



Urgent Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00322-R00		
Subject:	Day-Ahead Commitment Process		
Title:	Day-Ahead Intertie Offer Guarantees and Real-Time Negative CMSC		
Nature of Proposal:	<input checked="" type="checkbox"/> Alteration	<input type="checkbox"/> Deletion	<input type="checkbox"/> Addition
Chapter:	9	Appendix:	
Sections:	3.8A.2A		
Sub-sections proposed for amending:			

PART 2 – PROPOSAL HISTORY

Version	Reason for Issuing	Version Date
1.0	For Technical Panel Review/ Submitted to IESO Board Urgent Rule Amendment Committee	June 1, 2006
2.0	Approved by IESO Board Urgent Rule Amendment Committee	June 2, 2006
3.0	Ratified by IESO Board	June 8, 2006
Approved Amendment Publication Date:	June 2, 2006	
Approved Amendment Effective Date:	June 4, 2006	

PART 3 – EXPLANATION FOR PROPOSED AMENDMENT

Provide a brief description of the following:

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

Summary

This amendment proposes to change the formulation of the day-ahead intertie offer guarantee (DA_IOG) settlement amount for certain import transactions. Import transactions that meet the following conditions would be affected by this amendment:

- The import transaction receives a constrained schedule through the Day-Ahead Commitment Process (DACP); and
- The import transaction is subsequently constrained-on in real-time.

The proposed change would adjust the real-time CMSC term within the DA_IOG formulation for the above import transactions. This change would ensure that any protection against real-time negative CMSC charge afforded by the DA_IOG for such an import transaction is only for the MW quantity specified in the DACP constrained schedule for that transaction.

This amendment will ensure that the applicable CMSC and DA_IOG settlement amounts for importers and the resulting uplift charges for all market participants are consistent with the intent of the DACP.

This amendment meets the following statutory criteria for being considered urgent:

“to avoid, reduce the risk of or mitigate the effects of an unintended adverse effect of a market rule.” (section 34(1)(4) of the Electricity Act, 1998)

The existing market rules would have the unintended adverse effect of inappropriate CMSC and DA_IOG settlement amounts for importers and resulting uplift charges for all market participants.

Background

Initial DA_IOG Formulation (MR-00305)

The DACP design introduced a day-ahead intertie offer guarantee (DA_IOG). The original DA_IOG formulation comprised an operating profit formulation similar to the calculation of IOG for real-time imports. The inputs to the operating profit calculation for the DA-IOG initially included:

- the lesser of the day-ahead constrained schedule and the real-time constrained schedule;
- the real-time energy market price; and
- the day-ahead offer.

DA_IOG Changes Accounting for the Presence of Real-Time CMSC (MR-00313)

During the implementation of the Day-Ahead Commitment Process, the IESO identified an issue with respect to the calculation of the Day-Ahead Intertie Offer Guarantee (DA_IOG) for import transactions

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that:

- are committed and receive the guarantee through the day-ahead commitment process; and
- are scheduled in appropriate pre-dispatch schedule to flow in real-time; but
- are then constrained on or off by the IESO in real-time.

The calculation of the DA_I OG (specified in MR-00305) and real-time congestion management settlement credit payment could, under certain circumstances, under pay or over pay the importer relative to its offer price. Such an over-payment or under-payment was not consistent with the intent of the DA_I OG and CMSC payments to keep the importer whole to its offer price. Consequently, the DA_I OG formulation was altered (MR-00313) to include a real-time CMSC term to address the over-payment or under-payment.

The examples examined for the development of the MR-00313 amendment were general and did not include all possible circumstances of import transactions being scheduled in the DACP and subsequently constrained on or off in real-time. However the principle of the MR-00313 was to protect the market participant from real-time negative CMSC charges for the transaction scheduled through the DACP.

What is Negative CMSC?

Negative CMSC is a mathematical consequence of the Ontario regime of uniform pricing and side payments for congestion management.

Where a real-time constrained schedule differs from the real-time unconstrained schedule, CMSC is calculated. CMSC payments are made to ensure market participants receive the operating profit based on the unconstrained schedule. In simplified terms, CMSC is calculated as follows:

CMSC = (real-time unconstrained schedule quantity – real-time constrained schedule quantity)
multiplied by (real-time energy market price – real-time energy offer price)

In most situations, the CMSC calculation results in a payment to the participant. In some situations, however, the calculation results in a negative value i.e. the market participant is charged a CMSC settlement amount. This charge represents a repayment of excess operating profit received by the participant relative to their unconstrained schedule quantity. The underlying logic is that the market participant is neither financially harmed or better off as a result of being constrained: thus extra costs are compensated and extra profits are recovered. These negative CMSC charges reduce uplift charges to other market participants.

One example of negative CMSC occurs when an import has been constrained-on in real-time (i.e. the constrained schedule quantity exceeds the unconstrained schedule quantity) and the real-time energy market price exceeds the real-time energy offer price. (since imports are scheduled hour ahead, events in real-time can cause real-time price to rise above the import offer). In this case, the CMSC payment is negative. In other words, the negative CMSC returns the import to the profit position associated with the real-time unconstrained schedule.

To provide some context of the impact of negative CMSC, for the period June 2005 through the end of November 2005, import transactions attracted approximately \$4 million in negative CMSC charges. This time period is of interest as it is the same time of the year that the DACP will be in operation.

PART 3 – EXPLANATION FOR PROPOSED AMENDMENTNeed for Additional Refinement of DA_I OG Calculation (MR-00322)

Analysis of DACP Trials settlement data has revealed an issue in some limited cases resulting from the interaction of DA_I OG with real-time “negative” CMSC. The anomaly can occur under the following conditions:

- the import is constrained-on in real-time to levels above its day-ahead constrained schedule quantity; and
- the real-time price exceeds the real-time offer price , leading to the calculation of negative CMSC settlement amounts for the import transaction.

The existing DA-I OG formulation results in the importer receiving protection for the negative CMSC amount for the real-time constrained quantity, not the day-ahead constrained quantity.

A numerical example follows to illustrate this situation.

An import transaction is scheduled through the DACP and is subsequently constrained on in real-time as follows:

- day-ahead offer price \$31.10/MW
- day-ahead constrained schedule 54 MW
- real-time offer price -\$1000/MW (participant offers at very low price to ensure the day-ahead scheduled quantity is scheduled)
- real-time constrained schedule 100 MW
- real-time unconstrained schedule 55 MW
- real-time energy market price \$40.

For this import transactions, the existing settlement amounts would be determined as follows:

$$\text{Real-Time CMSC} = (55\text{MW} - 100 \text{ MW}) \times (\$40 - (-\$1000)) = -\$46800$$

$$\text{DA_I OG} = (\text{Min}(0, (54 \text{ MW} \times (\$31.10.\text{MW} - \$40/\text{MW})) - \text{CMSC})) = -480.6 - (-\$46800) = \$46319.4$$

$$\text{Energy Payments} = \$4000$$

$$\text{Total Revenue} = \text{CMSC} + \text{DA_I OG} + \text{Energy} = -\$46800 + \$46319.4 + \$4000 = \$3519.4$$

These calculations show that the import transaction receives a credit for the negative CMSC for the 45 MW constrained-on portion of the real-time transaction not the 54 MW scheduled in the DACP. It can also be argued that since the real-time unconstrained quantity is greater than the day-ahead scheduled quantity, that none of the day-ahead import was constrained on in real-time. The offsetting uplift credit to other market participants for the negative CMSC would not occur.

An import transaction that does not have a DACP schedule (i.e. is offered and scheduled only in real-time) has no comparable protection against comparable real-time negative CMSC charges. In effect, an import transaction that has a DACP schedule has less financial risk than an import transactions that does not have a DACP schedule. This inequity in risk is not appropriate given other measures, such as the day-ahead and real-time intertie failure charges, intended to provide an equivalent level of risk for

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day-ahead and real-time import transactions.

One cannot extrapolate the \$4 million 2005 negative CMSC charges and impacts to 2006 because of the significant changes to the market, such as DACP. There is also a potential for increased negative CMSC charges if importers take advantage of the existing market rules to protect themselves against such charges.

Discussion

The amendment proposes to adjust the DA_IOG formulation for import transactions that receive a DACP schedule and are subsequently constrained in real-time. This adjustment is achieved by introducing a DA_IOG calculation for such an import transactions that use an “adjusted” CMSC term: $OPE\{adj\}_{k,h}^i$.

This $OPE\{adj\}_{k,h}^i$ term is defined such that the CMSC adjustment is made on the basis of the lesser of the DACP scheduled quantity (PDR_DQSI) and real-time constrained schedule quantity (DQSI), and in all instances greater than or equal to the real-time unconstrained quantity (MQSI). The effect of this adjustment is that the negative CMSC protection would only accrue to those MW scheduled in the DACP and constrained-on in real-time.

It is proposed that the IESO use the $OPE\{adj\}_{k,h}^i$ determining the DA_IOG for all import transactions that receive a day-ahead schedule and are constrained-on in real-time in order to simplify implementation. The proposed formulation $OPE\{adj\}_{k,h}^i$ will determine the correct DA_IOG even when there is no negative CMSC. Citing the above example, the proposed amendment would result in the following settlement amounts:

Real-time CMSC = -\$46800 (unchanged from above)

DA_IOG = 0 (since the day-ahead scheduled quantity is less than the real-time unconstrained quantity)

Energy Payments = \$4000 (unchanged from above)

Total Revenue = CMSC + DA_IOG + Energy = -\$46800 + \$0 + \$4000 = -\$42800

In other words, the importer would be charged the full amount of the negative CMSC since the MW constrained on in real-time were not the MWs that were schedule day-ahead.

Software changes would be required for the market settlement systems to automatically implement this proposed amendment on a trading day settlement basis. The financial prudence of making those software changes is dependent on factors such as frequency and dollar magnitude of such adjustments and whether or not DACP is used beyond November 2006. Therefore it is proposed that the IESO have some flexibility as to when it effects the DA_IOG adjustments for the targeted import transactions e.g. manual entry on daily settlement statements or a month-end adjustment. This flexibility would be achieved by allowing the IESO to specify in a market manual how the adjustments would be effected. The IESO would be obligated to advise market participants 5 business days in advance of the implementation of the software changes, so that participants have time to adjust their own processes.

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Day-Ahead Intertie Offer Guarantee

3.8A.2A The day-ahead *intertie offer* guarantee *settlement* credit for *market participant* ‘k’ for *settlement hour* ‘h’ (“DA_IOG_{k,h}”) shall be determined by the following equation:

PDR_BE_{k,h}^{i,t} is the *offer* matrix of N *price-quantity pairs* for the eligible import transaction scheduled in the *pre-dispatch of record* for *market participant* ‘k’ during *metering interval* ‘t’ for *settlement hour* ‘h’ at *intertie metering point* ‘i’ arranged in ascending order by offered price where offered prices are in column 1 and offered quantities are in column 2.

Let OP(P,Q,B) be a profit function of Price (P), Quantity (Q) and an N by 2 matrix (B) of *price-quantity pairs*:

$$OP(P, Q, B) = P \cdot Q - \sum_{n=1}^{s^*} P_n \cdot (Q_n - Q_{n-1}) - (Q - Q_{s^*}) \cdot P_{s^*+1}$$

Using matrix notation for parameter ‘B’ this may be expressed as follows:

$$OP(P, Q, B) = P \cdot Q - \sum_{n=1}^{s^*} [B[n,1] \cdot (B[n,2] - B[n-1,2])] - [(Q - B[s^*,2]) \cdot B[s^*+1,1]]$$

Where:

s* is the highest indexed row of B such that $Q_{s^*} \leq Q \leq Q_n$ and where, $Q_0=0$

‘P’ is EMP_h^{i,t}: the real-time 5-minute *energy market price* at the applicable *intertie metering point* ‘i’ during *metering interval* ‘t’ of *settlement hour* ‘h’

‘Q’ is the minimum of:

PDR_DQSI_{k,h}^{i,t}: the *pre-dispatch of record* constrained quantity scheduled for injection by *market participant* ‘k’ for an import transaction at *intertie metering point* ‘i’ during *metering interval* ‘t’ of *settlement hour* ‘h’; or

DQSI_{k,h}^{i,t}: the real-time constrained quantity scheduled for injection by *market participant* ‘k’ at *intertie metering point* ‘i’ during *metering interval* ‘t’ of *settlement hour* ‘h’

‘B’ is matrix PDR_BE_{k,h}^{i,t}: *energy offers* submitted into the *pre-dispatch of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* ‘k’ at *intertie metering point* ‘i’ during *metering interval* ‘t’ of *settlement hour* ‘h’ arranged in ascending order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2.

such that the day-ahead *intertie offer* guarantee is formulated as follows:

DA_IOG_{k,h} (for all intertie metering points) =

-1 x MINIMUM of:

[Zero or

[The sum of all revenues implied by each import transaction valued at the real-time *energy market price* in the applicable *intertie zone* times the minimum of the quantity scheduled for injection in the *pre-dispatch of record* or the *real-time schedule*

minus

Those costs represented through the *offers* submitted by the *market participant* for the import transaction scheduled in the *pre-dispatch of record*]

plus

That component of the real-time congestion management *settlement credit settlement amount* applicable to the same import transaction.]

[In circumstances other than those where the import transaction is subsequently subject to a constrained-on event in the real-time market:](#)

$$DA_IOG_{k,h} = \sum_i (-1) \bullet \text{MIN} \left[0, \sum_t \left[\text{OP}(\text{EMP}_h^{i,t}, \text{MIN}(\text{PDR_DQSI}_{k,h}^{i,t}, \text{DQSI}_{k,h}^{i,t}), \text{PDR_BE}_{k,h}^{i,t}) \right] + \text{OPE}_{k,h}^i \right]$$

where:

‘I’ is the set of all *intertie metering points* ‘i’.

‘T’ is the set of all *metering intervals* ‘t’ in *settlement hour* ‘h’

OPE_{k,h}ⁱ is that component of the congestion management *settlement credit settlement amount* (CMSC) for *market participant* ‘k’ at *intertie metering point* ‘i’ for *settlement hour* ‘h’ as defined in section 3.5.2.

[In circumstances where the import transaction is subsequently subject to a constrained-on event in the real-time market:](#)

$$DA_IOG_{k,h} = \sum_i (-1) \bullet \text{MIN} \left[0, \sum_t \left[\text{OP}(\text{EMP}_h^{i,t}, \text{MIN}(\text{PDR_DQSI}_{k,h}^{i,t}, \text{DQSI}_{k,h}^{i,t}), \text{PDR_BE}_{k,h}^{i,t}) \right] + \text{OPE}_{k,h}^i \right]$$

[where:](#)

[‘I’ is the set of all intertie metering points ‘i’.](#)

'T' is the set of all metering intervals 't' in settlement hour 'h'

OPE{adj}{k,h}^i is an adjusted component of the congestion management settlement credit settlement amount (CMSC) for market participant 'k' at intertie metering point 'i' for settlement hour 'h' in which the constrained schedule is the lesser of PDR_DQSI_{k,h}^{i,t} or DQSI_{k,h}^{i,t} but in all instances, greater than or equal to MQSI_{k,h}^{i,t} such that it is formulated as follows:

$$OPE\{adj\}_{k,h}^i = \sum_t \left[\begin{array}{l} OP(EMP_h^{i,t}, MQSI_{k,h}^{i,t}, BE) - \\ OP(EMP_h^{i,t}, \text{MAX}(MQSI_{k,h}^{i,t}, (\text{MIN}(PDR_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t}))), BE) \end{array} \right]$$

Until the IESO has the software capability to report DA_IQG_{k,h} settlement amounts pertaining to import transactions that are subject to a constrained-on event in the real-time market (i.e. using the variable OPE{adj}{k,h}^i) on settlements statements for the trading day in which they were incurred, the IESO shall:

- report such settlement amounts or any required adjustments to DA_IQG_{k,h} settlement amounts in a manner and schedule determined in the applicable market manual; and
- recover such settlement amounts in a manner and schedule determined in the applicable market manual.

The IESO shall give market participants 5 days notice of when such software capability will be put into service.

PART 5 – IESO BOARD DECISION RATIONALE

This change ensures that the guarantees and protections afforded by the DA_IQG for an import transaction receiving a DACP schedule is only for the MW quantity specified in the DACP schedule for that transaction.



Urgent Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00322-R01		
Subject:	Day-Ahead Commitment Process		
Title:	Day-Ahead Intertie Offer Guarantees and Real-Time Negative CMSC – IOG Offset		
Nature of Proposal:	<input checked="" type="checkbox"/> Alteration	<input type="checkbox"/> Deletion	<input type="checkbox"/> Addition
Chapter:	9	Appendix:	
Sections:	3.8A		
Sub-sections proposed for amending:	3.8A.4		

PART 2 – PROPOSAL HISTORY – PLEASE REFER TO MR-00322-R00

Version	Reason for Issuing	Version Date
Approved Amendment Publication Date:		
Approved Amendment Effective Date:		

PART 3 – EXPLANATION FOR PROPOSED AMENDMENT

Provide a brief description of the following:

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

Summary

This amendment proposes to make the consequential changes to the DA_I OG offset calculations resulting from the changes proposed under MR-00322-R00.

This amendment will ensure that the DA-I OG offset calculations are made on a consistent basis with the DA_I OG.

In addition, the DA_I OG offset process needs a correction to its formulation in order to mirror the change to DA_I OG payments originally made under MR-00313. Specifically, the CMSC component included in the DA_I OG needs to be accounted for when calculating the DA_I OG offset settlement amount.

Background

Please refer to MR-00322-R00.

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3.8A.4

[.....]

Given the above, the total IOG offset *settlement amount* for *market participant ‘k’* during *settlement hour ‘h’* shall be derived as follows:

$$IOG_{k,h} \text{ OFFSET} = \sum_{x=1}^N MI_{k,h}^1[x,2] - \sum_{i \in T} (-1) \cdot \text{MIN} \left[0, \sum_{T} \text{OP}(\text{EMP}_h^{i,t}, \text{QSI}\{\text{adj}\}_{k,h}^{i,t}, \text{BE}_{k,h}^{i,t} \text{ or } \text{PDR_BE}_{k,h}^{i,t}) + \frac{\sum_{T} \text{QSI}\{\text{adj}\}_{k,h}^{i,t}}{\sum_{T} MI_{k,h}^1[n,1]} \cdot \text{OPE}_{k,h}^{i,t} \right]$$

Where:

‘T’ is the set of all metering intervals in settlement hour ‘h’

'I' is the set of all *intertie metering points* 'i'

'N' is the number of rows n in matrix $MI_{k,h}^t$ [N,2];

'n' is a row in the set of N rows within matrix $MI_{k,h}^t$ [N,2] corresponding to each applicable *intertie metering point* 'i'

$MI_{k,h}^t$ [N,2] is an N by 2 matrix of N pairs of import quantities scheduled for injection by *market participant* 'k' in the *real-time market schedule* or the constrained schedule from the *pre-dispatch of record in metering interval* 't' of *settlement hour* 'h' ($MQSI_{k,h}^{i,t}$, $DQSI_{k,h}^{i,t}$ or $PDR_DQSI_{k,h}^{i,t}$ as the case may be) paired with the corresponding component of the *real-time intertie offer guarantee settlement credit* (or *day-ahead intertie offer guarantee* as the case may be) for all *intertie metering points* 'i' arranged in ascending order by the *settlement amount* in each row.

$QSI\{adj\}_{k,h}^{i,t}$ is as defined above

$PDR_BE_{k,h}^{i,t}$ are *energy offers* submitted into the *pre-dispatch of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2 where the value $QSI\{adj\}_{k,h}^{i,t}$ applies to a *day-ahead intertie offer guarantee*;

$BE_{k,h}^{i,t}$ is the *real-time market offer matrix of price-quantity pairs* for the eligible import transaction for *market participant* 'k' during *metering interval* 't' of *settlement hour* 'h' where the value $QSI\{adj\}_{k,h}^{i,t}$ applies to a *real-time intertie offer guarantee*;

$EMP_h^{i,t}$ is the *real-time 5-minute energy market price* at the applicable *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

$OPE'_{k,h}^i$ is a term used when the *settlement amount* in row 'n' pertains to a $DA_IOG_{k,h}$ *settlement amount* and is equal to:

- $OPE_{k,hi}$: that component of the congestion management settlement credit settlement amount (CMSC) for market participant 'k' at intertie metering point 'i' for settlement hour 'h' as defined in section 3.5.2.; or
- $OPE\{adj\}_{k,hi}$: that component of the congestion management settlement credit settlement amount (CMSC) for market participant 'k' at intertie metering point 'i' for settlement hour 'h' in which the constrained schedule is the lesser of $PDR_DQSI_{k,hi,t}$ or $DQSI_{k,hi,t}$ but in all instances, greater than or equal to $MQSI_{k,hi,t}$;
depending on the value prescribed in the original calculation of the $DA_IOG_{k,h}$ settlement amount in section 3.8A.2A.

OP(P,Q,B) is a profit function of Price (P), Quantity (Q) and an N by 2 matrix (B) of offered *price-quantity pairs*:

$$OP(P, Q, B) = P \cdot Q - \sum_{n=1}^{s^*} P_n \cdot (Q_n - Q_{n-1}) - (Q - Q_{s^*}) \cdot P_{s^*+1}$$

Using matrix notation for parameter 'B' this may be expressed as follows :

$$OP(P, Q, B) = P \cdot Q - \sum_{n=1}^{s^*} [B[n,1] \cdot (B[n,2] - B[n-1,2])] - [(Q - B[s^*,2]) \cdot B[s^*+1,1]]$$

Where:

s^* is the highest indexed row of B such that $Q_{s^*} \leq Q \leq Q_n$ and where, $Q_0=0$

'P' is $EMP_h^{i,t}$: the real-time 5-minute *energy market price* at the applicable *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

'Q' is $QSI\{adj\}_{k,h}^{i,t}$ as defined above.

'B' is matrix $BE_{k,h}^{i,t}$ or $PDR_BE_{k,h}^{i,t}$ depending on whether $QSI\{adj\}_{k,h}^{i,t}$ applies to a real-time *intertie offer* guarantee or a day-ahead *intertie offer* guarantee respectively.

PART 5 – IESO BOARD DECISION RATIONALE

Please refer to MR-00322-R00.