



Market Rule Amendment Submission

This form is used to request an amendment to, or clarification of, the *Market Rules*. Please complete the first four parts of this form and submit the completed form by email or fax to the following:

Email Address: Rule.Amendments@theIMO.com

Fax No.: (416) 506-2847 Attention: Market Rules Group

Subject: *Market Rule Amendment Submission*

All information submitted in this process will be used by the *IMO* solely in support of its obligations under the *Electricity Act, 1998*, the *Ontario Energy Board Act, 1998*, the *Market Rules* and associated policies, standards and procedures and its licence. All submitted information will be assigned the *confidentiality classification* of “public” upon receipt. You should be aware that the *IMO* will *publish* this *amendment submission* if the *Technical Panel* determines it warrants consideration and may invite public comment.

Terms and acronyms used in this Form that are italicized have the meanings ascribed thereto in Chapter 11 of the *Market Rules*.

PART 1 – SUBMITTER’S INFORMATION

Please enter contact information in full

Name: IMO Staff	
(if applicable) <i>Market Participant / Metering Service Provider No.</i> ¹ : N/A	Market Participant Class: N/A
Telephone: 416-506-2801	Fax: 416-506-2847
Email Address: rule.amendments@theimo.com	

PART 2 – MARKET RULE AMENDMENT SUBMISSION INFORMATION

Subject: Market Evolution Program
Title: Multi-interval Optimization – Permissions and Obligations
Nature of request (please indicate with X): <u> X </u> Alteration <u> </u> Deletion <u> </u> Addition Clarification
Chapter: 7, 11 Appendix: 7.1 Sections:
Sub-sections proposed for amending/clarifying : 2.2.6A (new), 7.1A

¹ This number is a maximum of 12 characters and does not include any spaces or underscore.

PART 3 – DESCRIPTION OF THE ISSUE

Provide a brief description of the issue and reason for the proposed amendment. If possible, provide a qualitative and quantitative assessment of the impacts of the issue on you and the *IMO-administered markets*. Include the Chapter and Section number of the relevant market rules.

As part of the Market Evolution Program the IMO has been working with market participants to develop and implement multi-interval optimization (MIO). It is felt there are many benefits that may be realized by the introduction of MIO. The key benefits are:

- Improved Unit Scheduling – The optimized solution, based on future interval requirements, will automatically solve a number of reliability issues. By recognizing ramp rate restrictions for future intervals the DSO schedules resources in advance of actual requirements to allow ramp rate capability to be utilized to solve for reliability concerns.
- Operational Stability – Reduced Unit Cycling - A longer optimization period creates a dispatch solution that schedules resources recognizing the requirements over future intervals. This has the effect of smoothing dispatch instructions and reducing the number of start/stop sequences for hydroelectric generation facilities and ramping up and ramping down dispatch instructions for slow moving fossil units. This should result in an increase in overall unit availability due to reduced stress on facilities. In addition, the Real Time Constrained (RTC) Dispatch Scheduling Optimizer (DSO) will respect the limitation that some thermal generation facilities are unable to change direction without some period of steady operation. This will be a configurable value of either 0, 1 or 2 intervals.
- Operational Stability – Improved Compliance – The addition of dispatch advisories to market participants indicating potential future dispatch targets allows market participants to proactively position resources to manage the transition to new dispatch instructions. The overall anticipated effect is the reduction of non-compliance with dispatch instructions.
- Improved Market Efficiency – The optimized solution should improve market efficiencies by reducing constraint payments caused by limited ramp compared to today’s myopic 5-minute optimization and yield a more economically efficient utilization of resources.

For further information regarding the MIO rule amendments regarding the dispatch algorithm please refer to MR-00246-Q00.

The MIO project proposes that the existing Real-Time Constrained Dispatch Scheduling Optimizer (RTC DSO) be enhanced such that it employs a formal multi-interval optimization technique. This enhanced function, MIO, will determine security-constrained economic dispatch schedules for all resources such that they are optimally utilized over a selected number of intervals. Optimization is performed for 5 "critical" intervals within a forward looking study horizon of up to 11 intervals. These "critical" intervals are selected every 5 minutes based on a set of defined selection criteria that considers both most efficient optimization and information that is most beneficial for facility operators. The Dispatch Interval is always selected as a critical interval and the resulting schedule is issued to the respective market participants in the form of dispatch instructions using the same mechanisms that are currently used. The schedules for the remaining critical intervals are communicated to the respective market participants in the form of Dispatch Advisories, which are issued every 5 minutes. Market participants have identified a number of circumstances that occur in real time where dispatch instructions are issued that generation facilities are either unable to physically follow or, if followed

PART 3 – DESCRIPTION OF THE ISSUE

may cause equipment damage. These include the following:

- **Minimum Loading Point** – Many generation facilities have a requirement to operate at or above a “minimum” output level or Minimum Loading Point. These facilities cannot operate below those levels under stable conditions without ignition support unless they are either synchronizing or being shutdown. The RTC DSO should not schedule these units below this minimum output level unless the unit is synchronizing or shutting down.
- **Start Up and Shut Down Requirements** - After a non-quick start facility synchronizes it must be dispatched by the RTC DSO, to its minimum load or above. While on line the unit should never be dispatched below its minimum load unless the pre-dispatch schedule indicates the unit is coming out of service and a shutdown has been confirmed by the Control Room Operator in the Unit Commitment Manager application.
- **Dispatch Trajectory (Period of Steady State Operation)** – Many Thermal generation facilities are unable to follow dispatch instructions that change their direction without some period of steady operation. The RTC DSO will ensure that these units will not receive a dispatch instruction to reverse direction without a minimum period of steady state operation of 1 or 2 intervals After a pre-determined minimum period of steady state operation the unit will be in a position to be normally dispatched.
- **Forbidden Operating Range** – Hydroelectric generation facilities have operating ranges where the units are unable to maintain steady operation without causing equipment damage. The RTC DSO should not schedule hydroelectric generation facilities in these predefined operating ranges. There are some circumstances where it may not be possible to avoid dispatching a unit in its forbidden region. An example is when ramp limitations will not allow a generation unit to move through the region in a single interval. Unsafe ranges for aggregated facilities should also be respected.

PART 4 – PROPOSAL (BY SUBMITTER)

Provide your proposed amendment. If possible, provide suggested wording of proposed amendment.

MR-00245-Q00 proposes to specify the new obligations and permissions necessary to facilitate the introduction of MIO and to facilitate the introduction of additional features which are being built into MIO to deal with specific operational issues that have been encountered to date. These issues are most pronounced under the current single interval optimization design. While MIO improves the issues, additional features are required to more fully address them.

First, it is proposed to insert two new sections in Chapter 7 of the market rules.

Section 2.2.6A would specify the following:

- A market participant may submit facility specific data such as minimum loading point, forbidden regions, and period of steady operation.
- The IMO may request additional technical data to support the validation of the submission of facility specific data noted above.
- The IMO may deny a registration request for facility specific data such as minimum loading point,

forbidden regions, and period of steady operation where, in the IMO's opinion the technical data submitted does not support the request.

- If a market participant submits forbidden region data for a facility it must be reflected in their bids or offers.
- If no data is submitted the IMO shall assign default values for the minimum loading point, forbidden regions, and period of steady state operation as per the applicable market manual.
- Where data was submitted by a market participant, but the IMO deemed that the data was not supported by additional technical information requested by the IMO, the IMO shall assign default values for the minimum loading point, forbidden regions, and period of steady state operation as per the applicable market manual.
- The IMO shall respect facility specific data that has been submitted in its determination of the real-time schedule.

Section 7.1A would specify the following:

- The IMO shall issue dispatch advisories to all registered dispatchable market participants, however, the registered dispatchable market participant will not be obligated to follow these advisories.

Appendix 7.1 – Energy Offer Information

- Section 1.1.5 to specify submitted price-quantity pairs should not overlap both forbidden and non-forbidden regions. This would be only where an MP has elected to specify such a range for its registered facility.

In addition it is also proposed to insert into Chapter 11 of the market rules two new definitions, namely, “forbidden regions” and “period of steady state operation.”

PART 5 – FOR *IMO* USE ONLY

<i>Technical Panel Decision on Rule Amendment Submission</i>	
MR number: MR-00245-Q00	
Date submitted to <i>Technical Panel</i>: November 25, 2003	
Accepted by <i>Technical Panel</i> as: <input checked="" type="checkbox"/> General <input type="checkbox"/> Urgent Minor (please indicate with X)	Date:
Criteria for acceptance: g) It identifies means to better enable the market to satisfy the market design principles. h) It identifies ways to simplify the market and/or reduce participant or IMO costs.	
Priority: Medium	
Criteria for assigning priority: a) Pervasiveness of the problem – market inefficiencies caused by the existing Dispatching Scheduling Optimizer are impactful in one way or another on all market participants.	
Not accepted (please indicate with X):	
Clarification/interpretation required (please indicate with X):	
<i>Technical Panel</i> minutes reference: IMOTP 134-1	
<i>Technical Panel</i> Comments:	