Intertie Trading Sub-Committee Meeting
June 1, 2004
Agenda Item #2
Principles for Manual Adjustment of Intertie Transaction Schedules

Philosophy

The IMO will only take manual action to maintain the reliability of the power system and will minimize the disruption to the market, while remaining consistent with the market design fundamentals.

Principles

P1 **-** The IMO will only intervene to alter PD generated transaction schedules for a given dispatch hour if:
- in the IMO's opinion, as a result of changing conditions, the RT **constrained** schedules will not have sufficient resources available to maintain the reliable operation of the IMO controlled grid; or
- consistent with interconnection agreements and industry policy, requested to do so by another control area or reliability coordinator.

P2 **-** IMO manual changes shall be consistent with the changes that would have occurred if the hour-ahead pre-dispatch sequences recognized the reliability concern.

P3 **-** To the extent practicable, the IMO shall limit manual intervention to an amount equal to the difference between the change in conditions and the RT capability of available internal resources to address that change.

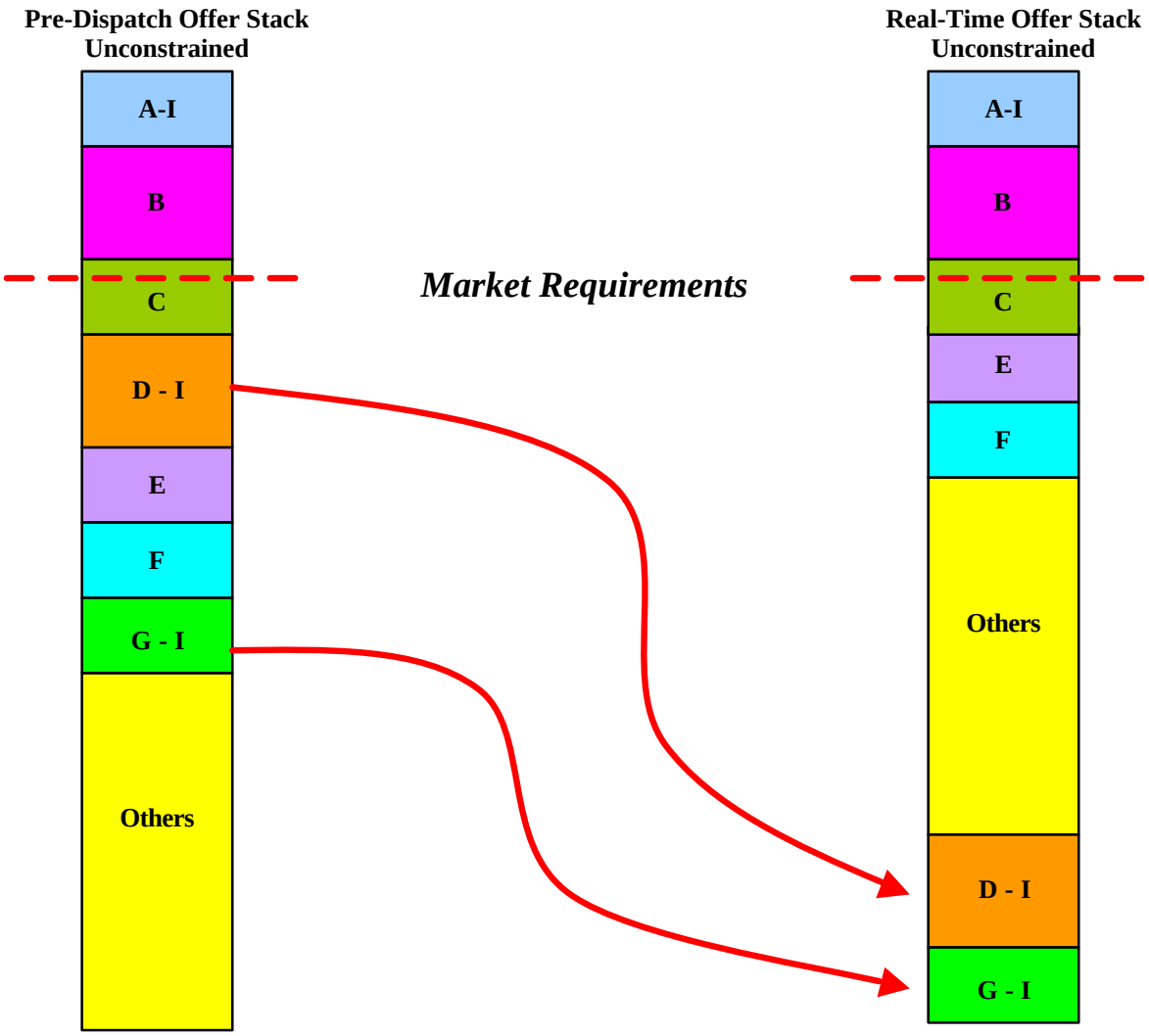
P4 **-** The IMO shall, to the extent practicable, use the economic merit order of intertie transactions as the basis for determining which transactions to manually adjust.

P5 **-** IMO manual intervention shall impact the same RT/PD schedule (constrained or unconstrained) that would have had insufficient resources as a result of the changing conditions, as noted in ***P1***.

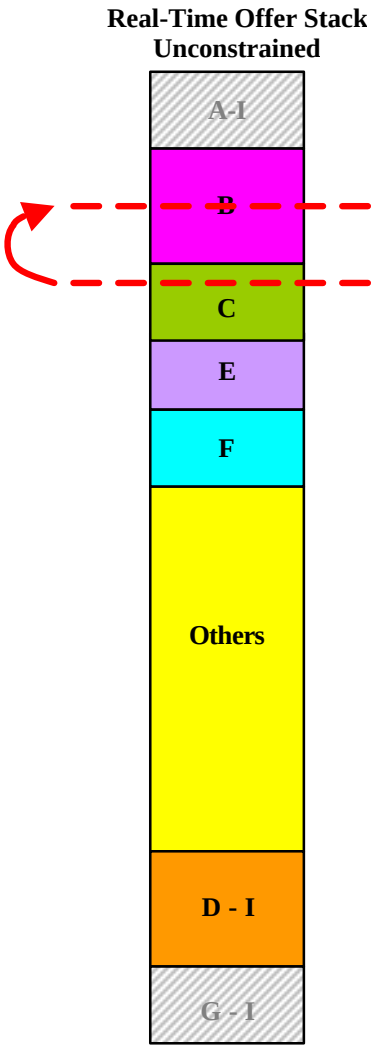
P6 **-** The MP whose transaction is affected by the IMO manual intervention shall be eligible for the same market compensation and be subject to the same risks as if the transaction was scheduled in the hour-ahead PD.*

**Compensation includes Energy/OR MCP, CMSC and IOG, while the risks include negative CMSC.*

Market Schedule PD vs RT Stacking



Base Example A



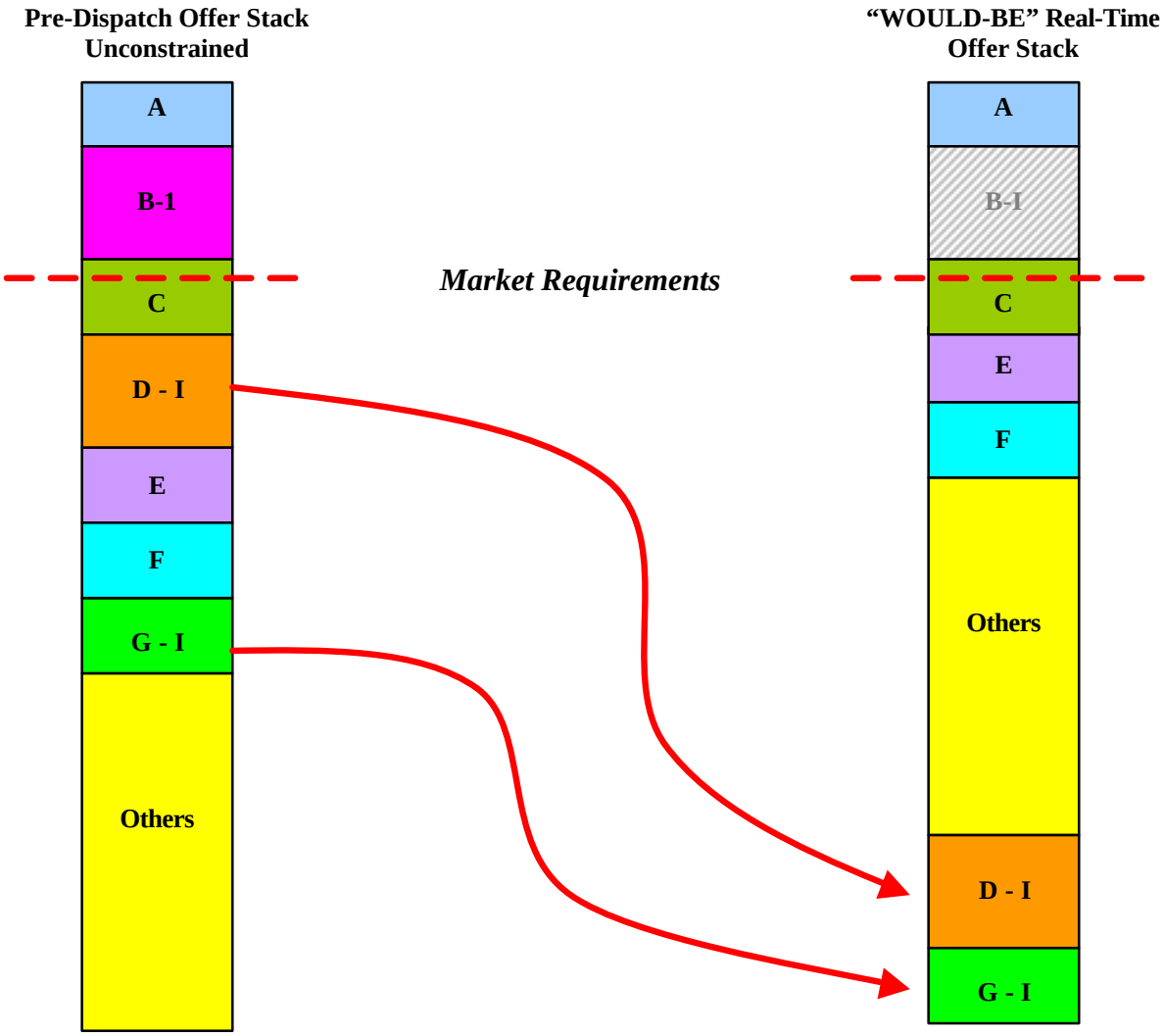
Transaction G-I fails during checkout. The IMO assesses that there are sufficient internal resources and that reliability is not an issue.

No additional transactions are selected.

A-I is not eligible for selection in real-time and transaction G-I is removed from the schedule.

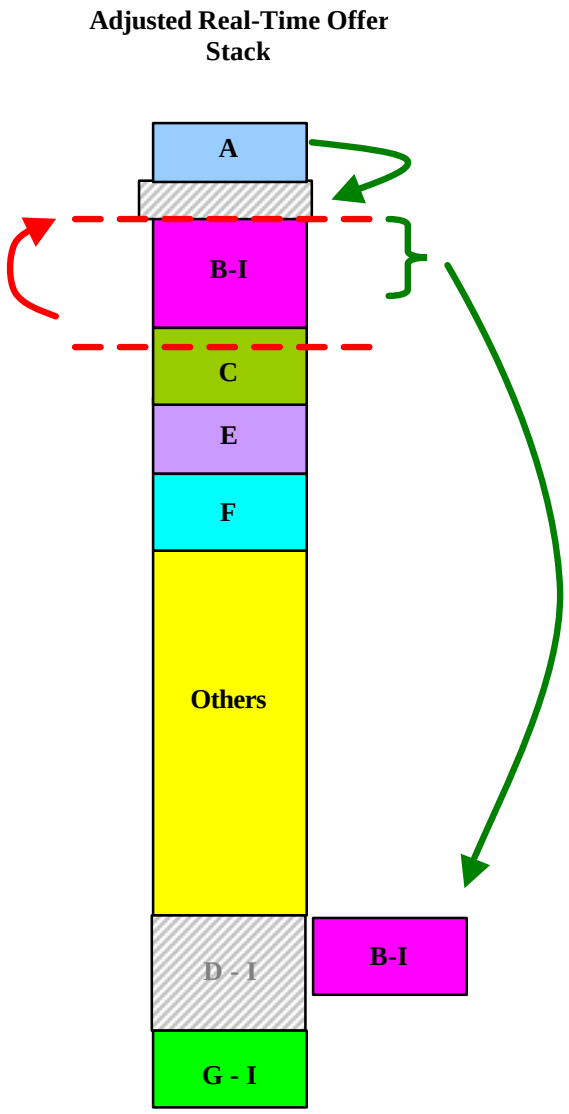
The Market price and schedule will be set by internal resource B. Upward pressure on price.

Base Example B



The "WOULD-BE" stack provides a reliable dispatch the IMO can use to meet the market's needs. The next graph however illustrates the actions taken should transaction D-I fail checkout and the IMO is left with a deficient schedule.

Base Example B (con't)



Transaction D-I fails during checkout. The IMO assesses that there are *NOT* sufficient internal resources and that reliability *IS* an issue.

In this example internal resource A is insufficient to meet the needs after D-I has failed checkout. B-I is an alternate import that is selected prior to real-time operation. The IMO will endeavour to select just enough of B-I to resolve for the expected shortage and thus preventing the need for emergency energy.

Transaction G-I is removed from the schedule. The amount of B-I selected will move to the bottom of the RT Market Schedule "Stack" and the Market Price and Schedule would be set by internal resource A*.

*Assuming Demand in RT equals the PD forecast.

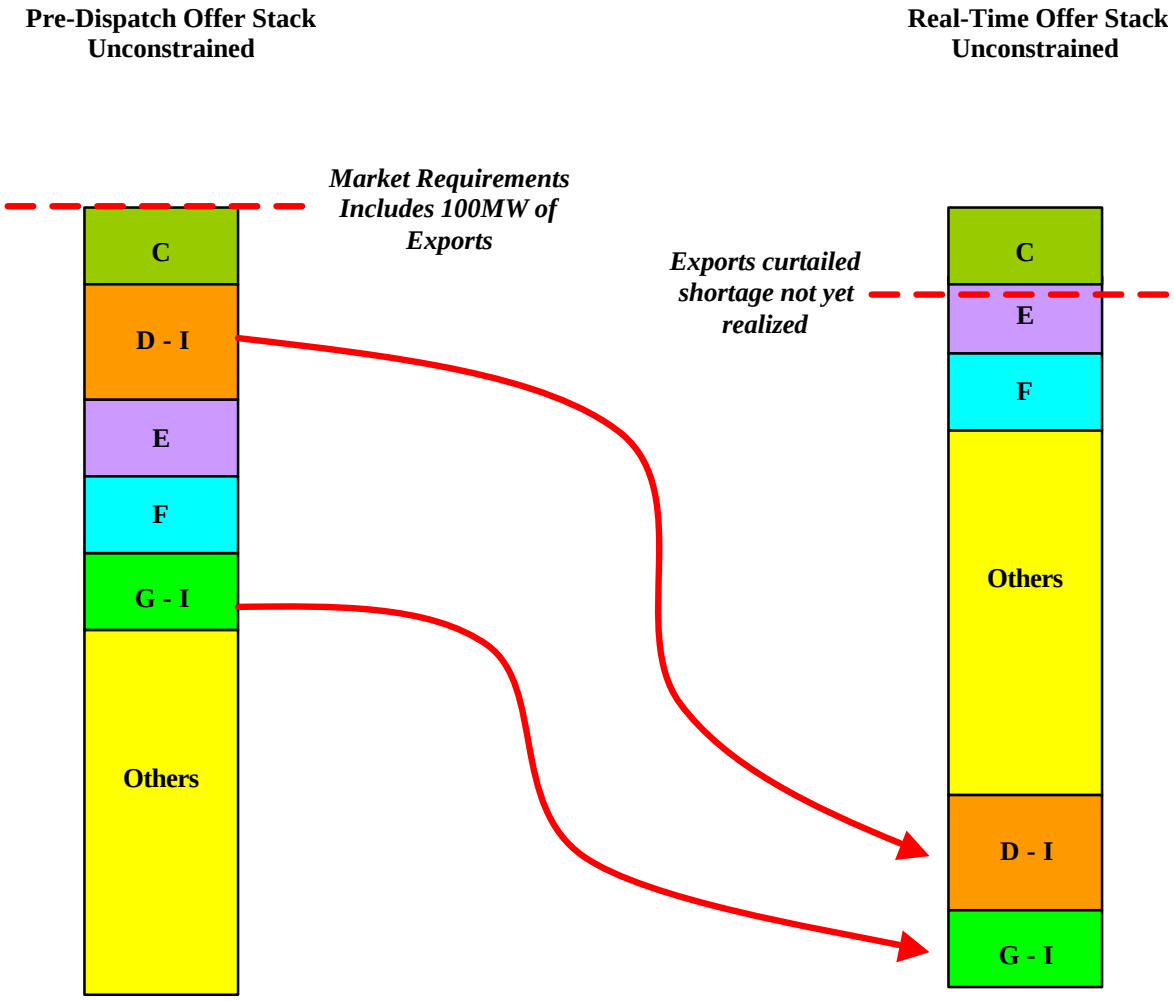
Base Case #5 – Worksheet

Applicability – The treatment applies for only one of the identified timelines (After final PD but before RT).

5 – Internal Adequacy	**IMO Action**	**Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)**	**Discussion: Consistent with Principles? Rationale for Divergence?**
Base case 5 deals specifically with circumstances after PD but prior to RT. Internal adequacy shortfall identified after hour-ahead PD and real-time resources cannot solve the problem. For example, this can be the result of generation contingencies after the PD or failed transactions during check-out.	**Select additional imports**	• IMO selects and increases import transaction quantity; assigns OTH to transaction. • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC • Transaction eligible for IOG based on modified MS.	• P1: Yes, IMO assesses that remaining RT resources are not sufficient to maintain reliable operation. • P2: Yes. If PD sequences had seen adequacy shortfall (contingency or transaction failure) and insufficient RT resources, it would have taken same action. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: Yes. Adequacy shortfall likely[1] to occur in both CS and MS. Both schedules should reflect IMO action. • P6: Yes. Transaction eligible for same compensation and exposed to same risks as if it was scheduled in PD CS and PD MS. Due to manual nature of intervention, the resulting transaction quantities may not be the same as if scheduled by the PD sequences.
	Reduce exports	• IMO selects and decreases export transaction quantity; assigns OTH to transaction. • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC	

[1] Currently it is impossible to see the exact correlation between a CS and MS shortage therefore the IMO takes actions with the assumption that both schedules are equally resourced. It is acknowledged that circumstances can arise where either the MS or the CS are under-generated.

EXPORT RECALL (No OR offered)



The IMO may recall an export that was previously scheduled by the PD process. This action is taken when the IMO is faced with a reliability concern that could as examples result in an unacceptable shortages of Operating Reserve or a potential energy shortfall (voltage reduction and/or load curtailment). The IMO will curtail sufficient exports to satisfy the anticipated needs. To the extent practicable the action taken by the IMO would yield a similar price result given this action is one of meeting supply and demand precisely. If the expected shortfall does materialize there will be a downward pressure on price and if it is larger than expected an upward pressure on price.

Base Case #7 – Worksheet

Applicability – The treatment applies for two of the identified timelines (After final PD but before RT, and in RT).

7 – Recall of an Export (not offered as OR)	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
Base case 7 deals specifically with the curtailment of an export whether or not it has been offered as OR. Internal adequacy shortfall identified within (or for) a given dispatch hour and real-time resources cannot solve the problem. As examples, this can be the result of failed transactions, contingencies, unexpected load increases or transaction recall during an hour.	**Reduce the export transaction.**	• The IMO will coordinate the "recallability" with the external entities. • IMO recalls (reduces the schedule for) the export, assigns OTH to transaction • CS and MS has revised qty; • RT MCP would reflect action • Transaction not eligible for CMSC	• P1: Yes, IMO assesses that remaining RT resources are not sufficient to maintain reliable operation. • P2: Yes. If PD sequences had seen adequacy shortfall (contingency or transaction failure) and insufficient RT resources, it would have taken same action. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem.. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: Yes. Adequacy shortfall likely[2] to occur in both CS and MS. Both schedules should reflect IMO action. • P6: Yes. Transaction eligible for same compensation and exposed to same risks as if it was scheduled in PD CS and PD MS. Due to manual nature of intervention, the resulting transaction quantities may not be the same as if scheduled by the PD sequences. Note that the priority export treatment and use of Control Action Operating Reserve will permit the scheduling of exports during circumstances where the original algorithm would have otherwise not scheduled the export in the first place.

[2] Currently it is impossible to see the exact correlation between a CS and MS shortage therefore the IMO takes actions with the assumption that both schedules are equally resourced. It is acknowledged that circumstances can arise where either the MS or the CS are under-generated.

OR Activation

Description of Internal Generation

1. A market participant has offered 100 MW of generation at $62 for energy and $2 for OR.

2. The IMO schedules a generator for 0 MW of energy but 100 MW of OR in the MS. The MCP is $58 and $3 for energy and OR respectively.

3. During the interval the IMO activates the MP's OR energy by sending an ORA dispatch instruction**.**

4. The IMO reduces the OR requirement at the time of the event. The next run of the MS recognizes the reduction and includes the new value in the prices and MS calculation. Let's assume the MS generates a price of $60 and the generator activated does not receive a MS for energy and is therefore constrained on and receives a CMSC.

5. Within 15-minutes the IMO has recovered the generation and load balance and begins to increase the OR requirement to its pre-event level.

6. The MS continues to recalculate energy and OR schedules and prices and due to the loss of a different generation unit the price naturally rises. The extent of the increase and the timing is uncertain but it can be affected for many intervals given the stepped approach to the replenishment of the OR requirement.

7. The MS at some point assume the 4th interval after the contingency is now indicating that the OR provider is now economic (MCP $75) as energy and is included in the MS energy stack.

In this brief example you can see the transition of an OR provider to energy provider over the course of time when an internal resource is activated for OR energy. In this example you can see how the IMO administered markets can and will optimize resources and allow those resources that have been paid energy standby revenue be converted to energy resources in the MS. At present the reciprocal treatment for intertie transactions does not exist. The current ORA codes used during OR activation do not permit the import and/or export to be viewed by the MS as anything other than OR. The IMO suggested a review of this treatment given that the resource that is receiving a standby payment for energy is prohibited from participating as energy in the MS.

Base Case #8 – Worksheet

Applicability – The treatment applies only in RT.

8 – OR Activation	**IMO Action**	**Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG, etc)**	**Discussion: Consistent with Principles? Rationale for Divergence?**
Activation of OR provided by import (assume no MS for energy)	**Activate import energy. (increase import schedule)**	• IMO activates import energy, assigns ORA to the transaction. • CS has revised qty. • MS qty not affected; MCP does not reflect action. • Transaction eligible for CMSC for energy provided upon activation. • Transaction not eligible for IOG (MS energy qty is not changed). • IMO reduces OR requirement and then transitions back to full complement post recovery.	• **P1: No. The IMO manually intervenes to activate offered OR provider's energy. This action is not taken based on the internal resources ability to provide.** • P2: No. If PD sequences had seen contingency the PD may select the intertie resources as MS resources. • P3: No. See P1. • P4: Yes. OR Activation is based on least cost energy prices. • P5: No. The normal PD process would allow the activated OR providers to be dispatched in the MS as well as the CS. • P6: No. If PD recognized the change the compensation would be based on MS and CS considerations. Current practice has compensation on CS impacts only. Further consideration also indicates that the current treatment of OR activation from intertie resources is inconsistent with the RT equivalent for internal dispatchable resources. * See description below. Modifications to the existing processes should be considered because the activation of OR is inconsistent with several of the defined principles.
Activation of OR provided by export that offered OR and was selected for OR	**Activate export energy. (reduce export schedule)**	• IMO activates export energy, assigns ORA to the transaction. • CS has revised qty. • MS qty not affected; MCP does not reflect action. • Transaction eligible for CMSC for energy (potentially (-) CMSC). • IMO reduces OR requirement and then transitions back to full complement post recovery.	

* OR activation for internal resources results in limited CMSC followed by a “recalculation” of the MCP and ultimately the MS for the applicable resources. As an example a 100 MW dispatchable load bid at $50 in a $40 market will have a 100 MW MS for energy and we will assume it had an offer of 100MW of OR that was also accepted. If a contingency occurred the IMO would dispatch off the load resulting in a CS of 0 MW. Assuming the expost MS remains at 100MW (due to the simultaneous OR requirement reduction) there will be a 100 MW CMSC payment for energy of $10/MW. However, Once the IMO begins to increase the OR requirement, the load may see a MS quantity that is reduced to 0 MW due to the loss of more economical resources. As this happens the load goes from receiving CMSC to being dispatched off in the MS and getting no CMSC.

The process for generators is similar. However, as the IMO increases the OR requirement the price will rise and the MS for the generator is likely to increase proportionally, thus converting compensation from CMSC to energy.It is important to consider that the IMO is paying for the resources to be on standby for energy dispatch. For internal resources this means eligible for MCP considerations. With respect to imports and exports it would appear to be inconsistent and perhaps inappropriate that the market pays for resources to be eligible for energy dispatch but at the very time and for the very reason they are called upon they are not permitted to be dispatched in the energy MS. Therefore it may be appropriate to modify the current process from ORA to an OTH equivalent.

Base Case #6 – Worksheet

Applicability – The treatment applies for one of the three identified timelines (After final PD but prior to RT).

6 – Internal Transmission Constraint leads to Adequacy Concern	**IMO Action**	**Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)**	**Discussion:** **Consistent with Principles?** **Rationale for Divergence?**
Base case 6 deals with an initial security problem that becomes an adequacy concern due to the actions taken to resolve the security problem. For example, a studied contingency requires the reduction of a nuclear facility. IMO constrains down the nuclear unit and adjust imports and exports to compensate (BC#4). After some time the nuclear facility submits a derating or is forced O/S. At this time the IMO becomes deficient, similar to BC#5, and must reflects the fact that the nuclear unit cannot offer the same quantity it did prior to the event.	**Select additional imports**	• IMO selects and increases import transaction quantity; assigns OTH to transaction • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC • Transaction eligible for IOG	**Provided we are considering the period after the derating the following is true. The following is not true for the period leading up to the unit limitation.** • P1: Yes, IMO assesses that remaining RT resources are not sufficient to maintain reliable operation. • P2: Yes. If PD sequences had seen adequacy shortfall (contingency or transaction failure) and insufficient RT resources, it would have taken same action. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: Yes. Adequacy shortfall likely to occur in both CS and MS. Both schedules should reflect IMO action. • P6: Yes. Transaction eligible for same compensation and exposed to same risks as if it was scheduled in PD CS and PD MS. Due to manual nature of intervention, the resulting transaction quantities may not be the same as if scheduled by the PD sequences. The market's current treatment needs to be reviewed and changes may result. The practical application of a process under these high stress situations needs to be factored into the outcome/revised process.
	Reduce exports	• IMO selects and decreases export transaction quantity; assigns OTH to transaction. • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC	

Notes & Questions