation resulting from subsection 5(2)(c) plus the Saskatchewan transfer path allocation calculated under subsection 5(2)(a) must then be compared to the Alberta interchange capability limit referenced in subsection 2(1)(a); and

(e) if the Alberta interchange capability limit is not exceeded, then the allocations must remain as determined in accordance with subsections 5(2)(a) and 5(2)(c), but if that limit is exceeded, then a further allocation of available transfer capability must be done in accordance with the following sequence in order to ensure that the Alberta interchange capability limit as determined under subsection 2(1)(a) is not exceeded:

(i) first, any individual 1, or any combination of the British Columbia, Montana, and Saskatchewan transfer path allocations must be reduced as necessary by the applicable ancillary service type interchange transaction amount in MW;

(ii) second, any individual 1, or any combination of the British Columbia, Montana, and Saskatchewan transfer path allocations must be reduced as necessary by the applicable energy interchange transaction amounts in MW, with the reduction being in reverse merit order based on bid and offer prices; and

(iii) third, if there are equally priced British Columbia, Montana and Saskatchewan energy interchange transactions, then the British Columbia, Montana and Saskatchewan allocations must be reduced on a pro rata basis using the following formula:

| the MW allocation for each of the Montana and British Columbia transfer paths as determined in accordance with subsection 5(2)(c) and the Saskatchewan transfer path allocation under subsection 5(2)(a), as may be reduced under subsections 5(2)(e)(i), and 5(2)(e)(ii); |
| divided by |
| the sum in MW referred to in subsection 5(2)(d), as may be reduced under subsections 5(2)(e)(i) and 5(2)(e)(ii); |
| multiplied by |
| the amount by which that sum exceeds the Alberta interchange capability limit referenced in subsection 2(1)(a); |

(3) At approximately 85 minutes prior to a settlement interval, the ISO must post on the AESO website:

(a) the total in MW of all energy import offers and export bids received for each transfer path and the combinations of transfer paths referenced under subsection 2, at 2 hours prior to the start of the settlement interval in accordance with section 203.1 of the ISO rules, Offers and Bids for Energy;
(b) the limits referenced under subsection 2; and  
(c) all allocations made under this subsection 5.

(4) If, after 85 minutes prior to a settlement interval, any of the limits referenced in subsection 2 have changed, then the ISO must follow the procedures and sequence set out in Section 303.3, *Intertie Path Operations*.

**Revision History**

<table>
<thead>
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<th>Date</th>
<th>Description</th>
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Applicability

1 Section 303.3 applies to:

(a) the ISO.

Requirements

Subsection Title (no numbers)

Path Limit Management

2(1) If, after carrying out the available transfer capability allocation procedures set out in Section 303.2 of the ISO rules, Available Transfer Capability, and based on the e-tags submitted under Section 203.6 of the ISO rules, Market Requirements for Interchange Transactions, the available transfer capability limits referenced in Section 303.2 of the ISO rules, Available Transfer Capability are still exceeded in a settlement interval, then the ISO must reduce interchange transactions in accordance with the sequential procedures set out in this subsection 2.

(2) The ISO must determine the effective interchange transactions for mitigating a limit being exceeded at the Alberta interchange capability level, the combined Montana and BC transfer path capability level, or at each individual transfer path level.

(3) The ISO may determine that any wheel through transaction is not effective in mitigating an exceedance, based on its analysis under subsection 2(2).

(4) The ISO must comply with the following procedures in the following sequence to mitigate the remaining exceedance:

(a) assess all interchange transactions for transmission services against the limits and allocations referred to in Section 303.2 of the ISO rules, Available Transfer Capability, and determine the interchange transactions that will be effective in mitigating the constraint;

(b) dispatch any effective operating blocks in reverse merit order in accordance with section 203.2 of the ISO rules, Issuing Dispatches for Energy;

(c) where necessary to manage system reliability in real-time, curtail the transmission service of interchange transactions under the sequencing set out in subsection 2(4)(d), mitigating the constraint in the following order at the following levels, where effective:

(i) an individual transfer path limit level;

(ii) the combined Montana and British Columbia transfer path level; or

(iii) the Alberta interchange capability level; and

(d) curtail at the effective level:

(i) (i)—inadvertent energy payback interchange transactions, prior to the curtailment of any interchange transactions on the Saskatchewan transfer path;

(ii) (ii)—transmission services of any effective interchange transactions for ancillary services;

(iii) (iii)—where reasonably practicable, transmission services of any effective energy interchange transactions based on bid and offer prices in reverse merit order; and
(iv) (iii) transmission services of any effective energy interchange transactions on a pro rata basis in accordance with the following formula:

(A) scheduled amount of each effective interchange transaction;
(B) multiplied by the total amount necessary to mitigate the exceedance; and
(C) divided by total scheduled amount of all effective interchange transactions.

(5) The ISO must, if after following the procedures in subsection 2(4), and the available transfer capability has subsequently increased in the same settlement interval, apply the procedures in subsection 2(4)(c) and 2(4)(d) in the reverse order, where reasonably practicable.

Interchange Schedule and Dispatches by the ISO

3(1) Subject to the provisions of this section 303.3, the ISO must include in the interchange schedule the energy components of interchange transactions if the e-tags for the interchange transactions have been:

(a) received and validated by the ISO as set out in Section 203.6 of the ISO rules, Market Requirements for Interchange Transactions; and
(b) approved by all other applicable approval entities.

(2) The ISO must determine the interchange schedule for each transfer path taking into account the allocation set out in Section 303.2 of the ISO rules, Available Transfer Capability Allocation and the path limit management procedures set out in subsection 2.

(3) The ISO may initiate changes to an interchange schedule for a transfer path when required to address:

(a) a dispatch or directive for energy or ancillary services, including for an internal transmission market constraint;
(b) supply shortfall or supply surplus matter;
(c) a matter of reliability on the interconnected electric system, or a similar matter which may occur in any other balancing authority area;
(d) reserve sharing; or
(e) any changes resulting from the procedures and sequencing set out in subsection 2.

Saskatchewan Inadvertent Energy Management

4 If the ISO is required to manage an amount of inadvertent energy on the Saskatchewan transfer path, then:

(a) the inadvertent energy is not eligible to set the pool price; and
(b) inadvertent energy payback on the Saskatchewan transfer path must not exceed 25 MW.

Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>yyyy-mm-dd</td>
<td>Initial release</td>
</tr>
</tbody>
</table>
Applicability

1 Section 304.9 applies to:
   (a) the legal owner of a wind or solar aggregated generating facility connected to the interconnected electric system or an electric system within the service area of the City of Medicine Hat, including a wind or solar aggregated generating facility situated within an industrial complex that is directly connected to the interconnected electric system or to an electric system within the service area of the City of Medicine Hat and:
      (i) has a gross real power capability equal to or greater than 5 MW; or
      (ii) such wind or solar aggregated generating facility is associated with offers a pool participant submits in the energy market, or with ancillary services;
   and
   (b) the ISO.

Requirements

Functional Specification

2(1) The ISO may issue a written functional specification containing details, work requirements and specifications for the design, construction and operation of an aggregated generating facility and associated transmission facility connection facilities.

(2) The functional specification referred to in subsection 2(1) must be generally consistent with the provisions of this section 304.9, but may contain material variances approved of by the ISO based upon its discrete analysis of any one or more of the technical, economic, safety, operational and reliability requirements of the interconnected electric system related to the specific facility project.

Successor to Prior Requirements and Compliance Timeframe

3(1) The provisions of this section 304.9 succeed all previous forecasting requirements for aggregated generating facilities, whether in an ISO rule or other document, and those requirements will no longer be in force and effect as of September 1, 2018.

(2) The legal owner of an aggregated generating facility connected in accordance with any previous forecasting requirements must bring its aggregated generating facility into compliance with this section 304.9 by no later than twelve (12) months after September 1, 2018 unless otherwise agreed to in writing by the ISO, and until such time as the aggregated generating facility is brought into compliance with this section 304.9, the legal owner of the aggregated generating facility shall operate its aggregated generating facility in compliance with the previously effective forecasting requirements in accordance with which it was being operated prior to September 1, 2018.

Meteorological Data Collection Equipment and Availability Requirements

4(1) The legal owner of a wind or solar aggregated generating facility must ensure that the facility is equipped with meteorological data collection equipment and related devices that are installed and maintained in accordance with the provisions of subsections 4 and 5.

(2) The legal owner of a wind aggregated generating facility must ensure that it is equipped with two (2) sets of instruments for each meteorological parameter in accordance with the requirements in
ISO Rules  
Part 300 System Reliability and Operations  
Division 304 Routine Operations  
Section 304.9 Wind and Solar Aggregated Generating Facility Forecasting  

Table 1.  

(3) The legal owner of a solar aggregated generating facility must ensure that the facility is equipped with meteorological data collection equipment and related devices in accordance with the following:  

(a) one (1) set of instruments for each meteorological parameter in accordance with the requirements in Table 1 per 49 square kilometers of surface area within the facility;  

(b) each set of instruments, if required by subsection 4(3)(a), must be less than 8 kilometers apart; and  

(c) measurements must be taken at not less than 2 meters and not greater than 10 meters above ground.  

(4) The legal owner of a wind or solar aggregated generating facility must ensure that the meteorological data collection equipment and related devices described in subsections 4(2) and 4(3) take measurements of instantaneous values at interval of 15 seconds or less.  

(5) The legal owner of a wind or solar aggregated generating facility must measure, collect and submit to the ISO the meteorological data in Table 1.  

(6) The legal owner of a wind or solar aggregated generating facility must determine, at 30 minute intervals, and submit to the ISO, the gross real power capability with a precision to the nearest 2.0 MW.  

(7) The legal owner of a wind or solar aggregated generating facility must determine and submit to the ISO, the following data:  

(a) any real power limits in megawatts (MW), with a precision for instantaneous measurements to the nearest 0.1 MW; and  

(b) actual net to grid real power production in megawatts (MW), with a precision for instantaneous measurements to the nearest 0.1 MW.  

Data Transfer Technical Specification  

5(1) The legal owner of a wind or solar aggregated generating facility must submit to the ISO the data specified in subsection 4(5) using one minute average data.  

(2) The legal owner of a wind or solar aggregated generating facility must submit to the ISO the data specified in subsection 4 in the method and format the ISO specifies.  

(3) The legal owner of a wind or solar aggregated generating facility must ensure that its meteorological data collection equipment and related devices including its data transfer equipment is designed and maintained with an availability of 98.0% in accordance with Table 1 and a mean time to repair of forty-eight (48) hours or less.  

(4) The legal owner of a wind or solar aggregated generating facilities must keep seven (7) days of back up data for any data that has been submitted in accordance with this subsection 5 and must provide it to the ISO upon request within thirty (30) days.  

Notification of Unavailability, Suspected Failure or Data Error  

6(1) The legal owner of a wind or solar aggregated generating facility must, if any component in the meteorological data collection equipment and related devices including data transfer equipment becomes unavailable due to an unplanned event, is suspected to have failed, or to be providing
erroneous data, notify the **ISO** as soon as practicable, in writing, after identifying the unavailability, suspected failure or data error.

(2) The **legal owner** of a wind or solar **aggregated generating facility** must provide the **ISO** as soon as practicable, in writing:

(a) a description of the cause of any unavailability, suspected failure or data error reported pursuant to subsection 6(1);

(b) in the event of an equipment failure, a plan acceptable to the **ISO** to repair the failed equipment, including testing; and

(c) in the event of an equipment failure, the expected date when the equipment will be repaired and the required measurements will be restored.

(3) The **legal owner** of a wind or solar **aggregated generating facility** must, if an equipment failure described in subsection 6(2) is not repaired and required measurements are not restored by the expected date, notify the **ISO** as soon as practicable, in writing, of the revised date and the reason the component in the equipment was not repaired by the expected date.

(4) The **legal owner** of a wind or solar **aggregated generating facility** must notify the **ISO** as soon as practicable in writing after an equipment failure described in subsection 6(2) is repaired and the required measurements are restored.

**Exceptions**

7 Notwithstanding subsections 4 and 5, the **legal owner** of a wind or solar **aggregated generating facility** is not required to comply with the requirements of this section 304.9 relating to meteorological data collection equipment and related devices including data transfer equipment when:

(a) such equipment is being repaired or replaced in accordance with a plan acceptable to the **ISO** under subsection 6; and

(b) the **legal owner** is using reasonable efforts to complete such repair or replacement in accordance with that plan.

**Pre-Commissioning Facility Data and Records Requirements**

8(1) The **legal owner** of a wind **aggregated generating facility** must provide to the **ISO** the pre-commissioning data and records referred to in this subsection 8 in a method and format the **ISO** specifies.

(2) The **legal owner** of a solar **aggregated generating facility** must provide to the **ISO**, in a method and format the **ISO** specifies, either:

(a) the pre-commissioning data and records referred to in this subsection 8; or

(b) an industry standard model that is approved by the **ISO**.

(3) Subject to the provisions of this subsection 8, the **legal owner** of a wind or solar **aggregated generating facility** must retain and provide within sixty (60) **days** of the **ISO**’s written request the following averaged meteorological data and records at ten (10) minute intervals or less, covering the two (2) calendar years prior to the **commissioning** of the wind or solar **aggregated generating facility**:

(a) details on the height of the measurements;

(b) wind speed;
(c) wind direction;
(d) temperature;
(e) barometric pressure; and
(f) for solar aggregated generating facilities only, global horizontal irradiance.

(4) The legal owner of a wind aggregated generating facility must, in response to a request by the ISO under subsection 8(3), provide the following facility data:

(a) meteorological tower data collection height in meters (m), with a precision for instantaneous measurements to the nearest 1 m;
(b) turbine model name;
(c) turbine model capacity in megawatts (MW), with a precision to the nearest 0.1 MW;
(d) turbine wind speed cut-in in meters per second (m/s), with a precision to the nearest 0.1 m/s;
(e) turbine wind speed cut-out in meters per second (m/s), with a precision to the nearest 0.1 m/s;
(f) turbine temperature cut-out lower in degrees Celsius (°C), with a precision for instantaneous measurements to the nearest 1 °C and an indicator is required to confirm that the numbers are ambient temperature within the rotor or air temperature;
(g) turbine temperature cut-out upper in degrees Celsius (°C), with a precision for instantaneous measurements to the nearest 1 °C and an indicator is required to confirm that the numbers are ambient temperature within the rotor or air temperature;
(h) site latitude and longitude in degrees; and
(i) turbine power curves.

(5) The legal owner of a solar aggregated generating facility must in response to a request by the ISO under subsection 8(3), provide the following solar array data and records, including:

(a) site latitude and longitude in degrees;
(b) direct current (DC) real power rating;
(c) alternating current (AC) real power rating;
(d) inverter manufacturer and model;
(e) mounting height from ground in meters (m);
(f) tilt angle or range of tilt angles to horizontal plane in degrees;
(g) azimuth angle in degrees;
(h) alternating current (AC) real power capacity per solar array in megawatts (MW);
(i) mounting type, tracking (fixed, single or dual axis); and
(j) module type (crystalline, thin-film etc.).
### Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXX-XX-XX</td>
<td>Revised Applicability section to include facilities associated with offers in the energy or ancillary services markets.</td>
</tr>
<tr>
<td>2018-09-01</td>
<td>Initial release.</td>
</tr>
</tbody>
</table>

### Table 1

Wind and Solar Aggregated Generating Facility Meteorological Data Requirements

<table>
<thead>
<tr>
<th>Wind Aggregated Generating Facility Meteorological Data Requirements</th>
<th>Units</th>
<th>Precision</th>
<th>Range</th>
<th>Accuracy</th>
<th>Height of Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Speed</td>
<td>Meters/Second (m/s)</td>
<td>0.1 m/s</td>
<td>0 to 50</td>
<td>±1 m/s</td>
<td>At Hub Height At 35 Meters</td>
</tr>
<tr>
<td>Wind Direction</td>
<td>Degrees from True North</td>
<td>1 degree</td>
<td>0 to 360</td>
<td>±5°</td>
<td>At Hub Height At 35 Meters</td>
</tr>
<tr>
<td>Barometric Pressure</td>
<td>HectoPascals (HPa)</td>
<td>1 hPa</td>
<td>800 to 1000</td>
<td>±1.0 hPa at -20 to 50°C; and ±1.5 hPa at below -20°C</td>
<td>At Convenient location At Convenient location</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>Degree Celsius (°C)</td>
<td>0.1° C</td>
<td>-50 to +50</td>
<td>±0.2°C</td>
<td>At Hub Height At 35 Meters</td>
</tr>
<tr>
<td>Dewpoint</td>
<td>Degrees Celsius (°C)</td>
<td>0.1° C</td>
<td>-50 to +50</td>
<td>±0.2°C</td>
<td>At Convenient location At Convenient location</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>Percentage (%)</td>
<td>1.00%</td>
<td>0 to 100%</td>
<td>±2%</td>
<td>At Convenient location At Convenient location</td>
</tr>
<tr>
<td>Ice-up Parameter Measured with an Icing Sensor</td>
<td>Scale 0.0 to 1.0</td>
<td>0.1</td>
<td>0 to 1</td>
<td>n/a</td>
<td>At Convenient location At Convenient location</td>
</tr>
<tr>
<td>Precipitation</td>
<td>Millimeters/minute (mm/min)</td>
<td>0.1</td>
<td>0 to 11</td>
<td>2% up to 0.417 mm/mon 3% over 0.417 mm/min</td>
<td>At Convenient location At Convenient location</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solar Aggregated Generating Facility Meteorological Data Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Type</td>
</tr>
<tr>
<td>Wind Speed</td>
</tr>
<tr>
<td>Parameter</td>
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<td>------------------------------</td>
</tr>
<tr>
<td>Wind Direction</td>
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<tr>
<td>Barometric Pressure</td>
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<tr>
<td>Ambient Temperature</td>
</tr>
<tr>
<td>Dewpoint</td>
</tr>
<tr>
<td>Relative Humidity</td>
</tr>
<tr>
<td>Precipitation</td>
</tr>
<tr>
<td>Back panel Temperature</td>
</tr>
<tr>
<td>Global Horizontal Irradiance</td>
</tr>
<tr>
<td>Diffused Horizontal Irradiance</td>
</tr>
<tr>
<td>Direct Normal Irradiance</td>
</tr>
</tbody>
</table>

1 The requirement to provide this parameter will be determined by the AESO based on solar technology used in the project.
Applicability

Section 306.3 applies to:

(a) an electricity market participant with a load sink asset; and
(b) the ISO.

Requirements

Load Planned Outage Reporting

2(1) Subject to subsection 2(2), an electricity market participant who has a planned decrease in its capability to consume load at a facility of forty (40) MW or greater, must comply with the planned outage reporting requirements of this section 306.3.

2(2) The electricity market participant referred to in subsection 2(1) must submit to the ISO the following planned outage information, in a form the ISO approves and publishes on the AESO website:

(a) the commencement date and time of the planned outage, but not where such date and time is historical;
(b) the end date and time of the planned outage; and
(c) the actual decrease, in MW, in the load capability.

2(3) The electricity market participant must submit the information to the ISO as soon as reasonably practicable after the electricity market participant is aware of the planned outage information.

2(4) Subsequent to the ISO receiving from electricity market participants the submissions referred to in subsection 2(3), on each business day the ISO must aggregate all planned outage records for loads as submitted, and determine the aggregate daily planned outages in MW which the ISO will calculate as:

the sum of MWh of all submitted planned outages by time period;

divided by

the number of hours in the time period.

2(5) Once the ISO has determined the aggregate daily planned outages under subsection 2(4), the ISO also must prepare a daily planned outage report and publish it each business day on the AESO website, which report must include:

(a) the time and date the report was prepared; and
(b) the daily average planned outage amount in MW, rounded to the nearest MW, for each business day of the then current month and the next three successive months.
Subject to subsection 2(78), the ISO must keep confidential all planned outage information for loads submitted to it under this section 306.3, except as otherwise required to be made public under the provisions of section 103.1 of the ISO rules, Confidentiality.

The ISO must publish on the AESO website the aggregate daily planned outage report in a manner that, in accordance with section 103.1 of the ISO rules, Confidentiality, seeks to preserve the confidential nature of any planned outage information as submitted by any one electricity market participant, and precludes the identification of any one electricity market participant, or other directly affected pool participant.

Revision History

<table>
<thead>
<tr>
<th>Effective</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>XXXX-XX-XX</td>
<td>Revision to clarify &quot;market participant&quot; as &quot;electricity market participant&quot;.</td>
</tr>
<tr>
<td></td>
<td>Removal of subsection 2(2)</td>
</tr>
<tr>
<td>2014-07-02</td>
<td>Renumbered from section 208.1 of the ISO rules to section 306.3 of the ISO rules; unbolded all references to &quot;load&quot; and &quot;loads&quot;; and replaced references to &quot;outage&quot; with &quot;planned outage&quot;.</td>
</tr>
<tr>
<td>2013-01-08</td>
<td>Removed reference to section 3.5 Offers and Bids, and replaced with section 203.3 Restatements for Energy.</td>
</tr>
<tr>
<td>2011-09-30</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
Applicability

1  Section 306.4 applies to:
   (a)  the legal owner of a transmission facility;
   (b)  the legal owner of generating unit connected to a transmission facility;
   (c)  the legal owner of an aggregated generating facility;
   (d)  the legal owner of an electric distribution facility;
   (e)  the legal owner of an intertie;
   (f)  the legal owner of load directly connected to the transmission system; and
   (g)  the ISO;
when managing the reporting and coordination of planned outages, including live line work and recloser block situations, for transmission facilities.

Requirements

General

2  The legal owner of a transmission facility must, prior to the occurrence of a planned outage, submit to the ISO a planned outage request for approval by submitting the information specified in this section 306.4 and according to the timelines set out below.

Planned Outage Schedule and Requests

3(1)  The legal owner of a transmission facility must submit to the ISO, by the first day of every month, a schedule of significant planned outages that are planned to occur within the next 48 months.

(2)  The legal owner of a transmission facility must submit to the ISO a significant planned outage request as soon as possible, and not less than 30 days before the start of the operating week in which the significant planned outage is intended to occur.

(3)  The legal owner of a transmission facility must, in its schedule of significant planned outages and in its significant planned outage requests, include a planned outage that meets any 1 or more of the following criteria:
   (a)  it affects a transmission facility operating at 240 kV or greater;
   (b)  it affects an intertie;
   (c)  it affects a system element connecting facilities owned by 2 or more different legal owners of transmission facilities;
   (d)  it affects a system element that connects a generating unit or an aggregated generating facility to the interconnected electric system;
   (e)  it requires the ISO to issue a dispatch or directive for generation in order to facilitate the planned outage;
   (f)  it affects a cutplane limit;
(g) it limits or reduces the operability of a synchronous condenser, static VAr compensator, static compensator or other similar dynamic device; or

(h) it affects high voltage direct current facilities.

(4) The legal owner of a transmission facility must submit to the ISO a non-significant planned outage request no later than 12:00 noon on Tuesday in the week before the operating week in which the non-significant planned outage is intended to occur.

(5) The legal owner of a transmission facility must, on the Tuesday before each operating week and prior to 12:00 noon, resubmit to the ISO all planned outage requests that the legal owner intends to conduct in the following operating week.

Changes to Requests and Cancellations

4(1) The legal owner of a transmission facility must submit to the ISO any changes to a previously submitted planned outage request, including cancellations, as soon as possible, and no later than 10:00 am on the business day before the first day impacted by the intended change to the previously submitted planned outage request.

(2) The legal owner of a transmission facility must, if it is unable to comply with subsection 4(1), submit to the ISO a cancellation of a planned outage request as soon as possible after the deadline set out in subsection 4(1), and provide a reason as to why it was unable to submit the cancellation by that deadline.

Outage Pre-Work and Information

5(1) The legal owner of a transmission facility must, prior to submitting to the ISO any planned outage request or a change to a previously submitted planned outage request:

(a) coordinate the planned outage with other affected legal owners;

(b) perform a contingency assessment of the planned outage, considering conditions throughout the duration of the planned outage, and develop plans to mitigate any concerns identified; and

(c) determine the planned outage does not conflict with any other planned outage.

(2) The legal owner of a transmission facility must, as part of any planned outage request, provide planned outage information to the ISO in the form the ISO specifies, including the following:

(a) the transmission facility being taken out of service;

(b) dates and times, indicating the start of switching to isolate a facility and the end of switching to return the facility to service;

(c) nature of work and any related system elements that will be affected;

(d) details of the contingency assessment and any mitigation plans;

(e) confirmation of coordination with all affected legal owners;

(f) isolation points energized at greater than 25 kV; and

(g) time to restore the transmission facility in an emergency.
ISO Assessments

6(1) The ISO must, no later than the start of the operating week in which the planned outage is to occur, assess:

(a) in the case of a significant planned outage:
   (i) a planned outage request submitted prior to 90 days before the start of the operating week in which the planned outage is to occur; and
   (ii) a change to a planned outage request, previously submitted pursuant to subsection 6(1)(a)(i), that is submitted prior to 30 days before the start of the operating week in which the change is to occur; and

(b) in the case of a non-significant planned outage, a planned outage request, and any change to such request, that is submitted prior to 12:00 noon on Tuesday in the week before the operating week in which the planned outage or the change, as applicable, is to occur.

(2) The ISO may assess a change to a planned outage request that is submitted in accordance with subsection 4, but that is submitted later than the timelines specified in subsection 6(1).

(3) The ISO must, if it assesses a planned outage request or any change to such request, do so by taking into account:
   (a) the reliability of the interconnected electric system;
   (b) potential impacts to electricity market participants;
   (c) coordination of the planned outage with other affected legal owners; and
   (d) coordination of the planned outage with other anticipated conditions on the interconnected electric system.

ISO Approvals

7(1) The ISO must approve a planned outage request or any changes to such request, excluding cancellations, if the ISO:

(a) assesses the planned outage request, or any change to such request, as set out in subsection 6; and

(b) determines that the planned outage can be conducted without adversely affecting the reliability of the system or the fair, efficient and openly competitive operation of the market.

(2) The ISO must, if it approves a planned outage request or any change to such request, communicate such approval via an approved outage report posted on the AESO website.

(3) The ISO must approve a planned outage request and any change to such request in order for the planned outage to proceed.

(4) The ISO may, based on real time reliability requirements of the interconnected electric system and necessary ISO operational flexibility, cancel any planned outage it has already approved under subsection 7(1) by providing written or verbal notice to the legal owner of the transmission facility.
**Real-Time ISO Approval**

8(1) The legal owner of a transmission facility must, in relation to any planned outage, obtain real-time approval from the ISO prior to switching transmission equipment out of service.

(2) The legal owner of a transmission facility must, in relation to any planned outage, obtain real-time approval from the ISO prior to energization of equipment after completion of an outage.

**Coordination**

9 The legal owner of a generating unit, the legal owner of an aggregated generating facility, the legal owner of an electric distribution system and the legal owner of load must, on a reasonable efforts basis, coordinate with the affected legal owners regarding any planned outages.

**Provision of Outage Information by the ISO**

10(1) The ISO must publish on the AESO website a list of significant planned outages that are to occur in the period beginning in the operating week after the upcoming operating week and ending 48 months later.

(2) The ISO must publish on the AESO website a list of all planned outages it has approved to occur during the remaining days of the current operating week and all days of the following operating week, and must use reasonable efforts to do so by 18:00 (6:00 pm) each Wednesday.

(3) The ISO must document details of its assessments of the approved planned outages noted on the list referred to in subsection 10(2) in a report commonly known as the coordination plan.

(4) The ISO must not include details of generation dispatches, generation directives or generation outage schedules in the coordination plan.

(5) The ISO must email the coordination plan to each legal owner of a transmission facility and must use reasonable efforts to do so by 18:00 (6:00 pm) each Thursday.

**Revision History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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</thead>
</table>
| YYYY-MM-DD | Revision to clarify “market participant” as “electricity market participant”.
| YYYY-MM-DD | Revised subsections 3(1) and 10(1) from 24 months to 48 months             |
| 2016-08-30 | Inclusion of the defined term system element.                               |
| 2014-07-02 | Initial release                                                             |
Applicability

1 Section 306.5 applies to:
   (a) a pool participant with a generating source asset with a maximum capability greater than or equal to 5 MW;
   (b) a pool participant that submits offers in the energy market for a generating source asset with a maximum capability that is greater than or equal to 1 MW and less than 5 MW;
   (c) a legal owner of a source asset described in subsections 1(a) and 1(b); and
   (d) the ISO.

Requirements

General

2(1) A pool participant must, for any outage that results or will result in a change in available capability of:
   (a) 1 MW or greater, for a generating source asset with a maximum capability that is greater than or equal to 1 MW and less than 5 MW; or
   (b) 5 MW or greater, for a generating source asset with a maximum capability greater than or equal to 5 MW,

comply with the notification requirements set forth in subsections 3, 4 or 5, as applicable.

(2) A pool participant must provide to the ISO, in writing and in conjunction with its first planned outage notification, a list of contact persons who must be involved in the planning of outages and be in a position of authority to resolve with the ISO any issues or concerns regarding outages.

(3) A pool participant must submit information required to be provided to the ISO pursuant to this section 306.5 via the Energy Trading System.

Planned Outage Notification Requirements

3(1) A pool participant must, in respect of any planned outage, submit to the ISO:
   (a) the dates, times, durations and impact to MW capability for the planned outage;
   (b) the specific nature of the planned outage work to be done; and
   (c) a designation of the planned outage as “Derate-Planned” or “Outage-Planned”.

(2) A pool participant must, by the first 1st day of every month after the date of energization, submit the information set out in subsection 3(1) to the ISO related to planned outages that, as of the time of the submission, are planned to occur at any time within the next 48 months.

(3) A pool participant must, with respect to:
   (a) any revisions to the information submitted to the ISO under subsection 3(1); or
(b) a planned outage that is not included in the submission set out in subsection 3(2);
submit such information or planned outage as soon as reasonably practical.

(4) A pool participant must, if information submitted under subsection 3(3) is submitted later than 3 months prior to the day the planned outage is to start, include a statement in its submission setting out the reasons that the information varies from the original subsection 3(1) submission or was not included in the submission set out in subsection 3(2).

Delayed Forced Outage Notification Requirements

4(1) A pool participant must, as soon as reasonably practicable, in respect of a delayed forced outage, submit to the ISO:

(a) the dates, times, durations and impact to MW capability for the delayed forced outage;
(b) the specific nature of the delayed forced outage work to be done; and
(c) a designation of the delayed forced outage as “Derate-Forced” or “Outage-Forced”.

(2) A pool participant must also, as soon as reasonably practicable, in respect of a delayed forced outage for which the pool participant has less than 24 hours between the time of discovering the circumstances requiring the delayed forced outage and the time of commencing the delayed forced outage, contact the ISO by telephone, on a telephone number that the ISO designates, which must contain a voice recording system.

Automatic Forced Outage Notification Requirements

5 A pool participant must, as soon as reasonably practicable, submit automatic forced outage information as follows:

(a) through contacting the ISO by telephone, on a telephone number that the ISO designates, which must contain a voice recording system; and
(b) submit a designation of the automatic forced outage as “Derate-Forced” or “Outage-Forced”.

Timely Information from Legal Owner

13 A legal owner of a source asset must, if it is not the pool participant for that source asset, provide such timely and complete information to the pool participant for such source asset to enable the pool participant to comply with its obligations under subsections 3, 4 and 5.

Revision History

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Applicability

1 Section 306.8 applies to:

(a) a pool participant with a load sink asset with a capacity commitment and a maximum capability greater than or equal to 5 MW;

(b) a pool participant with a load sink asset with a capacity commitment that submits offers into the energy market and has a maximum capability of greater than or equal to 1 MW and less than 5 MW;

(c) a legal owner of a load sink asset described in subsection 1(a) and 1(b); and

(d) the ISO.

Requirements

General

2(1) A pool participant must, for any outage that results or will result in a change in available capability of:

(a) 1 MW or greater, for a load sink asset with a maximum capability that is greater than or equal to 1 MW and less than 5 MW; or

(b) 5 MW or greater, for a load sink asset with a maximum capability greater than or equal to 5 MW,

comply with the notification requirements set forth in subsections 3, 4 or 5, as applicable.

(2) A pool participant must provide to the ISO, in writing and in conjunction with its first planned outage notification, a list of contact persons who must be involved in the planning of outages and be in a position of authority to resolve with the ISO any issues or concerns regarding outages.

(3) A pool participant must submit information required to be provided to the ISO pursuant to this section 306.8 via the Energy Trading System.

Planned Outage Notification Requirements

3(1) A pool participant must, in respect of any planned outage, submit to the ISO:

(a) the dates, times, durations and impact to MW capability for the planned outage;

(b) the specific nature of the planned outage work to be done; and

(c) a designation of the planned outage as “Derate-Planned” or “Outage-Planned”.

(2) A pool participant must, by the 1st day of every month after the date of energization, submit the information set out in subsection 3(1) to the ISO related to planned outages that, as of the time of the submission, are planned to occur at any time within the next 48 months.
(3) A pool participant must, with respect to:

(a) any revisions to the information submitted to the ISO under subsection 3(1); or

(b) a planned outage that is not included in the submission set out in subsection 3(2);

submit such information or planned outage as soon as reasonably practical.

(4) A pool participant must, if information submitted under subsection 3(3) is submitted later than 3 months prior to the day the planned outage is to start, include a statement in its submission setting out the reasons that the information varies from the original subsection 3(1) submission or was not included in the submission set out in subsection 3(2).

Delayed Forced Outage Notification Requirements

4(1) A pool participant must, as soon as reasonably practicable, in respect of a delayed forced outage, submit to the ISO:

(a) the dates, times, durations and impact to MW capability for the delayed forced outage;

(b) the specific nature of the delayed forced outage work to be done; and

(c) a designation of the delayed forced outage as “Derate-Forced” or “Outage-Forced”.

(2) A pool participant must also, as soon as reasonably practicable, in respect of a delayed forced outage for which the pool participant has less than 24 hours between the time of discovering the circumstances requiring the delayed forced outage and the time of commencing the delayed forced outage, contact the ISO by telephone, on a telephone number that the ISO designates, which must contain a voice recording system.

Automatic Forced Outage Notification Requirements

5 A pool participant must, as soon as reasonably practicable, submit automatic forced outage information as follows:

(a) through contacting the ISO by telephone, on a telephone number that the ISO designates, which must contain a voice recording system; and

(b) submit a designation of the automatic forced outage as “Derate-Forced” or “Outage-Forced”.

Timely Information from Legal Owner

6 A legal owner of a load asset must, if it is not the pool participant for that load asset, provide such timely and complete information to the pool participant for such load asset to enable the pool participant to comply with its obligations under subsections 3, 4 and 5.

Revision History
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<th>Description</th>
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Applicability

1 Section 306.9 applies to:
   (a) a pool participant with a generating source asset with a maximum capability greater than or equal to 5 MW;
   (b) a pool participant that submits offers in the energy market for a generating source asset with a maximum capability that is greater than or equal to 1 MW and less than 5 MW;
   (c) a legal owner of a source asset described in subsections 1(a) and 1(b); and
   (d) the ISO.

Requirements

Authority to Issue an Outage Cancellation Directive

2(1) The ISO may, if after:
   (a) completing the assessments and procedures set out in subsections 3(2) through 3(6) the ISO determines that there remains:
      (i) an immediate need on a short term basis for services provided by certain source assets to maintain the necessary level of reliability or adequacy, as the case may be; and
      (ii) a high probability that the situation will not be alleviated in a voluntary manner:
         (A) by any pool participants amending or revising outage plans; or
         (B) through the ordinary course operation of the market; and
   (b) taking into account the factors set out in subsection 3(7) below,
issue a directive to cancel any 1 or more of a planned outage, a delist outage, or a delayed forced outage.

(2) The ISO must not issue a directive canceling an outage without the authorization of the Chief Executive Officer of the ISO or his designee.

Outage Cancellation Procedure

3(1) The ISO must, prior to issuing a directive canceling an outage, comply with the procedures set out in subsection 3(2) through 3(8) in sequence.

(2) The ISO must consider and analyze the results of the adequacy assessments undertaken in accordance with section 202.6 of the ISO rules, Adequacy of Supply, and perform a further assessment of the status of all source assets based on all planned outages that pool participants submit under section 306.5 Generation Outage Reporting and Coordination.

(3) The ISO must:
   (a) after completing the assessments and taking into account the total amount of all generating source assets which are planned for outages; and
(b) if the ISO anticipates a high probability of a supply adequacy shortfall or reliability concern, notify market participants on the AESO website of its determination.

(4) The ISO must continue to conduct further situational analysis to seek to alleviate the potential supply adequacy shortfall or reliability concern and avoid the cancellation of any outages.

(5) The ISO must post the determination referred to in subsection 3(3) above for a minimum period of 1 calendar week, and in anticipation that certain pool participants:

(a) may have flexibility to voluntarily amend plans for outages to assist in the alleviation of the supply adequacy shortfall or reliability situation; or

(b) in the case of a delist outage, may submit a request to the ISO to delay the start of the delist outage or return to the energy market before the end of the delist outage term, and substitute be able to participate in asset substitution in accordance with Section 206.9 of the ISO rules, Asset Substitution.

(6) The ISO must, if the ISO determines that the request received in subsection 3(5)(b) would assist in the alleviation of the supply adequacy shortfall or reliability situation, change the delist outage by permitting the pool participant to submit offers in the energy market for a specified volume and substitute in accordance with Section 206.9 of the ISO rules, Asset Substitution.

(7) The ISO must, if any actions made pursuant to subsections 3(5) and 3(6) do not result in a reduction in the total amount of generating source asset capacity planned for outages such that the forecast supply adequacy shortfall or reliability remains unresolved, contact the individual pool participants to request that they further review outage plans.

(8) The ISO must consider all of the following factors in its determination as to whether or not to issue a directive canceling an outage as contemplated in this subsection 3:

(a) the economic and operational consequences for the legal owner of the generating source asset and for any designated pool participant, if a different person;

(b) the operational and functional impact on the generating source asset if the outage is cancelled;

(c) the effectiveness of canceling the outage in alleviating the supply adequacy shortfall or reliability concern;

(d) the historical frequency that a given generating source asset has been the subject of outage cancellations relative to other source assets;

(e) the length of time of, and reasons for, any outage the pool participant has previously submitted to the ISO under the reporting requirements set out in this section 306.9;

(f) the extent to which the outage will begin or end during the period of the forecast supply adequacy shortfall or reliability concern;

(g) any requirements or material implications under or related to any applicable municipal, provincial or federal legislation or regulations if the ISO proceeds to issue a directive to cancel an outage; and

(h) the practicality and effectiveness of market-based solutions to alleviate the supply adequacy shortfall or reliability concern, including a consideration of load curtailment options.

(9) The ISO must, where reasonably practicable, after assessing the effectiveness of each generating source asset in alleviating the supply adequacy shortfall or reliability concern, issue directives
cancelling outages in the following order:

(a) a generating source asset subject to a capacity commitment;
(b) a generating source asset that is not subject to a capacity commitment and is not on a delist outage;
(c) a generating source asset that is on a delist outage for economic reasons; and
(d) a generating source asset that is on a delist outage for physical or operational reasons.

(10) The ISO must not issue a directive canceling an outage more than 90 days in advance of the first day of the period which has been determined to be the commencement of the reliability or adequacy shortfall.

Outage Planned Costs and Work Submission

4(1) A pool participant who has received a directive for the cancellation of an outage must use all reasonable efforts to submit to the ISO in advance of the period when the outage would have occurred:

(a) a detailed description and estimation of the work, which was to have been carried out during the outage, including an itemization of the specific plant, machinery and equipment which are the subject of the work during the that period; and
(b) an estimate of any known or anticipated incremental generation costs that may be the basis for a claim for compensation under these ISO rules.

(2) The submissions set out in subsection 4(1) do not limit compensation claims for other reasonable demonstrable costs.

Time Constrained Outage Cancellation

5 The ISO may, notwithstanding subsection 3, dispense with any or all of the procedures set out in that subsection 3 and proceed to issue a directive to cancel an outage, if in the ISO’s opinion, it is evident that immediate reliability or adequacy circumstances do not allow sufficient time to permit the ISO to comply with such procedures.

Outage Cancellation Report

6 The ISO must, if it issues a directive under subsection 2 to cancel an outage, prepare a report and post it on the AESO website, which report must contain:

(a) an explanation of the circumstances, background and chronological events that caused and are related to the issuance of the directive cancelling the outage;
(b) the particulars of the outage that was cancelled, including date of cancellation, duration and MW affected;
(c) any material market impacts known to the ISO;
(d) whether the cancellation was a time and procedurally constrained one under subsection 5, and if so, the reasons for a decision to depart from any prescribed procedures set out in subsection 3; and
(e) any other matters that, in the ISO’s opinion, are necessary in order to provide a full and complete explanation to market participants of the decision.
Payment Eligibility for Incremental Generation Costs and Claim Limitations

7(1) Subject to this subsection 7 and section 103.4 of the ISO rules, Power Pool Financial Settlement and the definition of incremental generation costs, a pool participant or legal owner of a generating source asset, or both of them if different persons, that has complied with a directive to cancel an outage issued pursuant to subsection 2, is eligible to receive payment for incremental generation costs from the ISO.

(2) A pool participant or a legal owner who is a claimant under this subsection 7 must, within 40 days after the end of the settlement period related to the period during which the directive was effective, provide the ISO with a written statement which contains:
   
   (a) the detailed information of the claim and calculation of incremental generation costs as incurred and caused by the cancellation, to the extent those details and calculations are known or estimable as of the date of delivery of the statement to the ISO; or
   
   (b) if any detailed information or calculations are not known or estimable as of the date of delivery of the statement, an estimate of the date by which any of the outstanding information or calculations required under subsection 7(2)(a) will be finally determined and delivered to the ISO.

(3) A pool participant or a legal owner who is a claimant under this subsection 7 must provide the ISO with a supplementary written statement setting out all outstanding information or calculations as soon as reasonably practicable after the delivery of the original statement, but in any event no later than 1 year after the end of the settlement period related to the period during which the cancellation directive was effective.

(4) A pool participant or a legal owner who is a claimant under this subsection 7 must provide to the ISO:
   
   (a) any and all of its own and third party supporting data, records, invoices, formulas, calculations, third party contract claims and related terms and conditions;
   
   (b) any other information or materials used to calculate or determine the amounts claimed in the statement or any supplementary statement; and

   (c) an attestation from a corporate officer that information provided pursuant in accordance with subsection 7 is complete and accurate; and

   (d) any other detail and information the ISO may reasonably request in order to verify the incremental generation costs, claims, calculations and particulars.

(5) The ISO must approve the compensation and settlement in respect of any incremental generation costs on or before the 40th day following the day of the receipt by the ISO of the last of the initial statement, supplementary statement or deficiency materials.

(6) The ISO must reject the portion of a claim for incremental generation costs related to any of the following:
   
   (a) costs or claims related to a cancellation for which the claimant is eligible for compensation pursuant to the provisions of a transmission must-run contract with the ISO;
   
   (b) costs or claims associated with or related to the claimant’s market or hedging portfolio, other than those allowed under subsection (iv)(d)(B) of the definition of incremental generation costs which limits such costs and claims to the source asset which is the subject of the directive;
(c) lost opportunity costs, or other form of loss of profits, revenue, earnings or revenue not specifically provided for in the definition of incremental generation costs;

(d) raw material, fuel, processing, production, manufacturing or industrial costs of any nature which are not directly related to the source asset’s participation in the energy market;

(e) fixed costs; or

(f) costs or claims that the claimant could otherwise have mitigated through all reasonable efforts.

Cost Recovery

8 The ISO must treat the incremental generation costs paid to a claimant for an approved claim under subsection 7(6) as an ancillary services cost.

Timely Information from Legal Owner

9 A legal owner of a source asset must, if it is not the pool participant for that source asset, provide such timely and complete information to the pool participant for such source asset to enable the pool participant to comply with its obligations under this section 306.9.

Revision History

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Applicability

1 Subject to subsections 2 and 3 below, section 502.8 applies to:

(a) the legal owner of a generating unit, or an aggregated generating facility, or an energy storage facility that has a gross real power capability equal to or greater than 5 MW and is:

(i) connected to the interconnected electric system or an electric system in the service area of the City of Medicine Hat, including by way of connection to an electric distribution system; or

(ii) part of an industrial complex connected to the transmission system; or

(iii) providing, or part of a facility providing, ancillary services;

(b) the legal owner of a transmission facility connected to the transmission system or transmission facilities in the service area of the City of Medicine Hat;

(c) the legal owner of a load that is:

(i) connected to the transmission system;

(ii) connected to transmission facilities in the service area of the City of Medicine Hat; or

(iii) part of an industrial complex;

(iv) providing, or part of a facility providing, ancillary services; or

(v) associated with offers or bids in the energy market;

(d) the legal owner of a generating unit, or aggregated generating facility, energy storage facility, or a load, if a pool participant for such generating unit, aggregated generating facility, that has a gross real power capability equal to or greater than 1 MW and less than 5 MW and is:

(i) connected to the interconnected electric system or an electric system in the service area of the City of Medicine Hat, including by way of connection to an electric distribution system, or is part of an industrial complex connected to the transmission system; and

(ii) is associated with offers or bids in the energy storage facility or load submits offers or bids in the energy market, provides ancillary services, or has a capacity commitment.

(e) and

(f) the ISO.

2 The legal owner of a generating unit, aggregated generating facility, transmission facility, energy storage facility, or a load that is energized and commissioned on or after April 7, 2017 must ensure the facility meets the minimum supervisory control and data acquisition requirements of this section 502.8 and, where applicable, verify to the ISO that the facility meets those requirements during commissioning and energization.

3(1) Subject to subsection 3(3), the provisions of this section 502.8 do not apply to the legal owner of a
**ISO Rules**  
**Part 500 Facilities**  
**Division 502 Technical Requirements**  
**Section 502.8 SCADA Technical and Operating Requirements**

**generating unit**, aggregated generating facility, transmission facility, energy storage facility, or a load that was energized and commissioned prior to April 7, 2017 in accordance with a previous technical requirement, technical standard, ISO rule or functional specification, but the legal owner of such an existing generating unit, aggregated generating facility, transmission facility, or a load must remain compliant with all the standards and requirements set out in that previous technical requirement, technical standard, ISO rule or functional specification.

(2) Notwithstanding subsection 3(1), the ISO may require the legal owner of a generating unit, aggregated generating facility, transmission facility, energy storage facility, or a load to comply with any specific provision or all of the provisions of this section 502.8, if the ISO determines that such compliance is necessary for the safe and reliable operation of the interconnected electric system.

(3) Notwithstanding subsection 3(1), the legal owner of a generating unit, transmission facility, aggregated generating facility, energy storage facility, or a load must comply with the provisions of this section 502.8 if:

   (a) it modifies its facilities after April 7, 2017 to:

      (i) increase its Rate DTS or Rate STS contract capacity; or

      (ii) upgrade or alter the functionality of its supervisory control and data acquisition system; and

   (b) the ISO determines that such compliance is necessary for safe and reliable operation of the interconnected electric system.

(4) Notwithstanding section 3(1), the legal owner of a generating unit, aggregated generating facility, energy storage facility, or a load owners referred to in subsections 1(c)(v) and 1(d) must comply with the provisions of this section 502.8 if a pool participant for such generating unit, aggregated generating facility, energy storage facility, or load submits offers or bids in the energy market, provides ancillary services, or has a capacity commitment.

**Functional Specification**

4(1) The ISO may issue a written functional specification containing details, work requirements and specifications for the design, construction and operation of a supervisory control and data acquisition system for the facility.

(2) The functional specification referred to in subsection 4(1) must be generally consistent with the provisions of this section 502.8 but may contain material variances the ISO approves of based upon its discrete analysis of any one (1) or more of the technical, economic, safety, operational and reliability requirements related to the specific system or connection project.

**Use of the Term Legal Owner**

5(1) Unless specified otherwise, where the term “legal owner” is used below it includes the legal owner of a generating unit, an aggregated generating facility, a transmission facility, an energy storage facility, or a load.

**Supervisory Control and Data Acquisition Requirements**

6(1) The legal owner of a synchronous generating unit must meet the supervisory control and data acquisition requirements set out in Appendix 1, SCADA Requirements for Synchronous Generating Units.
(2) The legal owner of a wind or solar aggregated generating facility must meet the supervisory control and data acquisition requirements set out in Appendix 2, SCADA Requirements for Wind or Solar Aggregated Generating Facilities.

(3) The legal owner of an energy storage facility generating unit that is part of an industrial complex and the legal owner of a load must meet the supervisory control and data acquisition requirements set out in Appendix 3, SCADA Requirements for Energy Storage Facilities Industrial Complexes and Load.

(4) The legal owner of a generating unit that is part of an industrial complex and the legal owner of a load transmission facility must meet the supervisory control and data acquisition requirements set out in Appendix 4, SCADA Requirements for Industrial Complexes and Load.

(5) The legal owner of a transmission facility must meet the supervisory control and data acquisition requirements set out in Appendix 5, SCADA Requirements for Transmission Facilities, if at least one (1) of the following criteria is met:

(a) the substation contains two (2) or more buses operated above 60 kV nominal voltage;
(b) the substation contains one (1) or more buses operated above 200 kV nominal voltage;
(c) the substation contains a capacitor bank, reactor, static VAr compensator or synchronous condenser rated 5 MVAr or greater;
(d) the substation connects three (3) or more transmission lines above 60 kV;
(e) the substation supplies local site load, with normally energized site load equipment rated at 5 MVA or greater that are offered for ancillary services or are included in remedial action schemes;
(f) the substation supplies local site load with normally energized site load equipment rated at 10 MVA or greater;
(g) the substation supplies supplemental reserve load of 5 MVA or greater; or
(h) the substation supplies system load that is part of a remedial action scheme.

(6) The ISO must meet the supervisory control and data acquisition requirements set out in:

(i) Appendix 2, SCADA Requirements for Wind or Solar Aggregated Generating Facilities; and
(ii) Appendix 65, SCADA Requirements for Ancillary Services.

Separate Meters

7 A legal owner must gather supervisory control and data acquisition data using a device that is independent from a revenue meter.

Data Acquisition
8(1) The ISO must initiate all supervisory control and data acquisition communications with a legal owner’s equipment directly connected to the ISO’s equipment to acquire supervisory control and data acquisition data from a legal owner and must do so using the following means:

(a) periodic scans; or
(b) report-by-exception polls.

(2) The ISO must configure the ISO’s communications device to be the “master” device.

(3) A legal owner must configure its communication device to be the “slave” device using the appropriate addressing the ISO assigns.

(4) The ISO must, if it initiates communications with a legal owner using report-by-exception polls, configure and acquire the supervisory control and data acquisition data so that the data value falls within the allowable deadbands set out in Table 1 below:

<table>
<thead>
<tr>
<th>Value</th>
<th>Allowable Deadband</th>
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<tr>
<td>MW</td>
<td>0.5 MW from 0 to 200 MW, 1.0 MW above 200 MW</td>
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<tr>
<td>MVar</td>
<td>0.5 MVar from 0 to 200 MVar, 1.0 MVar above 200 MVar</td>
</tr>
<tr>
<td>kV</td>
<td>0.1 kV from 0 to 20 kV, 0.5 kV above 20 kV</td>
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(5) A legal owner must, if it is providing analog values to the ISO, provide those values with at least one (1) decimal place accuracy unless otherwise specified in the attached appendices.

(6) A legal owner must ensure that the transducer is scaled such that the maximum, full scale, value returned is between 120% and 200% of the nominal equipment rating.

(7) The legal owner of a generating unit that uses a mode of operation of either a synchronous condenser or motor, must ensure that the minimum, full scale, values are between 120% and 200% of the lowest operating condition.

(8) A legal owner must report supervisory control and data acquisition data relating to power flows with the sign convention of positive power flow being out from a bus, except in situations where source measurements are positive polarity.

(9) Notwithstanding subsection 8(8), a legal owner must report:

(a) MVar measurements from a reactor as negative polarity;
(b) MW and MVar measurements from a collector bus as positive polarity; and
(c) MVar measurements from a capacitor as positive polarity.

(10) A legal owner must, if installing a global positioning system clock as required in a functional specification, use the coordinated universal time as the base time where the base time is the universal time code minus seven (7) hours.

(11) A legal owner must ensure that its global positioning system clock functionality provides for one (1) millisecond time stamped event accuracy and can automatically adjust for seasonal changes to daylight savings time.
Supervisory Control and Data Acquisition Communications

9(1) A legal owner must implement one (1) of the following communication methods between its facility and the ISO:

(a) an internet connection, if the legal owner has a latency time requirement of thirty (30) seconds or greater; or

(b) a dedicated telecommunications link, if the legal owner has a latency time requirement of less than thirty (30) seconds.

(2) A legal owner must provide and maintain a connectivity point and data communication to both the ISO’s primary system coordination centre and the ISO’s backup system coordination centre.

(3) The ISO must provide and maintain a connectivity point to the legal owner’s facility at both the ISO’s primary system coordination centre and the ISO’s backup system coordination centre.

(4) The legal owner of a generating unit, an aggregated generating facility, an energy storage facility, or a load must, if it owns a facility with the capability of combined load and generation greater than 1000 MW, provide two (2) communication circuits to each of the ISO’s primary system coordination centre and the ISO’s backup system coordination centre and to each of the legal owner’s primary and backup communication centres.

(5) A legal owner of a generating unit, an aggregated generating facility, an energy storage facility, or a load must, when providing ancillary services, send supervisory control and data acquisition data to each of the ISO’s primary system coordination centre and the ISO’s backup system coordination centre.

(6) A legal owner must, based on the ISO’s generic communication block diagrams and prior to connecting facilities to the interconnected electric system or an electric system in the service area of the City of Medicine Hat, indicate to the ISO the generic communication block diagram that depicts the communication protocols between the legal owner’s facility and the ISO’s system coordination centre, with any variations as appropriate.

(7) A legal owner must, if it changes the communication protocols used between itself and the ISO, communicate these changes to the ISO in writing ninety (90) business days prior to changing the protocols.

Notification of Unplanned Availability

10(1) A legal owner must, if any component in the communication circuit becomes unavailable due to an unplanned event, notify the ISO as soon as practicable, in writing, after determining such unavailability due to equipment failure.

(2) The ISO may, following receipt of the notification in 10(1), require the legal owner to discontinue the provision of ancillary services.

(3) A legal owner must provide the ISO as soon as practicable, in writing:

(a) the cause of any unavailability reported pursuant to subsection 10(1);

(b) in the event of an equipment failure, a plan, acceptable to the ISO, to repair the failed equipment, including testing; and

(c) the expected date when the equipment will be repaired and the required measurements will
be restored.

(4) The legal owner must, if the equipment is not repaired and required measurements are not restored by the expected date, notify the ISO as soon as practicable, in writing, with the revised date and the reason why the communication system was not repaired.

(5) The legal owner must notify the ISO once the equipment is repaired and the required measurements are restored.

Suspected Failure or Erroneous Data of a Remote Terminal Unit

11(1) A legal owner must, if it suspects that a remote terminal unit has failed or is providing erroneous data, notify the ISO as soon as practicable, in writing, after identifying the failure or data error.

(2) The ISO must, if it suspects that a remote terminal unit has failed or is providing erroneous data, notify the legal owner as soon as practicable, after identifying the failure or data error.

(3) The legal owner must provide the ISO as soon as practicable, in writing, with the date it expects to test the remote terminal unit.

(4) The legal owner must, if it is unable to test the remote terminal unit on the expected date provided under subsection 11(3), provide the ISO as soon as practicable, in writing, with the revised date.

(5) The legal owner must, after testing the remote terminal unit, confirm if there is a problem with the remote terminal unit or not and notify the ISO as soon as practicable, in writing, with the results of the test.

(6) The legal owner must, if the results of the test indicated that the remote terminal unit has actually failed, provide the ISO as soon as practicable, in writing, with a plan acceptable to the ISO to repair the failed remote terminal unit and the date by which that the legal owner expects to repair or replace the remote terminal unit.

(7) The legal owner must, if the remote terminal unit is not repaired or replaced by the date provided under subsection 11(6), notify the ISO as soon as practicable, in writing, with the revised date.

(8) The legal owner must notify the ISO as soon as practicable, in writing, once the remote terminal is repaired or replaced.

Exceptions

12 A legal owner is not required to comply with the specific supervisory control and data acquisition submission requirements of this section 502.8 applicable to a particular device:

(a) that is being repaired or replaced in accordance with a plan acceptable to the ISO under subsections 10 or 11; and

(b) the legal owner is using reasonable efforts to complete such repair or replacement in accordance with that plan.

Appendices

Appendix 1 – SCADA Requirements for Generating Units

Appendix 2 - SCADA Requirements for Wind or Solar Aggregated Generating Facilities
### Revision History

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<tr>
<td>xxxx-xx-xx</td>
<td>Revised to include requirements for an energy storage facility and to the legal owner of an asset where the pool participant submits offers and bids into the energy or ancillary services markets, or has a capacity commitment. Added Appendix 3. Addition of trip status indicator for LSSI in Appendix 6. Clarification of point descriptions in Appendices.</td>
</tr>
<tr>
<td>2018-09-01</td>
<td>Revised applicability section; clarified which requirements are applicable to synchronous generating units; added requirements for a distribution connected aggregated generating facility; added additional SCADA requirements for wind aggregated generating facilities to Appendix 2; and added SCADA requirements for solar aggregated generating facilities to Appendix 2.</td>
</tr>
<tr>
<td>2015-03-27</td>
<td>Replaced “effective date” with the initial release date in sections 2 and 3; and replaced the word “Effective” in the Revision History to “Date”.</td>
</tr>
<tr>
<td>2014-12-23</td>
<td>Appendix 1 amended by combining the two lines concerning generating unit automatic voltage regulation into one line. Appendix 5 amended reflect that the regulating reserve set point signal is sent by ISO every 4 seconds, not every 2 seconds. Appendix 5 amended to include the measurement point for load when providing spinning reserve.</td>
</tr>
<tr>
<td>2013-02-28</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
## Appendix 1 – SCADA Requirements for Synchronous Generating Units

<table>
<thead>
<tr>
<th>Facility/Service Description</th>
<th>Point Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
<th>Resolution</th>
<th>Latency and Availability Requirements Based on Maximum Authorized Real Power</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum authorized real power less than 50 MW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Latency</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>For each power plant Status</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Gross real power as measured at the stator winding terminal

- **MW**
- **Accuracy Level**: +/- 2% of full scale
- **Resolution**: 0.5% of the point being monitored

### For each synchronous generating unit directly connected to the transmission system or transmission facilities in the service area of Medicine Hat Status

#### Analog

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Accuracy Level</th>
<th>Resolution</th>
<th>Latency and Availability Requirements Based on Maximum Authorized Real Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross reactive power as measured at the stator winding terminal</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>30 seconds</td>
</tr>
<tr>
<td>Generating unit voltage at the generator stator winding or equivalent bus voltage</td>
<td>MV</td>
<td>+/- 0.012 Hz</td>
<td>6 seconds</td>
</tr>
<tr>
<td>Frequency as measured at the stator winding terminal or equivalent bus voltage</td>
<td>Hz</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Net reactive power as measured on the high side terminal of the transmission system step up transformer</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Net reactive power of summated generation of a facility with multiple generating units offering as a single market participant</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Net reactive power as measured on the high side terminal of the transmission system step up transformer</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Net reactive power of summated generation of a facility with multiple generating units offering as a single market participant</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Unit service load measured on the high side of the unit service transformer if the capacity is greater than 0.5 MW</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Unit service load measured on the high side of the unit service transformer if the capacity is greater than 0.5 MW</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Station service load reactive power if the capacity is greater than 0.5 MW, or if the station service load is for multiple units then the combined load for those units, measured on the high side of the station service transformer</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Excitation system real power if the capacity is greater than 0.5 MW, measured on the high side of the excitation system transformer</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Excitation system reactive power if the capacity is greater than 0.5 MW, measured on the high side of the excitation system transformer</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
</tr>
<tr>
<td>Voltage at the point of connection to the transmission system</td>
<td>kV</td>
<td>+/- 0.12</td>
<td></td>
</tr>
<tr>
<td>Automatic voltage regulation setpoint</td>
<td>kV</td>
<td>+/- 2%</td>
<td></td>
</tr>
<tr>
<td>Transmission system step up transformer tap position if the step up transformer has a load tap changer</td>
<td>Tap position</td>
<td>Integral Value</td>
<td>1</td>
</tr>
<tr>
<td>Ambient temperature if the generating unit is a gas turbine generating unit (range of minus 90 degrees to plus 50 degrees Celsius)</td>
<td>degrees Celsius</td>
<td>+/- 2% of full scale</td>
<td>1degree</td>
</tr>
<tr>
<td>Breaker, circuit switch, motor operated switches and other devices that can remotely or automatically control the connection to the AES, and does not include manually operated air breaks.</td>
<td>0 = Open 1= Closed</td>
<td>Value</td>
<td>N/A</td>
</tr>
<tr>
<td>Generating unit step up transformer voltage regulator if the transmission system step up transformer has a load tap changer</td>
<td>0 = Manual 1= Auto</td>
<td>Value</td>
<td>N/A</td>
</tr>
<tr>
<td>Generating unit power system stabilizer (PSS) status</td>
<td>0 = Off 1 = On</td>
<td>Value</td>
<td>N/A</td>
</tr>
<tr>
<td>Generating unit automatic voltage regulation (AVR) in service and controlling voltage</td>
<td>0 = Off 1 = On</td>
<td>Value</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Issued for Consultation: 2018-10-22
| For each distribution connected, including distributed connected in the service area of the City of Medicine Hat, synchronous generating unit, or aggregated generating facilities consisting of synchronous generating units, where the total turbine nameplate rating is greater than or equal to 5 MW, or that submits offers in the energy market, or that has a capacity commitment. | Analog Gross real power as measured at the stator winding terminal | MW | +/- 2% of full scale | 0.5% of the point being monitored | Generating unit voltage at the generator stator winding terminal or equivalent bus voltage | kV | Status Breaker, circuit switches, motor operated air brakes and other devices that can remotely control the connection to the AIES; and does not include manually operated air breaks. | 0 = Open | 1 = Closed | N/A |

**SCADA Technical and Operating Requirements**

**Part 500 Facilities**

**Division 502 Technical Requirements**

**Section 502.8**

| Remedial action scheme armed status, if applicable | 0 = Disarmed | 1 = Armed |
| Remedial action scheme operated status on communications failure, if applicable | 0 = Normal | 1 = Alarm |
| Remedial action scheme operated status on runback, if applicable | 0 = Normal | 1 = Alarm |
| Remedial action scheme operated status on trip, if applicable | 0 = Normal | 1 = Alarm |

**Table:**

- **Latency:** 15 seconds
- **Availability:** 98%
- **Mean time to repair:** 48 hours

**For each distribution connected, including distributed connected in the service area of the City of Medicine Hat, synchronous generating unit, or aggregated generating facilities consisting of synchronous generating units, where the total turbine nameplate rating is greater than or equal to 5 MW, or that submits offers in the energy market, or that has a capacity commitment.**

- **Analog Gross real power as measured at the stator winding terminal:** MW +/- 2% of full scale 0.5% of the point being monitored
- **Generating unit voltage at the generator stator winding terminal or equivalent bus voltage:** kV

**Status Breaker, circuit switches, motor operated air brakes and other devices that can remotely control the connection to the AIES; and does not include manually operated air breaks.**

- **0 = Open**
- **1 = Closed**
- **N/A**

**Latency:** 30 seconds; **Availability:** 98%; **Mean time to repair:** 48 hours
## Appendix 2 – SCADA Requirements for Wind or Solar Aggregated Generating Facilities

<table>
<thead>
<tr>
<th>Facility / Service Description</th>
<th>Signal Type</th>
<th>Point Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
<th>Resolution</th>
<th>Latency and Availability Requirements Based on Maximum Authorized Real Power</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum authorized real power less than 50 MW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Latency</td>
</tr>
<tr>
<td>Facility limit MW</td>
<td>Signal sent by ISO</td>
<td>Facility limit MW</td>
<td>MW</td>
<td>+/- 10% of full scale</td>
<td>0.1 MW</td>
<td>15 seconds</td>
</tr>
<tr>
<td>Facility limit Reason for facility limit</td>
<td></td>
<td>Reason for facility limit</td>
<td>1 = Transmission</td>
<td>2 = Ramp</td>
<td>3 = No limit</td>
<td>1 degree</td>
</tr>
<tr>
<td>Wind speed at hub height as collected at the meteorological tower, (for wind facilities)</td>
<td>Analog</td>
<td>Wind speed at hub height as collected at the meteorological tower, (for wind facilities)</td>
<td>km/h</td>
<td>+/- 2% of anemometer maximum</td>
<td>+/- 0.012 Hz</td>
<td>0.01001 Hz</td>
</tr>
<tr>
<td>Wind direction from the true north as collected at the meteorological tower, (for wind facilities)</td>
<td>Analog</td>
<td>Wind direction from the true north as collected at the meteorological tower, (for wind facilities)</td>
<td>Degrees</td>
<td>+/- 5 degrees</td>
<td>1 degree</td>
<td>1 degree</td>
</tr>
<tr>
<td>Barometric pressure with precision for instantaneous measurements to the nearest 6 HPA (for wind facilities)</td>
<td>Analog</td>
<td>Barometric pressure with precision for instantaneous measurements to the nearest 6 HPA (for wind facilities)</td>
<td>HPA</td>
<td>Nearest 6 HPA</td>
<td>1 HPA</td>
<td>0.1 HPA</td>
</tr>
<tr>
<td>Ambient temperature (for wind facilities)</td>
<td>Analog</td>
<td>Ambient temperature (for wind facilities)</td>
<td>°C</td>
<td>+/- 1 degrees</td>
<td>+/- 5 degrees</td>
<td>1 degree</td>
</tr>
<tr>
<td>Wind Speed at 2-10m above ground (for solar facilities)</td>
<td>Analog</td>
<td>Wind Speed at 2-10m above ground (for solar facilities)</td>
<td>km/h</td>
<td>+/- 2% of anemometer maximum</td>
<td>+/- 0.012 Hz</td>
<td>0.01001 Hz</td>
</tr>
<tr>
<td>Wind direction from the true north at 2-10m above ground (for solar facilities)</td>
<td>Analog</td>
<td>Wind direction from the true north at 2-10m above ground (for solar facilities)</td>
<td>Degrees</td>
<td>+/- 5 degrees</td>
<td>1 degree</td>
<td>1 degree</td>
</tr>
<tr>
<td>Global Horizontal Irradiance (for solar facilities)</td>
<td>Analog</td>
<td>Global Horizontal Irradiance (for solar facilities)</td>
<td>W/m²</td>
<td>+/- 25 W/m²</td>
<td>1 W/m²</td>
<td>0.1 W/m²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility / Service Description</th>
<th>Signal Type</th>
<th>Point Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
<th>Resolution</th>
<th>Latency and Availability Requirements Based on Maximum Authorized Real Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility limit MW</td>
<td>Signal sent by ISO</td>
<td>Facility limit MW</td>
<td>MW</td>
<td>+/- 10% of full scale</td>
<td>0.1 MW</td>
<td>15 seconds</td>
</tr>
<tr>
<td>Facility limit Reason for facility limit</td>
<td></td>
<td>Reason for facility limit</td>
<td>1 = Transmission</td>
<td>2 = Ramp</td>
<td>3 = No limit</td>
<td>1 degree</td>
</tr>
</tbody>
</table>

### Notes
- Accuracy Level: +/- 2% of full scale
- Resolution: 0.5% of the point being monitored

### Definitions
- **Accuracy Level**: Indicates the accuracy of the measurement
- **Resolution**: Specifies the precision of the measurement
- **Latency and Availability**: Indicates the time it takes to repair and the availability of the system

### Facility / Service Description
- For each wind or solar aggregated generating facility directly connected to the transmission system or transmission facilities in the service area of the City of Medicine Hat, and where its nameplate rating is greater than or equal to 5 MW, or that submits offers in the energy market, or that has a capacity commitment.
Communications failure alarm from remote terminal unit acting as a data concentrator for one or more generating units to a transmission facility control centre, if applicable.

Communications failure indication between an Intelligent Electronic Device and any remote terminal unit acting as a data concentrator.

Each collector system feeder breaker.

Each reactive resources feeder breaker.

Power limiting control system.

Voltage regulation system status.

Generating unit step-up transformer voltage regulation if the transmission system step-up transformer has a load tap changer.

Remedial action scheme armed status, if applicable.

Remedial action scheme operated status on communications failure, if applicable.

Remedial action scheme operated status on runback, if applicable.

Remedial action scheme operated status on trip, if applicable.

For each wind or solar aggregated generating facility, where the total nameplate rating is greater than or equal to 5 MW, that submits offers in the energy market, or that has a capacity commitment, and is connected to an electric distribution system including distribution facilities in the service area of the City of Medicine Hat.

Analog

Gross real power as measured at the collector bus.

Gross reactive power as measured at the collector bus.

Generating unit voltage at the collector bus.

Net real power at the point of connection.

Net reactive power at the point of connection.

Frequency at the point of connection.

Potential real power capability, being the real power that would have been produced at the point of connection without aggregated generating facilities curtailment and based on real time meteorological conditions.

Real power limit used in the power limiting control system at the aggregated generating facilities.

Feedback response for the facility limit reason code used in the power limiting control system at the aggregated generating facilities.

Wind speed at hub height as collected at the meteorological tower, (for wind facilities).

Wind direction from the true north as collected at the meteorological tower, (for wind facilities).

Barometric pressure with precision for instantaneous measurements to the nearest 6 HPA (for wind facilities).

Ambient temperature (for wind facilities).

Wind Speed at 2-10m above ground (for solar facilities).

Wind direction from the true north at 2-10m above ground (for solar facilities).

Ambient temperature (for solar facilities).

Global Horizontal Irradiance (for solar facilities).

FROM ISO Facility limit.

FROM ISO Reason for facility limit.
Breaker, circuit switchers, motor operated switches and other devices that can remotely or automatically control the connection to the AES, and does not include manually operated air breaks.

<table>
<thead>
<tr>
<th>Status</th>
<th>0 = Open</th>
<th>1= Closed</th>
<th>N/A</th>
<th>Latency is 30 seconds; Availability is 99%; Mean time to repair is 48 hours</th>
</tr>
</thead>
</table>

### Appendix 3: SCADA Requirements for Energy Storage Facilities

<table>
<thead>
<tr>
<th>Facility/Service Description</th>
<th>Signal Type</th>
<th>Event Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog</td>
<td></td>
<td>Real power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indications as measured at the alternating current terminal closest to each inverter based technology (or the equivalent node) (for battery facilities)</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power of station service over 0.5 MW</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power of station service over 0.5 MW</td>
<td>MVAr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power of each reactive power resource (other than energy storage devices)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power of each reactive power resource (other than energy storage devices)</td>
<td>MVAr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage at the point of connection</td>
<td>kV</td>
<td>+/- 2% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage regulation set point</td>
<td>kV</td>
<td>+/- 5% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy storage device state of charge</td>
<td>kV</td>
<td>+/- 5% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy storage device state of charge</td>
<td>MWHr</td>
<td>+/- 2% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communications failure alarm from remote terminal unit acting as a data concentrator (if applicable)</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communication failure between an intelligent electronic device and any remote terminal unit (if applicable)</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
</tbody>
</table>

### Latency and Availability Requirements Based on Maximum Authorized Real Power

<table>
<thead>
<tr>
<th>Facility/Service Description</th>
<th>Signal Type</th>
<th>Event Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Real power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indications as measured at the alternating current terminal closest to each inverter based technology (or the equivalent node) (for battery facilities)</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power of station service over 0.5 MW</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power of station service over 0.5 MW</td>
<td>MVAr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power of each reactive power resource (other than energy storage devices)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power of each reactive power resource (other than energy storage devices)</td>
<td>MVAr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage at the point of connection</td>
<td>kV</td>
<td>+/- 2% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage regulation set point</td>
<td>kV</td>
<td>+/- 5% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy storage device state of charge</td>
<td>kV</td>
<td>+/- 5% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy storage device state of charge</td>
<td>MWHr</td>
<td>+/- 2% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communications failure alarm from remote terminal unit acting as a data concentrator (if applicable)</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communication failure between an intelligent electronic device and any remote terminal unit (if applicable)</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility/Service Description</th>
<th>Signal Type</th>
<th>Event Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Real power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power consumed as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indications as measured at the alternating current terminal closest to each inverter based technology (or the equivalent node) (for battery facilities)</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power of station service over 0.5 MW</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power of station service over 0.5 MW</td>
<td>MVAr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real power of each reactive power resource (other than energy storage devices)</td>
<td>MW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reactive power of each reactive power resource (other than energy storage devices)</td>
<td>MVAr</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage at the point of connection</td>
<td>kV</td>
<td>+/- 2% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage regulation set point</td>
<td>kV</td>
<td>+/- 5% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy storage device state of charge</td>
<td>kV</td>
<td>+/- 5% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy storage device state of charge</td>
<td>MWHr</td>
<td>+/- 2% of full scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communications failure alarm from remote terminal unit acting as a data concentrator (if applicable)</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communication failure between an intelligent electronic device and any remote terminal unit (if applicable)</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td>Feature</td>
<td>Status</td>
<td>Remarks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>----------</td>
<td>--------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage regulation system status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactive power produced as measured at the alternating current terminal closest to each inverter based technology (for battery facilities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage as measured at the alternating current terminal closest to each inverter based technology or the equivalent bus voltage (for battery facilities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage at the point of connection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency at the point of connection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy storage device state of charge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy storage device state of charge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 4 – SCADA Requirements for Industrial Complexes and Loads

<table>
<thead>
<tr>
<th>Facility / Service Description</th>
<th>Signal Type</th>
<th>Point Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
<th>Resolution</th>
<th>Latency and Availability Requirements Based on Maximum Authorized Real Power</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum authorized real power less than 50 MW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum authorized real power equal to or greater than 50 MW and less than 300 MW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum authorized real power equal to or greater than 300 MW</td>
</tr>
<tr>
<td></td>
<td>Facility / Service Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Latency</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Communications failure alarm from remote terminal unit acting as a data concentrator for one or more generating units to a transmission facility control centre (if applicable)</td>
<td>0 = Normal</td>
<td>1 = Alarm</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Analog</td>
<td>Communications failure indication between an intelligent electronic device and any remote terminal unit acting as a data concentrator</td>
<td>0 = Normal</td>
<td>1 = Alarm</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Status</td>
<td>Breaker, circuit switchers, motor operated switches and other devices that can remotely or automatically control the connection to the AIES; and does not include manually operated air breaks.</td>
<td>0 = Open</td>
<td>1 = Closed</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Analog</td>
<td>Total Remedial action scheme load available</td>
<td>MW</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Amount of load armed</td>
<td>MW</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Remedial action scheme circuit breaker, circuit switcher or other controllable isolating devices</td>
<td>0 = Open</td>
<td>1 = Closed</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Among status of the Remedial action scheme</td>
<td>0 = Disarmed</td>
<td>1 = Armed</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Remedial action scheme operated status on communications failure, if applicable</td>
<td>0 = Normal</td>
<td>1 = Alarm</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Remedial action scheme operated status on runback, if applicable</td>
<td>0 = Normal</td>
<td>1 = Alarm</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Remedial action scheme operated status on trip, if applicable</td>
<td>0 = Normal</td>
<td>1 = Alarm</td>
<td>N/A</td>
<td>30 seconds</td>
</tr>
</tbody>
</table>
## Appendix 5.4 – SCADA Requirements for Transmission Facilities

<table>
<thead>
<tr>
<th>Facility / Service Description</th>
<th>Signal Type</th>
<th>Point Description</th>
<th>Parameter</th>
<th>Accuracy Level</th>
<th>Resolution</th>
<th>Latency and Availability Requirements Based on Transmission Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For each substation</strong></td>
<td>Status</td>
<td>Communications failure alarm from remote terminal unit acting as a data concentrator for one or more generating units to a transmission facility control centre (if applicable)</td>
<td>0 = Normal 1 = Alarm</td>
<td>N/A</td>
<td>30 seconds</td>
<td>latency is 30 seconds; availability is 98%; mean time to repair is 48 hours</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Communications failure indication between an intelligent electronic device and each remote terminal unit acting as a data concentrator</td>
<td>0 = Normal 1 = Alarm</td>
<td>N/A</td>
<td>30 seconds</td>
<td>latency is 30 seconds; availability is 98%; mean time to repair is 48 hours</td>
</tr>
<tr>
<td><strong>Bus</strong></td>
<td>Analog</td>
<td>Bus voltage line-to-line. Ring or split busses require a minimum of two voltage sources</td>
<td>kV</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
<td>30 seconds</td>
</tr>
<tr>
<td><strong>Transformer sending greater than 60 kV</strong></td>
<td>Analog</td>
<td>Real power as measured on the high side terminal of the transformer</td>
<td>MW</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Analog</td>
<td>Transformer voltage regulation setpoint if the transformer has a load tap changer</td>
<td>kV</td>
<td>-</td>
<td>-</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Transformer tap position if the step-up transformer has a load tap changer</td>
<td>0 = Open 1 = Closed</td>
<td>N/A</td>
<td>30 seconds</td>
<td>latency is 30 seconds; availability is 98%; mean time to repair is 48 hours</td>
</tr>
<tr>
<td><strong>Remedial Action Scheme</strong></td>
<td>Analog</td>
<td>Reactive power as switchable reactive power resource - capacitor bank (positive polarity) or reactor (negative polarity)</td>
<td>MVAr</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Reactive power resource control device - SVC, synchronous condenser, or other similar device</td>
<td>kV</td>
<td>-</td>
<td>-</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Automatic voltage regulation status for dynamic reactive power resource - SVC, synchronous condenser, or other similar device</td>
<td>0 = Off 1 = On</td>
<td>N/A</td>
<td>30 seconds</td>
<td>latency is 30 seconds; availability is 98%; mean time to repair is 48 hours</td>
</tr>
<tr>
<td><strong>Transmission line where the nominal voltage is greater than or equal to 60 kV and less than or equal to 200 kV</strong></td>
<td>Analog</td>
<td>Real power</td>
<td>MW</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Breakers, circuit switchers, motor operated switches, or other remotely or automatically controllable isolating device status</td>
<td>0 = Open 1 = Closed</td>
<td>N/A</td>
<td>30 seconds</td>
<td>latency is 15 seconds; availability is 98%; mean time to repair is 48 hours</td>
</tr>
<tr>
<td><strong>Transmission line where the nominal voltage is equal to or greater than 200 kV</strong></td>
<td>Analog</td>
<td>Real power</td>
<td>MW</td>
<td>+/- 2% of full scale</td>
<td>0.5% of the point being monitored</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td>Status</td>
<td>Breakers, circuit switchers, motor operated switches, or other remotely or automatically controllable isolating device status</td>
<td>0 = Open 1 = Closed</td>
<td>N/A</td>
<td>30 seconds</td>
<td>latency is 15 seconds; availability is 98%; mean time to repair is 48 hours</td>
</tr>
<tr>
<td>Facility/Service Description</td>
<td>Signal Type</td>
<td>Point Description</td>
<td>Parameter</td>
<td>Accuracy Level</td>
<td>Resolution</td>
<td>Latency and Availability Requirements Based on Maximum Authorized Real Power</td>
</tr>
<tr>
<td>-----------------------------</td>
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<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum authorized real power less than 50 MW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Latency (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>99.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 seconds</td>
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<td>30 seconds</td>
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<td>4 seconds</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>99.0%</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>30 seconds</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>4 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>99.0%</td>
</tr>
</tbody>
</table>

**Appendix 65 – SCADA Requirements for Ancillary Services**

**Facility/Service Description**

**Signal Type**

**Point Description**

**Parameter**

**Accuracy Level**

**Resolution**

**Latency and Availability Requirements Based on Maximum Authorized Real Power**

<table>
<thead>
<tr>
<th>Maximum authorized real power less than 50 MW</th>
<th>Maximum authorized real power equal to or greater than 50 MW</th>
<th>Maximum authorized real power equal to or greater than 300 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latency (%)</td>
<td>Availability (%)</td>
<td>Latency (%)</td>
</tr>
<tr>
<td>99.0%</td>
<td>48 hours</td>
<td>98.0%</td>
</tr>
<tr>
<td>15 minutes</td>
<td>48 hours</td>
<td>15 minutes</td>
</tr>
<tr>
<td>30 seconds</td>
<td>48 hours</td>
<td>30 seconds</td>
</tr>
<tr>
<td>4 seconds</td>
<td>48 hours</td>
<td>4 seconds</td>
</tr>
</tbody>
</table>

**Latency**

- 30 seconds
- 15 minutes
- 30 minutes
- 4 minutes

**Availability**

- 99.0%
- 98.0%
- 97.0%
- 96.0%

**Accuracy**

- ±0.1 Hz
- ±0.01 Hz
- ±0.001 Hz
- ±0.0001 Hz

**Resolution**

- 0.01001 Hz
- 0.00010 Hz
- 0.00001 Hz
- 0.000001 Hz

**Latency and Availability Requirements Based on Maximum Authorized Real Power**

- 99.0% availability
- 98.0% availability
- 97.0% availability
- 96.0% availability

**Availability ( % )**

- 99.0%
- 98.0%
- 97.0%
- 96.0%

**Latency ( seconds )**

- 10 seconds
- 30 seconds
- 1 minute
- 4 minutes
<table>
<thead>
<tr>
<th>Status</th>
<th>LSSI provider status indication</th>
<th>0 = Disarmed</th>
<th>1 = Armed</th>
<th>N/A</th>
<th>30 seconds</th>
<th>15 seconds</th>
<th>98.0% mean time to repair is 48 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>(From ISO) load shed service for imports dispatch status</td>
<td>LSSI provider trip status indication</td>
<td>0 = Disarmed</td>
<td>1 = Armed</td>
<td>N/A</td>
<td>30 seconds</td>
<td>15 seconds</td>
<td>98.0% mean time to repair is 48 hours</td>
</tr>
<tr>
<td>(From ISO) load shed service for imports trip status</td>
<td>LSSI provider trip status indication</td>
<td>0 = Disarmed</td>
<td>1 = Armed</td>
<td>N/A</td>
<td>30 seconds</td>
<td>15 seconds</td>
<td>98.0% mean time to repair is 48 hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>LSSI provider status indication</th>
<th>0 = Disarmed</th>
<th>1 = Armed</th>
<th>N/A</th>
<th>30 seconds</th>
<th>15 seconds</th>
<th>98.0% mean time to repair is 48 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>(From ISO) load shed service for imports dispatch status</td>
<td>LSSI provider trip status indication</td>
<td>0 = Disarmed</td>
<td>1 = Armed</td>
<td>N/A</td>
<td>30 seconds</td>
<td>15 seconds</td>
<td>98.0% mean time to repair is 48 hours</td>
</tr>
<tr>
<td>(From ISO) load shed service for imports trip status</td>
<td>LSSI provider trip status indication</td>
<td>0 = Disarmed</td>
<td>1 = Armed</td>
<td>N/A</td>
<td>30 seconds</td>
<td>15 seconds</td>
<td>98.0% mean time to repair is 48 hours</td>
</tr>
</tbody>
</table>