# MRP Energy – Detailed Design Engagement

## Physical Withholding

**Meeting Summary**

Background:

The IESO hosted a technical session on the physical withholding design consideration within the Energy detailed design within the Market Renewal Program (MRP) on January 23, 2020 in downtown Toronto (IESO Offices) from 1 p.m. to 4 p.m.

The focus of the discussion was the concept of physical withholding as it relates Market Power Mitigation. Specifically, the conversation centered around design elements related to the approach to physical withholding, the conduct and impact testing, and the result of conduct and impact test failure. Required reading material was shared two weeks in advance of the session to support the discussion on January 23.

The purpose of the in-person technical session was to answer stakeholder questions and understand their perspectives on the proposed elements of the design contained in the reading material. Stakeholder perspectives help inform the upcoming draft detailed design documents. Once released, the design documents are open to additional engagement, feedback and discussion with stakeholders.

Attendance:

The following organizations participated in the session:

| | |
|---|---|
| Bruce Power | Ontario Energy Association |
| Capital Power | Ontario Power Generation |
| Evergreen Energy | Power Advisory |
| Greater Toronto Airports Authority | TC Energy |
| McCarthy Tetrault | TransAlta |
| Northland Power | Workbench |

Discussion Topics:

Overall, the discussion with stakeholders focussed around how to reduce the administrative burden and complexity for a Market Power Mitigation regime. The following themes emerged from stakeholder questions and comments during the session:

- Stakeholders discussed using a must offer provision with the Market Rules as a potential alternative to the MPM framework for assessing physical withholding. There were also comments asking the IESO to focus on the impactful events, and isolate the problem of physical withholding.

- The IESO was asked to consider the role of offer strategy, the effect of outages, and the impact on long-lead time resources when determining the reference quantity for each facility.
- Stakeholders asked for an understanding of the role of the Market Power Mitigation (MPM) framework for assessing physical withholding, and how that intersects with the role of the IESO's Market Assessment and Compliance Division (MACD). There was also conversation regarding how dispute resolution could factor into the framework.
- Stakeholders asked how other jurisdictions manage their MPM framework for assessing physical withholding, and what Ontario can learn from issues in neighbouring markets including the potential administrative burden of the MPM framework for assessing physical withholding. Also worth looking at how other jurisdictions manage the role of ambient temperatures, de-rates, and head levels at hydroelectric facilities.
- Stakeholders asked about the potential of daily/hourly values for registered capacity to assist in avoiding false positives.
- Stakeholders commented on the potential complexity of how physical withholding for operating reserve is managed, given the co-optimization of energy and operating reserves.
- Stakeholders asked the IESO to consider the costs and administrative burden of the MPM framework for assessing physical withholding on participants, versus its intended outcome.
- There was discussion on the impact of the framework on smaller resources and demand-side participants. There was also some conversation regarding how metering precision and the IESO's current dispatch deadbands may affect how the MPM framework handles potential withholding through under-production of scheduled supply.
- There were also discussions about intent, the possibility of a grace period preventing public disclosure for events for a period following go-live, the role of the multipliers in coming to settlement charges, and when multipliers are triggered.

Next Steps:

The IESO will be providing stakeholders with additional research regarding the MPM systems in other jurisdictions. When that research is complete, it will be posted on the Engagement webpage. The feedback and discussion with stakeholders at these sessions is being used to inform the detailed design sections which will be released, and subject to stakeholder comment and discussion in the upcoming few months.

Capital Power
1200-10423 101 Street NW
Edmonton, AB T5H 0E9

January 30, 2020

**Via Email: engagement@ieso.ca**

Independent Electricity System Operator
1600, 120 Adelaide Street
Toronto, Ontario
Postal Code M5H 1T1

**Attention:** Darren Matsugu

Dear Mr. Matsugu:

**Re: Independent Electric System Operator ("IESO") – Market Renewal Program ("MRP") Detailed Energy Market Design: Physical Withholding**

Capital Power appreciates the IESO's ongoing efforts to communicate elements of its plans for reforms to the existing energy market as part of the MRP. The engagement session held on January 23, 2020 provided a helpful opportunity to discuss issues and feedback related to the IESO's proposed approach to identifying and sanctioning Physical Withholding ("PW") in IESO-administered markets, and Capital Power is pleased to summarize its comments here.

1. ***The IESO should consider replacing its proposed framework for identifying and sanctioning PW with an approach that is centered on a "must-offer" requirement.***

   The IESO's approach to addressing PW appears to be unnecessarily complex. Rules addressing physical withholding should be designed to ensure that available *and procured* capacity - capacity that has been procured through market or contract mechanisms – is offered into the IESO-administered market unless there is a valid operational reason for why the procured capacity is unavailable. An analysis of price effects arising from PW may inform the assessment of whether there has been market harm caused by the participant's withholding, and may further be considered when determining a compliance penalty under the market rules, but this inquiry is separate and distinct from the question of whether a market participant has physically withheld available capacity.

2. ***The IESO should not have such broadly defined discretion in its decisions to investigate PW. The conditions for effective competition require a fair and consistent application of market rules, and this cannot be achieved where the IESO has such broad discretion to determine whether it will investigate violations of the PW rules.***

   The complexity of the IESO's proposed approach to PW is implicitly reflected in the fact that the IESO has also proposed to award itself broad discretion when determining whether to investigate possible

PW. The IESO has proposed that its discretion be limited only by the following criteria, permitting the IESO to decline to investigate where:

- the IESO does not have sufficient reliable information upon which to conduct the conduct and impact testing;
- the effort that would be required to conduct the analysis is substantially more relative to the materiality of the anticipated price impact; or
- performing the analysis would constitute an inefficient utilization of the IESO's resources.

Capital Power believes that effective competition is a critical element of ensuring that MRP delivers expected benefits to the IESO-administered markets, and that the framework for identifying and sanctioning PW should not permit the IESO to investigate possible violations only where – in the IESO's subjective view, the "effort" required is incommensurate with "anticipated" but unknown results.

Such broad discretion embedded in the PW rules opens the door to an arbitrary application of IESO rules. The exercise of such discretion would also be inconsistent with the IESO's obligations under the Electricity Act if the rules permit the IESO to decline to investigate physical withholding without first determining whether competition has been restricted.

If the IESO is concerned about the availability of investigative resources, Capital Power respectfully submits that the resource burden would be diminished if the IESO adopted a simplified PW framework based on a must-offer requirement.

***3. The PW framework should apply only to offers of facility capacity.***

There is no basis for restricting a market participant's commercial judgment and discretion as to whether it would like to offer its available capacity as energy or operating reserve *unless* that market participant has also been awarded separate capacity payments for discrete IESO-administered market products. If a market participant has offered its capacity into the same IESO-administered markets for which it receives a capacity payment, the market participant should be deemed to have complied with the PW rules.

Furthermore, the PW rules should apply only to facility offers, not real-time facility production. Dispatch compliance rules sufficiently incentivize compliance with dispatch., Where non-compliance with dispatch is established the IESO may assess the market effects of such non-compliance, this assessment in its determination of compliance penalties. There is no clear need or basis for applying the PW framework to real-time generation.

***4. The IESO should assure market participants that system enhancements will facilitate the timely and effective communication of changes to available operating capacity.***

In order to facilitate compliance with the PW rules and diminish associated administrative burdens, the IESO should ensure that its systems facilitate the timely and effective communication of changes to a facility's operating capability. The IESO system should permit the communication of changes to available capacity through a participant's offer blocks so that real-time trading staff can promptly notify the IESO of changes to available capacity for reasons such as forced outages or derates due to changes in ambient temperatures.

Capital Power thanks the IESO for the opportunity to participate in the IESO's detailed MRP design process. We would be pleased to respond to any questions or comments the IESO may have regarding our feedback.

Sincerely,
Chris Sutherland
Capital Power

cc:
Santi Churphongphun, Capital Power
Jason Comandante, Capital Power
Emma Coyle, Capital Power
Kelly Lail, Capital Power

## IESO Engagement

**From:** Mike Zajmalowski
**Sent:** February 17, 2020 10:26 AM
**To:** Darren Matsugu; Jonathan Scratch
**Cc:** Mike Zajmalowski; Sushil Samant; Jon Veldhuizen; IESO Engagement
**Subject:** Physical Withholding Market Renewal Session - Supplemental comments



Hi Jon/Darren

After participating in the IESO's Physical Withholding sessions on January 23, 2020, I felt it was important to follow up with some additional comments (in addition to what we previously provided) to address some of our immediate concerns. My apologies that these are coming in so late. Hopefully you're still able to consider them in your work.

What wasn't clearly stated, but was implied, was that the IESO was taking the starting position that it expected generators to be offering the nameplate/registered capacity of their resources into the market. For one, it was not clear how the IESO was defining the "registered capacity". For example they could have been indicating registered capacity was the same as nameplate capacity. However some resources register different capabilities based on different ambient conditions (e.g. 35C, 20C, 10C, 0C, -10C) The IESO indicated that any deviation from the registered capacity of resources were expected to have corresponding derate slips submitted to the IESO. For e.g. for a hydroelectric facility the rated registered capacity for a unit is the maximum amount that can be provided based on the most optimal head (difference in elevation between reservoir and tailrace). Because reservoir levels fluctuate all the time throughout the day you could have a situation where you are submitting derate slips hourly for every single hydroelectric facility. The IESO in its proposal acknowledged that generators can utilize the compliance deadband to account for some instances where the hourly capability of a resource is only materially different from the registered value. However only applying a 15 MW deadband would not address this issue for many resources.

For Thermal resources, the difference between a summer and winter time capability could be in excess of a 10% difference. For e.g. a 600 MW combined cycle gas facility may only be capable of generating 540 MW during a hot summer day where the ambient temperature is 30 Celsius. The way participants would typically manage the difference between registered capacities and what their capabilities were adjusted for ambient conditions was by only submitting the ambient adjusted capabilities as offers. Derate slips were reserved more fore mechanical limitations such as tube leaks, etc. Applying the 15 MW compliance deadband to a thermal facility would not provide sufficient coverage, and the IESO's approach would require many thermal resources to submit derates on an hourly basis. This creates an administrative burden on the participant and the IESO's control room.

When it comes down to coming up with reference levels for each resource, the number of scenarios that would need to be created in order to manage the IESO's proposed granularity in the extreme case of 1 MW deviation being identified as physical withholding would be extreme. In theory for a thermal facility you would likely need to create a reference value for every single degree change between 40 Celsius and -40 Celsius in the extreme event. The accuracy of creating values for these scenarios on it's own is challenging enough since there are other factors that would impact the capability of a resource in those circumstances. Typically a resource may not submit derates if the capability differs by less than 10 MW (as per current market rules). Applying the IESO proposed methodology wouldn't allow participants to manage the administrative burden within that existing market design.

The IESO also discussed the approach for physical withholding when it comes to Operating Reserve indicating "Physical withholding occurs when one or more market participants do not offer energy or operating reserve that is available to

offer" with a footnote indicating that "The document only discusses how the conduct and impact test for physical withholding will apply to the energy market. The IESO will also use a conduct and impact test for physical withholding of operating reserves." The OR market is a voluntary market. Participants are not required to offer operating reserve, but do so if it's economic to do so. We have concern with how the IESO plans to adopt this requirement and the potential negative impact this could have to participants.

It's unclear how the IESO will respect existing limitations from facilities with respect to fuel availability, staffing availability and other factors typically referred to as SEAL (Safety, Equipment Damage and Applicable Law). Depending on the time of year, and the state of a resource, it could take a facility a short period of time to respond to market signals, or it could take in excess of 12 hours to respond. In circumstances where it will require a longer period of time, it's unclear how the IESO will respect existing registered values like lead time which is very different than other registered values like MRT. Lead time respects the time it takes from initiating a start for a facility to the point when the facility reaches its MLP. Not all facilities have contracted for the same services (transportation and storage for gas facilities) that give them the same flexibility to respond t market signals as quickly as others. Under the IESO's current capacity procurement design – it's not realistic to expect everybody to be treated the same without better understanding why some are very different from each other.

Proposal:
What I would recommend is a combination of the following:

- Having resource register more ambient condition values to address the variations in capability given a wider range of temperatures (for e.g. in 5 Celsius increments between -40 Celsius to +40 Celsius). Applying the compliance deadband to these values would then give each resource some other flexibility given the current market rules indicate a derate is not required for capability changes of less than 10 MW. This concept would also apply for hydroelectric, however instead of ambient conditions you may wish to find out how much a resource's output fluctuates given its range in the reservoir. For. E.g. if a hydro facility is rated for 80 MW, and the reservoir ranges from 150.00-148.00 metres above sea level, and under different conditions (summer, winter, freshet, etc.) the output ranges from 80 MW to 72 MW, then have resources register that value so that you're acknowledging their capability varies given those conditions, but doesn't require the resources to be submitting derates hourly.
- Would suggest also changing the IESO threshold of where 1 MW is used at the lowest granularity to flag for possible physically withholding to 5 MW. I can appreciate the IESO wanting to get this to be granular, however metering errors would often result in many false positives.
- Must bid requirements matched to a resources contract (e.g. CES) or capacity committed in the capacity auction. Any reduction in capability that differs from the contracted amount would be derated with the IESO by way of an outage slip (continue respecting existing market rules – re: 10 MW materiality).
- Making it clear that the IESO will respect lead times for resources, which is defined as "The amount of time between the initiation of the start-up sequence and the time at which a generator is able to reach its minimum loading point, which depends on the technical requirements of the facility. Lead time determines the amount of notice a generator needs to respond to a start-up instruction." For e.g. if a resource has a lead time of 12 hours, then it should not be offering any energy within 12 hours of real time because it can't physically meet the requirement. The facility would not be physically withholding in this instance. How has the IESO considered this in its design?

I'd be more than willing to sit down and brainstorm any of these ideas. Also, if any are not clear I'm available at anytime to provide further clarity.

Thank you

**Mike Zajmalowski |** Director Market Compliance & Integration
Northland Power Inc.

ONTARIO POWER GENERATION

700 University Avenue

IESO Stakeholder Engagement

February 6, 2020

# OPG Comments –
# Market Renewal Energy Workstream Detailed Design: Physical Withholding

This letter provides OPG's comments on the IESO's pre-reading materials for physical withholding market mitigation (Reference [1]) and the stakeholder session on January 23, 2020. OPG supports the IESO's stated objective to design market mitigation mechanisms "to reduce the occurrence of the material exercise of market power but avoid unnecessary intervention in market outcomes" (page 4 of Reference [1]). OPG is concerned that some elements of the proposed approach do not take into account the unique characteristics of hydroelectric generation and would over expose market participants and the IESO to extensive compliance reviews. OPG suggests that the IESO consider simpler approaches that include overall materiality in the criteria for further investigation of potential exercises of market power. In addition, the market power mitigation framework will need to evolve as the market renewal detailed design further develops. This includes the integration of physical and economic withholding.

In OPG's view, the IESO's proposed framework needs to:

- Consider and account for the unique characteristics of hydroelectric resources for both reference quantities and daily energy limits.
- Address the dynamic nature of materiality limit(s) for both conduct and impact thresholds, or in lieu of this flexibility consider the administrative burden that implementing immaterial limits will have on market participants and IESO staff.
- Provide certainty and transparency in the IESO's initial assessments of physical withholding quantities by publishing private reports to market participants in advance of the market submission deadline.
- Contemplate the existing IESO market rules and interpretation bulletins surrounding market participants' obligations to follow IESO dispatch instructions, as described in both Market Rules Chapter 3 and Market Rule Interpretation Bulletin (IMO_MKRI-0001 Version 6.1 [2]).
- Address the impact of joint-optimization of energy and operating reserve in conjunction with the market power mitigation framework for both energy and operating reserve reference quantities.

OPG has provided eleven detailed review comments in the subsequent pages of this letter. OPG is committed to working with the IESO, its vendors and other market participants to develop a market mitigation framework that provides certainty, transparency, and supports competition and efficiency in the renewed market.

We look forward to future discussions and collaboration.

Lynn Wizniak

Ontario Power Generation

## Comment #1: Challenge with Establishing Physical Withholding Reference Levels for Hydroelectric Energy Offers

The IESO's proposed methodology for calculating reference quantities (page 6 of Reference [1]), states:

"*For energy, the initial estimate of the reference quantity shall be equal to the unit's installed capacity (or the IESO's centralized forecast for variable generators), modified by any relevant operating restrictions or de-ratings.*"

This proposal fails to consider changes to hydroelectric capability that occur due to changes in head. A hydroelectric unit's registered capacity is based on the output it can achieve at maximum head. A unit's actual head and thus hourly capability fluctuates in real-time based on operating conditions including: water inflow, discharge (based on IESO dispatch), upstream and downstream relationships, lake level and river flow limitations, station storage characteristics, etc…

Under this proposal, prior to day ahead market submissions, market participants would be required to submit hourly derates/outages based on forecast expectations of head with expected hourly capabilities for the next day. In real time, hydroelectric operating conditions are re-evaluated/reconciled every hour, which will likely require revision to the previously submitted derates/outages for the remainder of the day. This approach would significantly increase the administrative burden on both market participants and IESO operations staff.

As an alternative approach, OPG suggests registering a new parameter called "minimum head based capability" for each hydroelectric generating which can then be used to calculate a physical withholding reference:

*Physical Withholding Reference Level (single unit) = Max ((min head based capability - derates/outages), 0)*

The above calculation could then be summed for resources with more than one unit.

Hydroelectric units would register this new parameter as part of facility registration.

## Comment #2: Clarification on Application of Reference Levels to Day Ahead and Real Time Markets

OPG requests clarification on whether reference levels apply to both the day ahead and real time markets. If they apply to both, the level will need to be different per market and may also need to be changed hourly.

## Comment #3: Need for Further Review/discussion on Trade-off Functions for Energy and Operating Reserve

At the January 23rd meeting, the IESO stated that the trade-off functions for energy and operating reserve will remain the same as in today's market. Whereas the IESO's dispatch scheduling & optimization (DSO) algorithm may not change, introducing a market power mitigation framework that tests compliance of the joint-optimization outcome will affect market participant operations and further work needs to be considered in the design to avoid unintended market consequences. This includes the joint-optimization of energy and operating reserve, make whole payments, use of operating reserve demand curve, outage slips for operating reserve, etc., as these design elements will affect the trade-off functions. OPG would appreciate further stakeholder discussion on these items and their impact on trade-off functions prior to the issue of the detailed design.

## Comment #4: Proposal for new "Energy plus OR Limit" parameter to improve Joint-optimization of Energy and Operating Reserve

Energy and operating reserve (OR) have different market rules which impact how they are offered. For OR, a resource must be able to provide the energy activated by the operating reserve activation (ORA) for one hour. Along with the hydroelectric capability changes highlighted in Comment #1, hydroelectric resources also need to constantly evaluate whether they can provide OR for one hour. This uncertainty may lead to fluctuating OR quantities offered during different times of the day based on operating conditions.

For example, energy/OR offers early in the day may have to be reduced to ensure sufficient water remains available such that later energy/OR offers can remain above reference levels. If market participants are constrained in their offers in order to be physically compliant with the market rules, the result could be reduced system efficiency, higher OR prices, and higher overall cost to ratepayers.

To improve OR scheduling efficiency and reduce the risk of infeasible schedules, OPG proposes a new parameter term, "Energy + OR Limit", which specifies the maximum combined quantity of energy plus OR that can be sustained for one hour given water constraints. This new parameter would be particularly beneficial in the day ahead timeframe to reduce the likelihood of an infeasible schedule. An example of how this new parameter would affect joint optimization is shown in Appendix A.

## Comment #5: Proposed Conduct Thresholds from Table 1 of Reference [1] are too Narrow

OPG is concerned that the reference quantity conduct thresholds defined in Table 1 of Reference [1] are too narrow for when global market power is triggered. The 200 MW threshold is immaterial when evaluated against 20,000

MW of primary demand in Ontario. In this context, OPG suggests the IESO perform materiality analysis based on the expected size of a broad constrained area or global market power.

Also, the single resource real-time output of 1 MW injected quantity threshold should not be broadly applied to all of the conduct threshold trigger buckets (i.e. global market power, broad constrained area, narrow constrained area, dynamic constrained area, reliability constraint). OPG suggests the IESO develop a process to recommend material difference for an injected quantity for each of the triggers. There are existing IESO Market Rules and Interpretation Bulletins surrounding market participants' obligations to follow IESO dispatch instructions, as described in both Market Rules Chapter 3 and Market Rule Interpretation Bulletin (IMO_MKRI-0001 Version 6.1 [2]) that can be used to assist in developing the new compliance regime.

## Comment #6: Inappropriate Methodology for Setting Hydroelectric Daily Energy Limit Reference Levels

The use of a rolling 30-day median for the daily energy limit (DEL) reference level is inappropriate as a conduct threshold for hydroelectric resources due to the weather influenced nature of inflows, and also considering that inflows/outflows may be mandated by external controlling authorities with little to no advance notice. For example as freshet ends and summer operating limits come into effect, there is significant reduction in hydroelectric capability, which could trigger failure of the DEL conduct threshold. Other DEL conduct threshold failures may be unnecessarily/immaterially caused by reductions in capability after precipitation events, drawdown periods, or when abiding by changing operating limits as required by water management plans.

In the event that IESO decides to impose the DEL physical withholding framework on hydroelectric resources, the DEL reference level needs to be assessed at the station level. As with previous detailed design discussions with the IESO, many hydroelectric stations have one or more units sharing the same fuel/forebay.

## Comment #7: Certainty and Transparency in Physical Withholding Reference Levels - Private Report

OPG requests that the IESO publish private reports with the physical withholding reference levels prior to the submission deadline of the day ahead market. This will provide market participants with the ability to assess the physical withholding levels prior to submission of energy and operating reserve offers. If the IESO, is also performing physical withholding tests on real-time offers, the real-time reference levels should also be available to market participants in private reports.

## Comment #8: Minimum Energy Price Required for Physical Withholding Test

Section 4.1 of Reference [1] specifies that conduct and impact testing will be confined when the energy locational marginal price (LMP) at the resource is above $25/MWh. A discussion paper published by the Market Surveillance Panel (MSP) in 2006 [2] recommended a pre-dispatch hourly Ontario energy price above $50/MWh for conduct and impact testing to be applied (see page 27 of Reference [2]). OPG requests that the IESO provide rationale for the $25/MWh threshold as opposed to the $50/MWh threshold previously recommended by the MSP. OPG is concerned that the use of the lower threshold will increase the need for and frequency of representations required to support alleged failed tests that have negligible impact on system costs

## Comment #9: Additional Work Required to Develop Governance and Decision Making Processes dealing with the Market Power Mitigation Framework

It is important that a rigorous, efficient governance and decision making process to address market power mitigation is developed as part of the detailed design. Market participants will be taking on additional risk with the implementation of Market Renewal and will need confidence in the proposed approach used to review offers.

OPG appreciates and looks forward to negotiations with the IESO on the reference levels for physical withholding. Similar to economic withholding, in the determination of these levels, there needs to be a decision making process established for the reference level, a periodic review of these levels (say every 3 years), and an approach to address appeals. The IESO may wish to consider using an independent third party for the design of the reference level methodology and the finalization of these levels with market participants.

One component of governance that needs to be addressed is the approach used to review alleged market power incidents by both the IESO and the Market Assessment and Compliance Division (MACD) should there be an unsuccessful conduct and impact test. As discussed at the January 23 meeting there is a concern that a market participant may be subject to extensive review of an event more than once. OPG supports that exercise of market power needs to be avoided, however, the mitigation regime to achieve this outcome needs to be efficient and cost effective. With this in mind, OPG requests additional information on how the new market power mitigation rules will be integrated with existing MACD enforcement. This includes whether market participants could be subject to both the new market mitigation rules as well later MACD investigation. OPG would also like to know which group within the IESO will manage the new market mitigation processes (is it MACD?) and any confidential provisions between these groups.

## Comment #10: Failed Conduct Test Notification

OPG recommends that the five day limit for a market participant to provide justification following notification of a failed conduct & impact test be increased to at least ten business days to allow sufficient time for proper review and representation. The timeframe following an alleged failed conduct & impact test for the IESO to notify the market participant needs to be clarified and should be designed to be comparable to the time for the market participant to respond.

## Comment #11: Metering Deadband for Market Mitigation

As additional capital costs could be incurred by market participants to convert existing infrastructure to track revenue meter data in the control room, a deadband should be considered as part of reference values to reconcile operating meter data with revenue meter data in order to minimize limited value expenditures to assess compliance. With this in mind, OPG would like confirmation on whether market mitigation will be performed using revenue or operating meters.

## References

[1] IESO, "*Stakeholder Engagement Pre-Reading Physical Withholding – January 23, 2020*"" January 2020.
[2] IESO Market Rule Interpretation Bulletin, "*Compliance with Dispatch Instructions Issued to Dispatchable Facilities",* IMO_MKRI-0001 Version 6.1, June, 2009.
[3] MSP Discussion Paper, "*Market Power Framework For the IESO-Administered Electricity Market – Proposed Framework for Identification of the Exercise of Market Power*", November 2006.

APPENDIX A:

## Example of New Proposed "Energy plus OR Limit" Parameter for enhanced Hydroelectric Joint-Optimization

The Issue: The quantity a resource can achieve and sustain in an ORA is contingent on the current energy dispatch which fluctuates based on energy price. There is no parameter to limit the total amount dispatched for energy and scheduled for OR.

Example:

- Energy offer: 60 MW @$20, 70 MW @$40, 100 MW @ $100
- 10S OR offer: 10 MW @ $0.20, 70 MW@$100 (Note the 100 MW lamination is not offered)

Only 10 MW of OR offered to coincide with energy dispatch of 60 MW based on Predispatch schedules – 70 MW is achievable for 1 hour. 100 MW is only achievable for 15 minutes.

Scenario 1: **Pre-dispatch equals MCP at $25**

- MCP $25 and OR Price $1
- Energy Dispatch: 60 MW
- OR Schedule: 10 MW
- ORA to 70 MW

Outcome: Resource ramps to 70 MW in less than 10 minutes and remains at 70 MW for one hour.

Scenario 2: **Pre-dispatch Energy at $25. Market participant expects same outcome as Scenario 1 except MCP increases to $50**

- MCP $50 and OR Price $1
- Energy Dispatch: 70 MW
- OR Schedule: 10 MW
- ORA to 80 MW

Outcome: Resource ramps to 80 MW in less than 10 minutes. After 25 minutes the resource derates to 70 MW for water control. It **FAILS** the ORA since it was not able to provide one hour of OR.

The Proposed Solution: Market Enhancement – Energy + OR Limit (an additional field to reflect actual OR capability for 1 hour)

Example (as above):

- Energy offer: 60 MW @$20, 70 MW @$40, 100 MW @$100
- 10S OR offer: 10 MW @ $0.20, 70 MW @$100
- Energy + OR limit: 70 MW

Scenario 3: Scenario 2 with a new parameter "Energy + OR Limit" of 70 MW

- MCP $50 and OR Price $1
- Energy Dispatch: 70 MW
- OR Schedule: 0 MW

Outcome: No ORA and no issue with non-compliance.