Up-to Congestion Credit Requirements

Credit Subcommittee
April 4, 2013
- Historical Up-to Exposure Analyses
- Prevailing – Counterflow Bid Analyses
- Recent One-Day Loss Analysis
- Current PJM Perspective
- Up-to-Congestion Credit Alternatives Matrix
- Next Steps
Historical Up-to Exposure Analysis

- Credit requirements calculated for two constructs with two variations
  - Construct A: FTR-style
    - MWH * (DA price – percentile of recent historical RT value)
  - Construct C: Virtual path style with counterflow adder
    - MWH * percentile of prior full year historical downside volatility
  - Variations on above:
    - Variation 1: Additional requirement on counterflow portfolios
    - Variation 2: Different percentiles for Prevailing flow and counterflow portfolios
• Analysis prepared for three representative periods: Summer (July 2012), Spring (April 2011), Winter (January 2013)

• Analyses looked at daily credit requirements vs. actual experienced path losses and profits

• Percentiles of 50, 70, 80, 90, and 95 were analyzed
  – Also 97, 99, and 99.9 for January

• Counterflow adder factors of 2, 3, 5, 10, 18 were analyzed for bid portfolios

• Counterflow adder factors of 0, 1, 2, 3, 4, 6 were analyzed for cleared January portfolios

• Additional analysis performed on over 100 large one-day daily loss portfolios from 2012
Analysis of recent actual defaults shows that they came from net counterflow portfolios

Credit constructs A and C alone may not have protected against these counterflow losses

Additional credit protection may be needed to reduce counterflow exposure
Historical Up-to Exposure Analysis

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  – Variations on above:
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2012 (Jan-Oct) Largest Loss for Each Member (Min $100k)

Construct "A:" appears to be the superior construct for the members' largest loss days.

See separate detail for Construct A.
2012 (Jan-Oct) Largest Loss for Each Member (Min $100k)

Sum of Each Member's Largest One-Day Loss Exceeding Credit

Average Daily Total Credit Excess

- PFL 70
- CFL 80
- CFL 50
- CFL 50
- CFL 97
- CFL 95
- CFL 97
- "A"

Construct "A:" appears to be the superior construct for the members' largest loss days.
At 70th percentile prevailing and 80th percentile counterflow:
- 55% of participants (51 of 93) would have less than $25,000 average excess credit requirement
- 10% of participants (9 of 93) would represent 56% of total average excess credit requirement

Construct "A:" appears to be the superior construct for the members' largest loss days.

Each A/A and C/C line represents a prevailing flow percentile with points on the line representing counterflow percentiles. The other lines represent a single PFL and CFL percentile with points representing CFL adders.

Percentage: 50, 70, 80, 90, 95, 97, 99, 99.9 (100)
Bid Counterflow Adder factors: 0, 1, 2, 3, 5, 10, 18
2013 January - Largest Loss for Each Member - BID

Sum of Each member's Largest One-Day Loss Exceeding Credit

(6,000) (5,000) (4,000) (3,000) (2,000) (1,000) Thousands

Thousands

Average Daily Total Credit Excess

Percentiles: 50, 70, 80, 90, 95, 97, 99, 99.9 (100)
Bid Counterflow Adder factors: 0, 1, 2, 3, 5, 10, 18

CFL 50

CFL 99

"A"/"A"
"C"/"C"
"A & CFL Adder"
C+CFL Adder

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In January, increasing the counterflow percentile or adder provided much greater relative value than increasing the prevailing flow percentile.

Percentiles: 50, 70, 80, 90, 95, 97, 99, 99.9 (100)

Bid Counterflow Adder factors: 0, 1, 2, 3, 5, 10, 18
For January Cleared positions, construct "A" appears to be the superior construct for the members' largest loss days, with a counterflow adder superior to different counterflow percentile.
For January cleared positions, a counterflow adder appears to provide much greater benefit at lower credit requirement levels.

Percentiles: 50, 70, 80, 90, 95, 97, 99, 99.9 (100)

Cleared Counterflow Adder factors: 0, 1, 2, 3, 4, 6
Cleared requirement with 6x adder virtually eliminated shortfalls

Members’ largest one-day credit shortfalls in January 2013 with 70th/80th percentile bid requirement and 70th percentile plus 6x cost adder cleared requirement

- "A" Bid
- "A" Cleared
In virtually all cases Cleared excess is less than Bid excess.

Members’ average daily credit excess in January 2013 with 70th/80th percentile bid requirement and 70th percentile plus 6x cost adder cleared requirement.

- "A" Bid
- "A" Cleared
Construct “A” with Varying Prevailing and Counterflow Percentiles

Large gain in protection with minimal increase in excess when going from 50 to 70 percentile Prevailing flow. No additional protection from increasing Prevailing flow percentile. Additional protection comes from increasing counterflow percentile to 80, with protection relative to excess continuing at lesser rate above 80 percentile.
Graph Data Point Detail

March 22, 2013 presentation, slide 22, circled data point

April 2011 – PFL 70th/CFL 80th percentiles

Prop A Bid Average Daily Excess

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March 22, 2013 presentation, slide 22, circled data point
April 2011– PFL 70th/CFL 80th percentiles

$Largest One-day Member Loss$
• Different months demonstrated different types of exposure
• No single construct was the “best” for each historical analyzed
• No particular construct appears to fully mitigate exposure for bid portfolios except at very high credit requirement levels
• A counterflow adder appears to be effective for cleared portfolios but less so for bid portfolios
  – A counterflow adder based on cleared path value is consistent with implementation in FTR auctions
• With sufficient counterflow protection, PJM can support a $200,000 minimum participation requirement instead of $500,000
Recent one-day losses greatly exceeded PMA requirements and would have needed a counterflow credit adder to the proposed bid screens to provide protection.
Current PJM Perspective

- PJM likely to support a proposal with the following three components
  1. Net prevailing flow portfolios
     a) Bid requirement = Construct A at 70th percentile
     b) Cleared requirement = Construct A at 80th percentile or higher
  2. Net counterflow portfolios
     a) Bid requirement = Construct A at 80th percentile
     b) Cleared requirement = Construct A at 70th percentile
        plus 6x cleared day-ahead cost adder
  3. $200,000 minimum participation requirement

- PJM may be able to support more than one proposal

- Expectation for PJM to monitor and report to the Credit Subcommittee on performance of revised credit requirements during first year in effect
Up-to-Congestion Credit Alternatives Matrix

Updated to reflect discussion during the April 4 Credit Subcommittee conference call meeting

<table>
<thead>
<tr>
<th>Component</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bid Requirement - Prevailing Flow</td>
<td>MWh * Max (0, Bid price – 70th percentile historical RT value)</td>
<td>MWh * Max (0, Bid Price – Mean)</td>
<td>Same as “A” but 80th percentile</td>
<td>Similar to “A” but done on path-by-path basis</td>
<td></td>
</tr>
<tr>
<td>2 Bid Requirement - Counterflow</td>
<td>MWh * Max (0, Bid price – 80th percentile historical RT value)</td>
<td>MWh * Max (0, Bid Price – Mean)</td>
<td>Same as “A”</td>
<td>Similar to “A” but 90th percentile and done on path-by-path basis</td>
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</tr>
<tr>
<td>3 Cleared Requirement - Prevailing Flow</td>
<td>MWh * Max (0, Bid price – 70th percentile historical RT value)</td>
<td>MWh * Max (0, Cleared Price – Mean)</td>
<td>Same as “A” but 80th percentile</td>
<td>Similar to “A” but done on path-by-path basis</td>
<td></td>
</tr>
<tr>
<td>4 Cleared Requirement - Counterflow</td>
<td>MWh * Max (0, Bid price – 70th percentile historical RT value)</td>
<td>MWh * Max (0, Cleared Price – Mean)</td>
<td>Same as “A” but 80th percentile and no counterflow adder</td>
<td>Similar to “A” but 90th percentile and done on path-by-path basis and no counterflow adder</td>
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<tr>
<td>5 Counterflow Determinant</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>Similar to “A” but done on path-by-path basis</td>
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<tr>
<td>6 Which MWH to apply credit requirement to</td>
<td>1 day bid + 3 days cleared</td>
<td>1 day bid + 1 day cleared</td>
<td>1 day bid + 1 day cleared</td>
<td>1 day bid + 3 days cleared</td>
<td></td>
</tr>
<tr>
<td>7 Path-Specificity</td>
<td>Path-specific requirement</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
<td></td>
</tr>
<tr>
<td>8 Peak/Off-Peak differentiation</td>
<td>No differentiation</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
<td></td>
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<tr>
<td>9 Seasonal differentiation</td>
<td>Rolling recent historical data</td>
<td>Single Annual Formula</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
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<tr>
<td>10 Historical Data Period</td>
<td>Prior 2 months</td>
<td>Prior Year</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
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<tr>
<td>11 Type/Period of Historical Data</td>
<td>RT data from prior 2 months</td>
<td>RT data from previous year’s 2-month period</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
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<tr>
<td>12 Method of satisfying requirement</td>
<td>Cash, L/C, Unsecured</td>
<td>Cash, L/C</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
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<td>13 Credit Overlap (which “bucket” of credit applies)</td>
<td>Added to virtual bid requirement</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
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<td>14 Minimum Participation Requirement</td>
<td>$200,000</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
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<td>15 Screen/Review</td>
<td>All bids screened</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
<td>Same as “A”</td>
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</tr>
</tbody>
</table>
- Credit Subcommittee
  - April 4 – Proposal presentations and discussion
  - April 9-12 – Survey Monkey polling of proposals
  - April 18 – Results of polling presented

- Market Implementation Committee: April 10 introduction, May 8 vote

- Markets and Reliability Committee: April 25 first read, May 30 vote

- Members Committee: April 25 first read, May 30 or June 27 vote

- FERC: Filing as soon as possible after Members Committee endorsement

- Target implementation: ~ 60 days following FERC filing *(no need to be on first day of a calendar month)*