

An INC or a DEC is an unpaired injection or withdrawal, while a UTC is a paired injection and withdrawal. The primary difference between bidding a UTC and bidding an INC and a DEC is that in the case of a UTC, one side of the transaction will not clear without the other. As a result, the UTC does not affect system power balance, if losses are ignored. System power balance refers to the difference between the sum of injections and the sum of withdrawals at any moment in time across the entire system. Regardless of whether a participant's bid, or combination of bids, causes changes in system power balance, it is important not to confuse an absence of an effect on system power balance with an absence of effect on the system solution, including prices, congestion, binding constraints, dispatch and unit commitment. UTCs do, like any injection or withdrawal, have an impact on dispatch, dependent on the distribution factors of the source and sink locations. Assuming that a submitted INC and DEC both clear for the same MW value and at the same nodes as the UTC, INCs and DEC will have exactly the same effect on the system as a UTC.

PJM incorrectly states, in its answer and in past filings, that INCs only use DECs as the "other bus" and that DECS only use INCs in the FTR forfeiture calculation.³ Under the current FTR Forfeiture Rule, the effect of any INC or DEC position on a relevant constraint is considered relative to the distribution factor effect of withdrawals or injections on the opposite side of the constraint. For example, the effect of an INC on a constraint is measured by comparing its distribution factor to that constraint and the distribution factor to that constraint of the largest impact withdrawal on the opposite side of the constraint.

For similar reasons, the impact of a UTC cannot be properly measured simply by considering the net of the distribution factors of the UTC pair as proposed by PJM. The net

³ See January 16th Filing at 5; Answer of PJM Interconnection, L.L.C., Docket No. ER13-1654-001 (October 8, 2013) at 3 ("October 8th Answer"); PJM Compliance Filing, ER13-1654-001 (September 6, 2013) at 15-16 ("September 6th Compliance Filing").

distribution factor of a UTC injection and withdrawal point determines whether that UTC is, for purposes of impact on the constraint, an injection (INC) or a withdrawal (DEC). But that is only the first step. Once the net effect is determined, the UTC must be treated as an INC or DEC in the FTR forfeiture rule.

B. The Commission Asked (No. 2), “Whether and how the calculations for UTC transactions in the FTR forfeiture rule would differ from the calculations for INCs and DEC?” and further:

(2a) How does PJM define the constrained FTR path for purposes of applying the FTR forfeiture rule to UTC transactions?

In both of the PJM and Market Monitor approaches, the definition of candidate FTR paths is the same and the same definition of candidate FTR paths as in the INC/DEC FTR forfeiture rule.

(2b) For a given application of the FTR forfeiture rule, are there any differences in the determination of the distribution factors associated with UTC transactions, INCs, and DEC? If so, explain in detail the differences. Does the calculation of distribution factors for purposes of the FTR forfeiture rule differ from the calculation of distribution factors for the purpose of determining if the power flow constraint binds in the optimization model?

The same distribution factors are used to determine power flow as are used in the calculation of FTR forfeitures. There is only one set of distribution factors for the system, which are calculated relative to the load-weighted reference bus. The forfeiture rule operates on a constraint basis, so a simple net of the distribution factors is not sufficient to capture the impact on an individual constraint. In the case of an INC or a DEC, the virtual bid’s impact is directly evident in the combination of its distribution factor value and the largest impact withdrawal/injection point on this constraint.

Contrary to PJM’s assertion, the sink or source for an INC or a DEC under the FTR forfeiture rule does not have to be a DEC or an INC, as stated by PJM, but any injection or

withdrawal point whether physical or virtual.⁴ Although PJM appears to take different positions on this issue.⁵ This represents the power injected/withdrawn at the virtual bid location and then withdrawn or injected at the largest impact point. This provides the impact on the constraint due to the virtual bid.

This is consistent with the Market Monitor's proposed approach to UTC transactions. The net of the UTC transaction provides a net impact on the constraint, whether injection or withdrawal. Once the net impact of the UTC on the constraint has been determined, the UTC can be treated like an INC or a DEC with respect to the constraint. Then, "other buses" must be considered in the UTC FTR forfeiture calculation. The "other bus" determines the largest impact point of injection/withdrawal of the virtual bid so that the UTC's impact on an individual constraint can be measured.

⁴ Market Monitor. "FTR Forfeiture Implementation," presented at the meeting of the PJM Market Implementation Committee convened March 6, 2013, which can be accessed at: < http://www.monitoringanalytics.com/reports/Presentations/2013/IMM_MIC_FTR_Forfeiture_Implementation_20130306.pdf >.

⁵ Cf. September 6th Compliance Filing (at 15) ("For each cleared INC, PJM finds the cleared DEC with the greatest distribution factor on a constrained path relative to that INC to determine whether the flow caused by the INC/DEC pair meet the 75% threshold on an FTR path. Similarly, for each cleared DEC, PJM finds the cleared INC with the greatest distribution factor relative to that DEC to determine whether the flow caused by the INC/DEC pair meet the 75% threshold on an FTR path."); January 16th Filing (at 5) ("For application to INCs and DEC, PJM includes all buses in the model, from all INC and DEC bids, not only those buses at which any market participant clears a virtual or physical transaction, or only those buses at which the same market participant clears a virtual or physical transaction.").

(2c) For UTC transactions, does the FTR forfeiture rule consider "other buses" among the sources or sinks submitted as part of a market participant's portfolio of UTC transactions? How is this different or similar to how PJM determines what bus to use for the "at any other bus" pairing for INC/DEC transactions? Does PJM include all buses in the model, or only those buses at which any market participant clears a virtual or physical transaction, or only those buses at which the same market participant clears a virtual or physical transaction?

PJM asserts that power injected from a UTC source flows along a direct path to the UTC sink point, not affecting points outside the transaction. This is simply not correct; the injected power will flow along the path of least resistance. The result of a UTC is that the system power balance (ignoring losses) will be the same, but that the individual buses and constraints electrically near the UTC will be affected. Calculating the net distribution factor of the UTC on the constraint accounts for the fact that UTCs are paired transactions and allows the net impact of the UTC to be determined.

Once the net impact of the UTC on the constraint has been determined, the UTC can be treated like an INC or a DEC with respect to the constraint. Then, "other buses" must be considered in the UTC FTR forfeiture calculation. The "other bus" determines the largest impact point of injection/withdrawal of the virtual bid so that the UTC's impact on an individual constraint can be measured.

The obvious problem with not considering other buses was demonstrated in a previous filing.⁶ A UTC will have no impact on the net power balance (excluding losses) of the system, which includes many constraints. Nonetheless, the UTC will have impacts on individual constraints, congestion, dispatch and unit commitment. When the UTC's impact on an individual constraint is considered, as is done in the FTR forfeiture rule, the problem with the contract path assumption becomes apparent. As shown in the example, it is possible for the source of the UTC to have a distribution factor of 0.75 on a given constraint,

⁶ See September 30th Filing Figure I-6.

but for the sink of the UTC to have a distribution factor of 0.00 on the same constraint. If the sink point has no impact on the constraint, it means that the power does not flow from the source to the sink on the constraint, but sinks at some other bus that does impact the constraint. It does not mean that the power flow entirely bypasses the constraint. In this case the impact of the UTC on the constraint being considered is identical to the impact of an INC, and should be treated identically.

(2d) Would PJM's implementation of the FTR forfeiture rule recognize that power from the UTC transaction is withdrawn at buses other than the sink bus of the UTC transaction?

PJM states that power injected at the source of a UTC is not withdrawn at any bus other than the sink bus. However, this is not correct. Basic physics dictates that power injected at a point will flow to any point on the system based on the impedances of the components of the system. Power injected at the UTC source is not guaranteed to be withdrawn at the sink, but rather at points near the injection point. To maintain system power balance, the quantity of power injected at the UTC source must be withdrawn at the UTC sink, but the power will not be drawn solely from the UTC source. This is why the "other bus" must be used as a tool to measure the net impact of a UTC on the single constraint being considered.

(2e) Does PJM consider counterflow FTRs for the forfeiture rule for UTC transactions? Is this different for INCs and DEC's? If so, why are they treated differently?

Neither the existing INC/DEC FTR forfeiture rule nor the UTC FTR forfeiture rule considers counterflow FTRs. This is inappropriate. The FTR forfeiture rule should include counterflow FTRs.

(2f) Could UTC transactions be combined in a portfolio with INCs and DEC's that individually would pass the FTR forfeiture rule, but would not as a group? If not, could the FTR forfeiture rule be modified to catch these group effects? If not, why? Does PJM consider the impacts of a market participant's portfolio of UTC transactions, INCs and DEC's for purposes of the FTR forfeiture rule? Please explain why/why not.

Portfolio positions, consisting of INCs, DEC's and UTCs can create opportunities for violating the FTR forfeiture rule that exceed the possible opportunities for manipulation with a single INC, DEC or UTC position. Similarly, portfolio positions allow opportunities for FTR value manipulation that would not be detected by the current FTR forfeiture rule. The FTR Forfeiture rule could and should be modified to capture portfolio effects. Such modifications would be based on the impact of portfolio net flows on constraints.

C. The Commission asked (No. 3a), "The Independent Market Monitor (IMM) states that the FTR forfeiture rule is currently applied to INCs and DEC's with both positive and negative distribution factor values, which is why both positive and negative distribution factors for UTC transactions should be considered. Do you agree with the IMM's statements? Please explain why/why not."

Under the current FTR forfeiture current rule for INCs and DEC's, a virtual bid is considered for forfeiture if the absolute value of the distribution factor difference between the bid and the largest impact "other bus" is greater than or equal to 75 percent. The sign of this difference may be positive or negative, but once the absolute value is taken it will always be positive. In other words, a positive or negative distribution factor difference, in and of itself, does not indicate whether an INC or DEC should be considered for forfeiture under the current FTR forfeiture rule as the sign of the distribution factor difference alone provides no information on the bus being considered. The combination of the shadow price and distribution factor signs is what determines the constrained and unconstrained side of

a constraint.^{7,8} The magnitude of the distribution factor difference is used in the FTR forfeiture rule; the sign is immaterial. The existing INC/DEC FTR forfeiture rule factors this into its calculations, and this is how it must be implemented for UTCs. Basing UTC consideration for forfeiture on the sign of the distribution factors alone, absent a determination of whether the UTC helps or hurts the constraint, is not consistent with the current application of the FTR forfeiture rule to INCS and DEC's and is not consistent with the correct application and purpose of the rule. PJM has provided no plausible explanation for not taking the correct approach on this issue.

D. The Commission asked (No. 3b), "In the IMM's October 25 answer at page 5, the IMM states that "In the IMM's FTR Forfeiture Rule analysis the only time the sign of the [distribution factor value], positive or negative, is considered is to exclude INCs on the constrained or DEC's on the unconstrained side of a constraint, since in both cases such bids help rather than hurt the constraint and therefore cannot make the associated FTR more valuable." How does PJM consider or propose to consider whether INCs, DEC's, and UTC transactions would relieve or worsen a given constraint in its methodology? Describe PJM's criteria and application in the FTR forfeiture rule."

Contrary to PJM's assertion (at 7), the Market Monitor did not incorrectly state the role of distribution factor signs, and PJM gives no indication as to how the Market Monitor was wrong. The Market Monitor's answer in this proceeding filed October 25, 2013, correctly stated (at 5) how the sign of the distribution factors is used; there is no other direct use of the sign in the existing FTR forfeiture rule. Again, as currently applied in the FTR forfeiture calculations, the "other bus" used in the test is not just any INC or DEC related bus, but any injection or withdrawal bus whether physical or virtual. The current FTR

⁷ The low (unconstrained) and high (constrained) sides of a constraint are indicated by CLMP. A negative CLMP is the low side and a positive CLMP is the high side. The sign of the CLMP relative to a constraint for a bus is equal to the constraint shadow price multiplied by the distribution factor of the bus for that constraint.

⁸ See Comments of the Independent Market Monitor for PJM, ER13-1654-001 (September 30, 2013) at 5.

forfeiture rule for INCs and DEC's does not assume that virtual bids can only sink or source to other virtual bids, but a virtual bid can also sink or source to a physical bid.

The Market Monitor agrees with PJM that if an INC, DEC or UTC relieves a constraint it should not be included in the forfeiture calculations, however, the Market Monitor does not agree with PJM's method for determining whether a UTC relieves a constraint. The simple sign of a virtual cannot be used to determine whether a virtual transaction helps or hurts a given constraint. Relying solely on the sign of the net distribution factor assumes that the shadow price of all constraints is always negative. While this is often the case, it cannot be assumed to always be the case. The constrained and unconstrained sides of a constraint are determined by the congestion component of the LMP (CLMP). If the CLMP at a bus is negative, that bus is on the unconstrained side of the constraint. If the CLMP at a bus is positive, the bus is on the constrained side of the constraint. The CLMP is calculated as the shadow price of the constraint multiplied by the distribution factor. The distribution factor of a bus to a constraint generally does not undergo significant changes unless there are large changes in the transmission system. If the shadow price of a constraint is negative and the sign of the distribution factor of a bus is positive the resultant CLMP is negative, therefore that bus is on the unconstrained side. However, if the shadow price on that same constraint becomes positive then the CLMP will be positive, indicating that bus is on the constrained side. The shadow price of constraints is predominantly negative, but this need not always been the case and is easily accounted for. Inclusion of this logic is simple, and would be a small step towards creating a UTC FTR forfeiture rule that worked for all scenarios.

- E. The Commission asked (No. 3c), “When applying the FTR forfeiture rule, explain the different outcomes resulting from the following methodologies: (a) the absolute value difference between a cleared virtual transaction and the greatest impact withdrawal or injection point and (b) the difference between the UTC transaction source’s distribution factor and the UTC transaction sink’s distribution factor.”**

The “other bus” in the FTR forfeiture rule is necessary for any virtual transaction to accurately determine its FTR forfeiture status. For INCs and DECs this is to provide a withdrawal/ injection point to measure the virtual bid’s impact on the constraint. For UTCs, the “other bus” is necessary to determine the injection/withdrawal point for the UTCs net impact, whether injection or withdrawal. This “other bus” provides the most significant injection or withdrawal of the UTC transaction’s net impact, and provides the measure of that impact on the given constraint when considering it for forfeiture. The UTC FTR forfeiture rule as proposed by PJM does not measure the UTC’s impact on a single constraint, but assumes a system wide view which is contrary to an examination of the impact on single constraints.

The UTC FTR forfeiture rule proposed by PJM does not mirror the existing application of the FTR forfeiture rule for INCs and DECs and does not accurately capture the impacts of UTCs on FTRs. The method proposed here, and in previous filings by the Market Monitor, provides a method that matches the existing rule. As a result, the Market Monitor’s proposed method provides a more accurate disincentive to manipulate a participant’s FTR position through virtual transactions. There are a few simple steps that will make the current rule both more accurate and a closer analog to the existing rule.

Table I-1 shows the impact of the forfeiture rule for only INCs and DECs, for INCs, DECs and UTCs using the PJM approach and for INCS, DECs and UTCs using the Market Monitor’s approach for the 2013 to 2014 planning period, through December 2013. The method proposed by PJM captures approximately \$42,000 in forfeitures from UTCs, while the Market Monitor’s method captures approximately \$929,000. By failing to consider the net impact of a UTC to the largest impact bus on the constraint, PJM significantly

understates the impact of UTCs on FTRs and significantly understates the required level of FTR forfeitures related to UTCs.

Table I-1 FTR forfeitures from INCs, DECs and UTC transactions from June 2013 through December 2013

	INC/DECs Only	INC/DEC and UTC PJM approach	INC/DEC and UTC IMM approach
Jun-13	\$78,336	\$79,992	\$193,798
Jul-13	\$324,836	\$334,992	\$737,116
Aug-13	\$22,428	\$26,163	\$99,019
Sep-13	\$14,926	\$22,246	\$234,737
Oct-13	\$44,272	\$49,030	\$83,059
Nov-13	\$21,576	\$34,802	\$62,377
Dec-13	\$6,988	\$7,903	\$32,576
Total	\$513,362	\$555,127	\$1,442,682

The PJM and Market Monitor methods both start by calculating the net distribution factor of the UTC, but PJM stops there, failing to recognize the constraint specific impacts of UTCs. This assumption can lead to inaccuracies in the application of the rule. This becomes an issue when a UTC crosses a constraint and is not flagged using the PJM method or when one side of a UTC is not connected to a constraint, making the UTC essentially an INC or DEC. PJM and the Market Monitor agree that if a bid or transaction helps a constraint it should not be included in the forfeiture process, but differ on how to determine this. PJM relies solely on the sign of the net dfax to determine this, and while normally accurate, it is possible this will not always be accurate. This can be solved using a simple additional step to check the sign of the shadow price and determine if the transaction helps or hurts a constraint.

A stakeholder process is just beginning to review the entire FTR forfeiture rule, with the goal to update the rule as well as take stakeholder considerations into account. This stakeholder process is scheduled to take at least five months, but could take much more time to conceive, create and implement a new rule. The Market Monitor and PJM agree that

an FTR forfeiture rule for UTCs is necessary, but it is essential that the rule be accurate and fair. It is essential that an accurate and fair FTR forfeiture rule for UTCs be implemented as soon as possible in order to ensure that market manipulation does not occur.

Finally, the Market Monitor does not agree that PJM currently has the authority to implement the UTC FTR forfeiture rule as submitted. The Commission has not yet issued a final determination on the proposed FTR forfeiture rule, so implementation is premature. However, at the request of PJM, the Market Monitor has been calculating FTR forfeitures for UTCs according to PJM's method and submitting these to PJM for billing.

II. CONCLUSION

The Market Monitor respectfully requests that the Commission afford due consideration to these comments as the Commission resolves the issues raised in this proceeding.

Respectfully submitted,



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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Eagleville, Pennsylvania,
this 6th day of February, 2014.



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