Summary of Updates

• Remove references to distribution facilities
• Modified short-circuit calculation pre-fault voltage for 138, 230, and 345kV
• Planning for non-firm transfers
• Largest generator outage
• NERC P3 & P6 events – permitted adjustments
• System maintenance analysis
Short-Circuit Pre-Fault Voltage

- Transmission system typically operates at a point greater than 1.0pu.
- Cable susceptance adds charging to the system, raising system voltages.
- Change in pre-vault voltage brings planning analysis in-line with actual voltages seen during operations

<table>
<thead>
<tr>
<th>Voltage (kV)</th>
<th>Pre-Vault p.u. voltage 2017</th>
<th>Pre-Fault p.u. voltage 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>1.1</td>
<td>No change</td>
</tr>
<tr>
<td>345</td>
<td>1.0</td>
<td>1.05</td>
</tr>
<tr>
<td>230</td>
<td>1.0</td>
<td>1.05</td>
</tr>
<tr>
<td>138</td>
<td>1.0</td>
<td>1.05</td>
</tr>
<tr>
<td>69</td>
<td>1.05</td>
<td>No change</td>
</tr>
</tbody>
</table>

- Moving to 1.05 results in two breakers overdutied; however, one is being addressed by an existing project that eliminates the 138kV station, the other by Project No. b2631.
- By 2022, one additional breaker has been identified. It will be addressed by n4487.
Planning for Non-Firm Transfers

Today, PJM studies common modes outages for non-firm, merchant transmission.
- stuck breaker
- double-circuit tower line
- bus fault

Because of its geographic location on the eastern edge of PJM, large non-firm transfers between PJM and NYISO utilize and greatly impact the PSE&G system.

Going forward, analyses will consider common mode outages with non-firm transfers included in the model.

Flow Direction - 5018

<table>
<thead>
<tr>
<th>Flow into PJM (Hours)</th>
<th>Flow into PJM (MWh)</th>
<th>Flow into NYISO (Hours)</th>
<th>Flow into NYISO (MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>188</td>
<td>13,882</td>
<td>6,646</td>
<td>2,814,443</td>
</tr>
</tbody>
</table>

Source: Joint PJM/NYISO Meeting April 2, 2018
System Adjustment for NERC TPL-00104 P3/P6

n-1-1 analysis permits system adjustment following the first contingency. For n-1-0, the system must be adjusted to below normal ratings. For n-1-1, no element is permitted to exceed the four-hour emergency rating after adjustment following loss of the first element.

*Adjustment can be:*  
Generator re-dispatch  
PJM PAR adjustment

*Switching a shunt device*  
*Tap changer adjustment*

*Not permitted:*  
Removal of equipment such as load serving transformers, or circuits.  
Load shed  
Special Protection System (SPS)  
Opening breakers
The system shall be developed such that during light load, a single element out of service for maintenance and following unscheduled contingencies will not cause circuit loadings to exceed applicable ratings.

This memorializes an existing practice.
Largest Generator

Clarify Category P3
NERC TPL-001-4 studies loss of a generator followed by adjustments, then loss of second generator, circuit, transformer, or shunt device.

For NERC Category P1, the most significant generator shall be modeled out of service as a pre-existing initial condition.

Following removal of a single element, no Transmission Facility shall exceed its STE. After the outage, the system must be capable of being re-adjusted so all equipment is loaded below its normal rating.