# FTR Forfeiture Complaint Alternative Approach

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# Background

On April 8, 2020, XO Energy LLC (with XO Energy MA, LP and XO Energy MA2, LP) (together, XO Energy), pursuant to sections 206 and 306 of the Federal Power Act (FPA), filed a complaint (Complaint) against PJM contending that:

(1) the FTR Forfeiture Rule, as implemented, is so broad that it captures competitive market conduct and leads to less efficient market outcomes; and

(2) cannot detect financial leverage.

(3) as a result, the FTR Forfeiture Rule is unjust and unreasonable.

# FERC Order (May 20, 2021)

We reject PJM's Compliance Filings, finding that a component of PJM's proposed FTR Forfeiture Rule trigger mechanism is unjust and unreasonable. We thus direct PJM to submit a compliance filing within 60 days of the date of this order to establish a just and reasonable replacement rate that proposes either a different threshold, or an alternative approach to triggering forfeiture, that strikes a more appropriate balance between deterring manipulative behavior and not burdening legitimate hedging activity.

In addition, because we reject the Compliance Filings, we find that the Complaint is moot as it challenges a rate that is not in effect.

# FERC Directives (January 17 Order)

1. Evaluate the net impact of a market participant's entire portfolio of virtual transactions on its FTR positions.
2. Measure the portfolio's net impact using the load-weighted reference bus, as opposed to the worst-case scenario bus.
3. Implement a trigger threshold based on the total MW limit of a binding constraint.
   a) the net flow must exceed a certain percentage of the physical limit of a binding constraint
   b) the net flow must be in the direction to increase the value of an FTR
4. Apply the FTR Forfeiture Rule to counterflow FTRs and include them in a portfolio's evaluation.

# Alternative Approach

The XO Energy Complaint outlines a prescriptive 5-step process and is offered as an alternative approach. (see Section H)

1. Virtual Portfolio Test (FERC Directives 1-3a)
2. Directional Test (FERC Directives 3b and 4)
3. Convergence Test
4. Leverage Test (Alternative Trigger)
5. Calculate Forfeitures

# Virtual Portfolio Test

**Step 1: Calculate the net impact of a market participant's portfolio of INCs, DECs, and UTCs on flows of a binding constraint for each hour.**

The first step follows the design of PJM's Virtual Portfolio Test. For each constraint, $c$, that bound in the day-ahead, the rule should calculate the net impact on flow from participant, $p$, that holds a portfolio of INCs, DECs and UTCs using the respective day-ahead shift factors in hour, $h$. The participant's contribution to flow on each day-ahead binding constraint is defined as follows:

$$VirtualFlow_{DA,c,h,p} = \sum_{v \in \{V\}_{h,p}} SF_{DA,c,h,v} * VB_{DA,h,v,p}$$

Where:

$SF_{DA,c,h,v}$ is the day-ahead shift factor of constraint $c$ with respect to a virtual award at node $v$ during hour $h$.

$\{V\}_{h,p}$ is the set of all nodes which participant, $p$, has virtual awards for hour, $h$ and

$VB_{DA,h,v,p}$ is the volume (MW) of virtual awards of the participant at node $v$. Virtual Awards include all cleared INCs, DECs, and UTCs.

# Virtual Portfolio Test

**Step 2: Determine the hours during which a market participant's portfolio of INCs, DECs and UTCs significantly impacted constraints.**

The next step is to compare the net impact of a participant's virtual portfolio ($VirtualFlow_{DA,c,h,p}$) to the physical transmission limit on each constraint in an hour to determine if the participant significantly impacted the flow in a prevailing or counterflow direction. PJM has defined the threshold to determine a significant or appreciable impact, $T$, to be 10% of the transmission facility limit, $L$.[125] We propose a prevailing flow check against the day-ahead constraints as follows:

$$VirtualFlow_{DA,c,h,p} > 0 \text{ and } VirtualFlow_{DA,c,h,p} \geq T * L_{DA,c,h}$$

and a counterflow check against day-ahead constraints as follows:

$$VirtualFlow_{DA,c,h,p} < 0 \text{ and } |VirtualFlow_{DA,c,h,p}| \geq T * L_{DA,c,h}$$

Where:

- $T$ is the threshold percentage
- $L_{DA,c,h}$ is the physical transmission facility limit

# Directional Test

**Step 3: Determine whether the virtual portfolio impacts are in the direction to increase the value of an FTR portfolio.**

In order to determine whether the virtual portfolio impacts are in the direction to increase the value of an FTR portfolio, the FTR portfolio for participant, $p$, must be calculated in the same manner as the virtual portfolios with respect to day-ahead constraints.

**Step 3a: Calculate the FTR flow on each day-ahead.**

A participant's FTR position on a day-ahead constraint is defined as:

$$FTRFlow_{DA,c,h,p} = \sum_{f \in \{F\}_{h,p}} SF_{DA,c,h,f} * FTR_{h,f,p}$$

Where:

- $SF_{DA,c,h,f}$ is the day-ahead shift factor of constraint $c$ with respect to an FTR path, $f$, during hour $h$ calculated as $SF_{DA,c,h,sink} - SF_{DA,c,h,source}$
- $\{F\}_{h,p}$ is the set of all FTR paths which participant, $p$, has for hour, $h$ and
- $FTR_{h,f,p}$ is the volume (MW) of an FTR path, $f$, that a participant, $p$, holds for hour $h$.

# Directional Test

**Step 3b: Determine whether FTR flow and virtual flow are in the same direction.**

Once the FTR flow for each constraint has been calculated, it can be compared to the virtual flow calculated for the constraints that were triggered in Step 2. For each $c$ in $\{C\}_{DA,h,p}$ identified in Step 2, the following checks are applied, and flags set:

i. If $FTRFlow_{DA,c,h,p} > 0$ and $VirtualFlow_{DA,c,h,p} > 0$

then $PrevailingFlow_{DA,c,h,p} = 1$

ii. If $FTRFlow_{DA,c,h,p} < 0$ and $VirtualFlow_{DA,c,h,p} < 0$

then $CounterFlow_{DA,c,h,p} = 1$

Where:

- $PrevailingFlow_{DA,c,h,p}$ is a binary flag indicating both virtual and FTR positions are in the prevailing flow direction
- $CounterFlow_{DA,c,h,p}$ is a binary flag indicating both virtual and FTR positions are in the counter flow direction

# Convergence Test

**Step 3c: Determine if virtual positions are converging DA and RT.**

If virtual positions are in the direction to increase the value of an FTR portfolio, a constraint-based convergence check indicates whether this virtual activity was converging DA and RT. The following convergence checks are proposed to ensure that only activity that diverges DA and RT in the direction to increase the value of FTR positions is subject to forfeiture.

Is $PrevailingFlow_{DA,c,h,p} = 1$ and $|\Lambda_{DA,c,h}| > |\Lambda_{RT,c,h}|$

Is $CounterFlow_{DA,c,h,p} = 1$ and $|\Lambda_{DA,c,h}| < |\Lambda_{RT,c,h}|$

Where:

- $\Lambda_{DA,c,h}$ is the day-ahead shadow price for constraint $c$ in hour $h$
- $\Lambda_{RT,c,h}$ is the real-time shadow price for constraint $c$ in hour $h$

If these checks are true, the constraints and corresponding positions move forward to the next step.

# Leverage Test

**Step 4: Determine whether financial leverage exists and quantify leveraged FTR positions.**

A leveraged FTR position exists when the FTR flow on a constraint exceeds the combined virtual and physical flow on a constraint.[126] Therefore, in order to check for the existence of financial leverage, the following checks are applied for prevailing flow leverage ($PrevailingFlow_{DA,c,h,p} = 1$):

If $FTRFlow_{DA,c,h,p} > VirtualFlow_{DA,c,h,p} + Max(PhysicalFlow_{c,h,p}, 0)$

Then $LeveragedMW_{DA,c,h,p} =$

$$FTRFlow_{DA,c,h,p} - (VirtualFlow_{DA,c,h,p} + Max(PhysicalFlow_{c,h,p}, 0))$$

# Leverage Test

and the following checks are applied for counterflow leverage ($CounterFlow_{DA,c,h,p} = 1$):

If $\left|FTRFlow_{DA,c,h,p}\right| > \left|VirtualFlow_{DA,c,h,p} + Min(PhysicalFlow_{c,h,p}, 0)\right|$

Then $LeveragedMW_{DA,c,h,p} =$

$$\left|FTRFlow_{DA,c,h,p}\right| - \left|VirtualFlow_{DA,c,h,p} + Min(PhysicalFlow_{c,h,p}, 0)\right|$$

Where

- $PhysicalFlow_{c,h,p}$ is the day-ahead physical flow across constraint $c$ in hour $h$ for participant $p$. $PhysicalFlow_{c,h,p}$ includes all generation, load, and bilateral transactions across the related affiliates of participant $p$ and represents the corresponding positions the FTR could legitimately hedge.

# Forfeiture

**Step 5: Calculate forfeiture amounts for leveraged FTR positions.**

Any leveraged FTR positions identified in Step 4 are subject to forfeiture of the excess profits related to the constraints identified by the preceding steps. Prevailing flow FTR forfeitures are calculated as follows (where $PrevailingFlow_{DA,c,h,p} = 1$):

$$Forfeiture_{DA,c,h,p} = LeveragedMW_{DA,c,h,p} * Max(|\Lambda_{DA,c,h}| - |\Lambda_{AUC,c,h,p}|,0)$$

Counterflow FTR forfeitures are calculated as follows (where $CounterFlow_{DA,c,h,p} = 1$):

$$Forfeiture_{DA,c,h,p} = LeveragedMW_{DA,c,h,p} * Max(|\Lambda_{AUC,c,h,p}| - |\Lambda_{DA,c,h}|,0)$$

Where

- $\Lambda_{DA,c,h}$ is the day-ahead shadow price for constraint $c$ in hour $h$.
- $\Lambda_{AUC,c,h,p}$ is the Flow-weighted hourly auction shadowprice for constraint $c$ in hour $h$ across all auctions participant $p$ holds an FTR.

# Summary

Steps 1 - 5 address the requirements set forth in the Commission's January 19, 2017 Order and corrects the flaws in the PJM Compliance Filing that lead to unjust and unreasonable outcomes.

This approach captures the actual realized profits that occur when a constraint binds in the day-ahead market. A constraint-specific test for convergence ensures that only unprofitable virtual activity coupled with increased flow is subject to further scrutiny.

A determination as to whether the virtual portfolio impacts are increasing the value of an FTR portfolio are then made. Next, checking for financial leverage accurately detects FTR positions that could, in fact, benefit from other trading activity.

# References

January 17, 2017 FERC Order
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