

SPP RTO Compliance Forum TPL-001-4

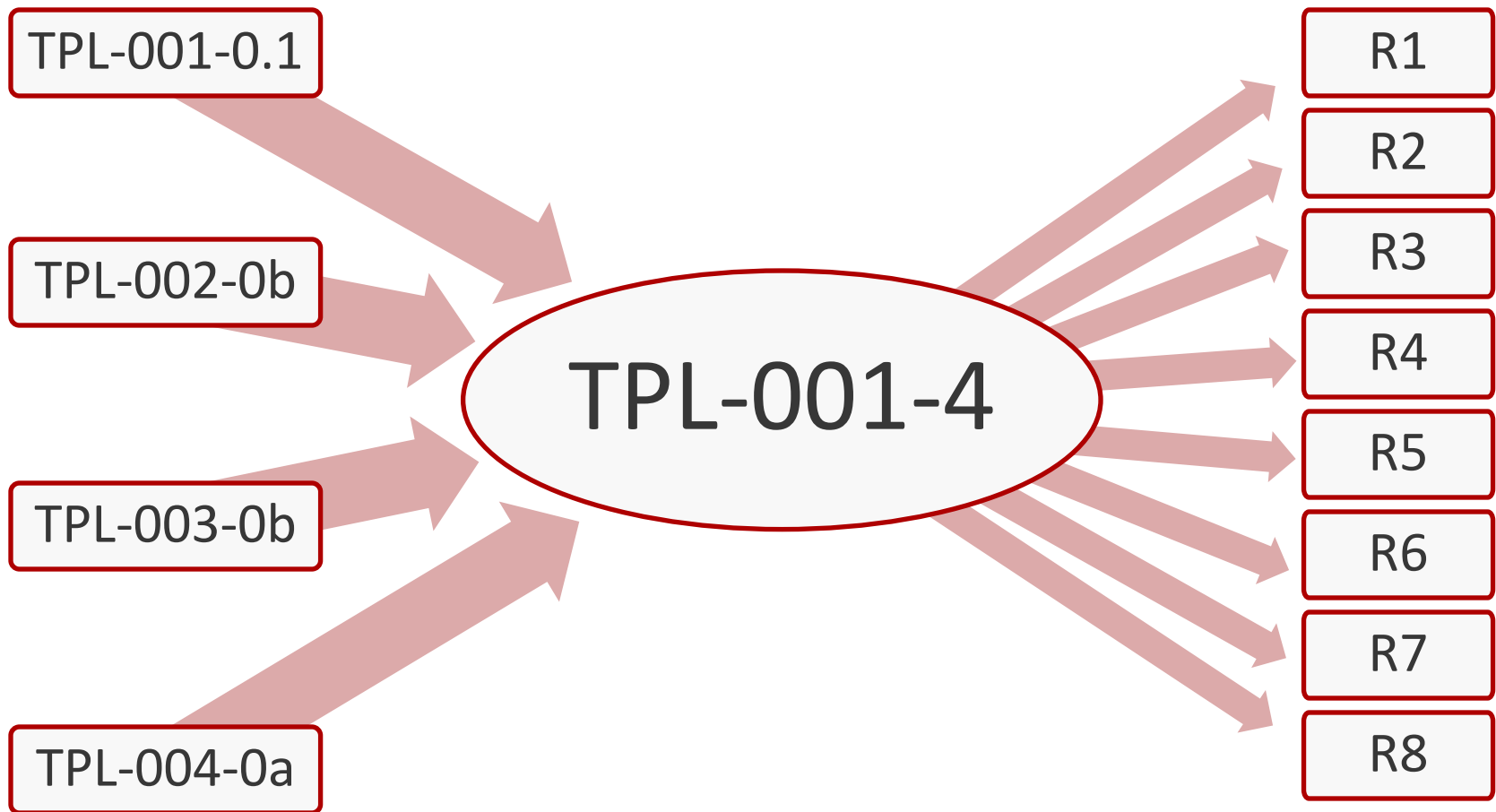
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TPL Standards have been Consolidated



Overview

- **R1 - Maintain the system models**
- **R2 - Planning Assessment overview**
- **R3 - Steady State study**
- **R4 - Stability study**
- **R5 - Voltage criteria**
- **R6 - System instability criteria**
- **R7 - Determine TP and PC responsibilities**
- **R8 - Distribution of Planning Assessment**
- **Table 1**

R1 - Maintain the system models

- SPP Modeling department
 - MOD-10
 - MOD-12
 - MDWG data submittal workbook
- System intact models
- Models used for P0 events
- Measure 1 = evidence



R2 - Planning Assessment overview

- **R2.1 - Near-Term steady state (Year One to five)**
 - **2 peak models and 1 off-peak model**
 - **3 Sensitivity models**
 - **Vary modeling assumption to show measurable change in System response**
 - **Models where known outages are scheduled**
 - **Must study P1 events (N-1)**
 - **Long lead time study (spare equipment strategy)**
 - **Must study P0, P1, P2 events**

R2 - Planning Assessment overview

- **R2.2 - Long-Term Steady State (years six to ten)**
 - 1 peak model
- **R2.3 - Near-Term short circuit (Year One to five)**
 - 1 peak model
 - Determine if circuit breakers have enough interrupting capability

R2 - Planning Assessment overview

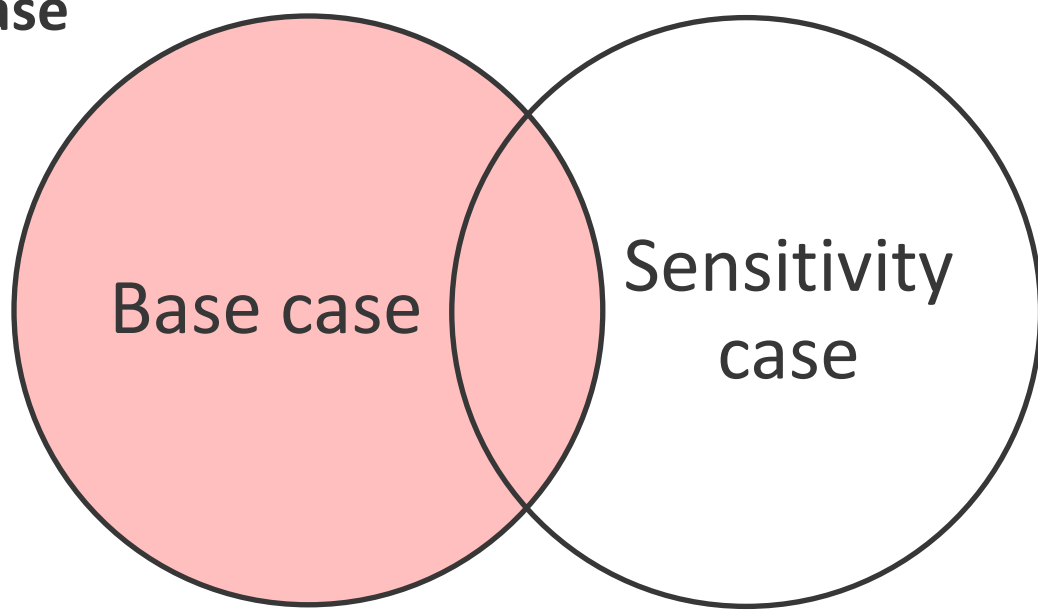
- **R2.4 - Near-Term Stability (Year One to five)**
 - **1 peak model**
 - **Model Dynamic load (In Progress)**
 - **1 off-peak model**
 - **2 Sensitivity models**
 - **Vary modeling assumption to show measurable change in System response**

R2 - Planning Assessment overview

- **R2.5 - Long-Term Stability (years six to ten)**
 - 1 peak model
 - Address impact of planned or changed generation
- **R2.6 - Can use qualified past studies, if...**
 - No more than five years old OR technical rationale can justify the older study is still valid
 - No material changes have occurred
 - Supporting documentation needed

R2 - Planning Assessment overview

- R2.7 - Corrective Action Plans (CAP)
 - List of actions and timetable needed to mitigate Table 1 violations
 - Do *NOT* have to be developed solely for a sensitivity case



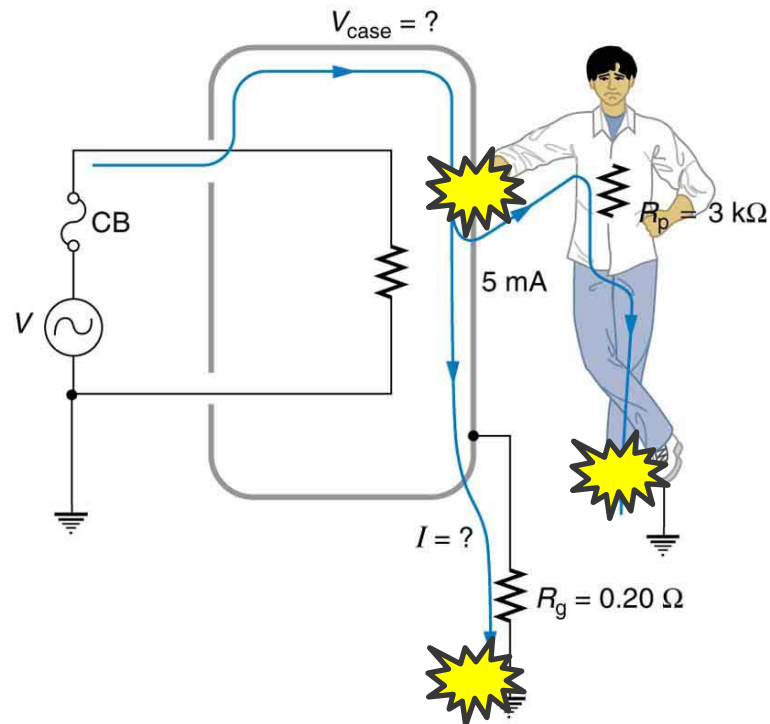
CAP Needed =

R2 - Planning Assessment overview

- **R2.7 - Corrective Action Plans (CAP) cont.**
 - **Need CAP if issue arises in two or more sensitivities**
 - **Can use Non-Consequential Load Loss and curtailment of Firm Transmission Service if...**
 - **Situations arise where CAP can not be implemented in required time frame, AND**
 - **Actions that are used to resolve the situation are documented, AND**
 - **Alternatives considered are documented**
 - **Reviewed if used in subsequent Planning Assessments**

R2 - Planning Assessment overview

- R2.8 - Short Circuit CAP
 - List of actions needed to mitigate rating being exceeded
 - Reviewed if used in subsequent Planning Assessments

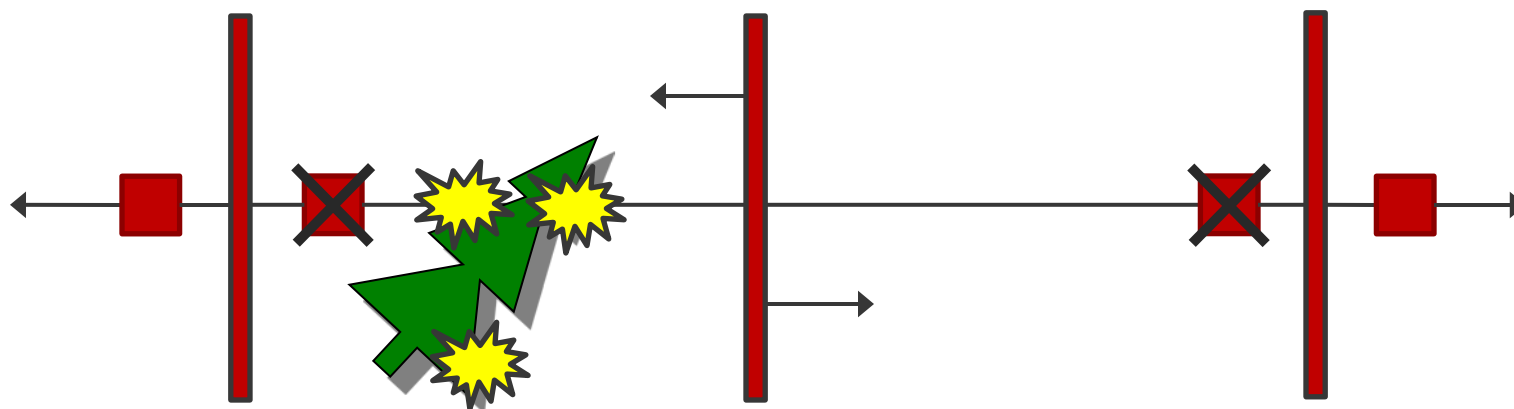


R3 - Steady state study

- **Contingencies evaluated – Table 1**
 - **Planning events deemed as “more severe”**
 - SPP PC intends to evaluate all planning events
 - **Planning events on adjacent systems that may impact the PC and TPs systems**
 - SPP PC will work with adjacent NERC registered PCs and TPs
 - **Extreme events deemed as “more severe”**
 - SPP PC will evaluate all extreme events
 - Mitigation needed if Cascading occurs

Requirement 3 - Steady state study

- Contingencies evaluated cont.
 - Breaker-to-breaker
 - R3.3.1 – automatic controls
 - P1.3 – transmission element
 - SPP PC generated a “first pass” list
 - SPP PC will work with TPs to verify and update the list



R4 – Stability study

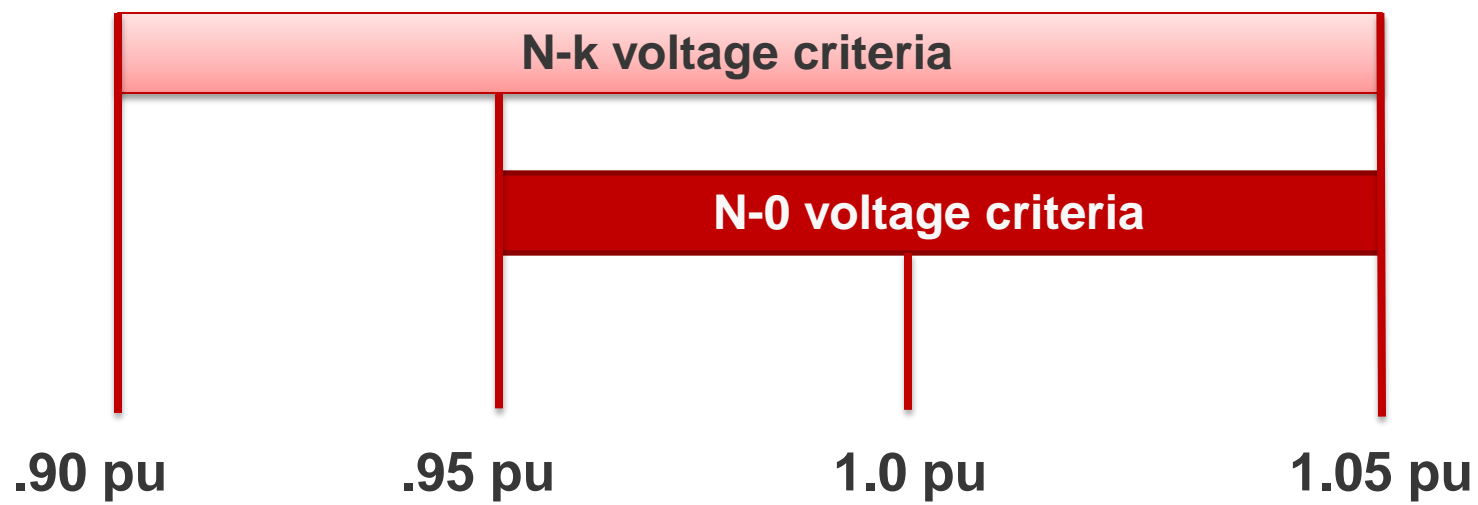
- **Contingencies evaluated – Table 1**
 - **Planning events deemed as “more severe”**
 - SPP PC intends to evaluate up to 5 TP submitted events per area
 - SPP PC intends to evaluate programmatically generated severe events
 - **Planning events on adjacent systems that may impact the PC and TPs systems**
 - SPP PC will work with adjacent NERC registered PCs and TPs

R4 – Stability study

- **Contingencies evaluated – Table 1 cont.**
 - **Stability performance requirements**
 - **P1 : No generator shall pull out of synchronism**
 - **P2 – P7 : If generator pulls out of sync, no other elements can trip off line**
 - **P1 – P7 : Must exhibit acceptable damping**
 - **Extreme events deemed as “more severe”**
 - **SPP PC intends to evaluate up to 5 TP submitted events per area**
 - **Mitigation needed if Cascading occurs**

R5 – Voltage criteria

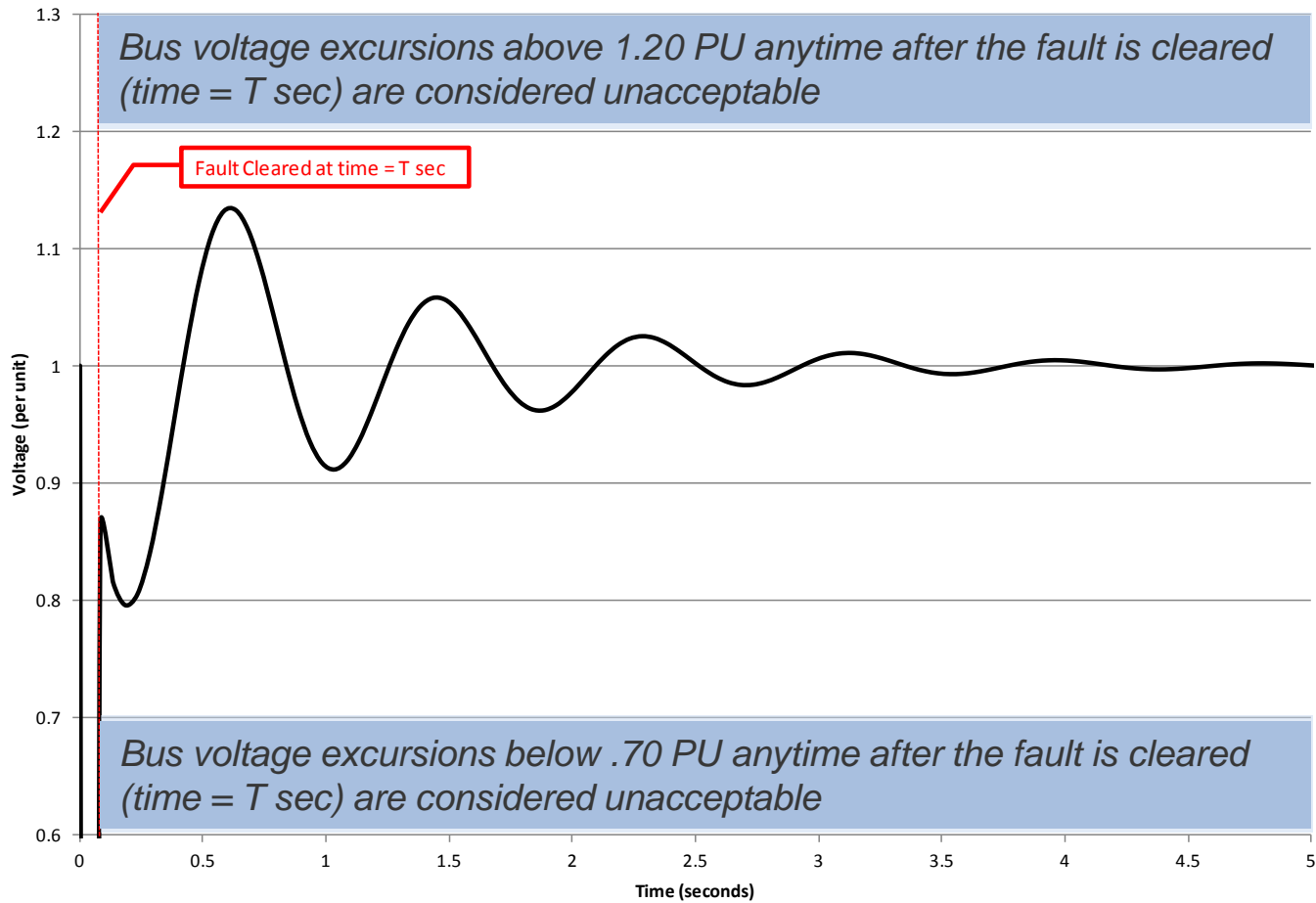
- **Steady State voltage limits**



- **Voltage deviations**
 - Voltages shall not deviate from SPP Criteria

R5 – Voltage criteria

- **Transient voltage response**



R6 – System instability criteria

- System instability criteria is being researched by TPLTF



R7 – TP and PC responsibilities

- Working with TPLTF to determine and finalize
- PC responsibilities
 - Perform short circuit analysis
 - Provide fault currents at every bus
 - Post Planning Assessment to applicable entities (R8)
- TP responsibilities
 - Provide certain contingency types
 - Breaker-to-Breaker (R3.3.1)
 - 230kv and above (P2, P4, P5)
 - Short circuit analysis
 - Identify where current exceeds breaker rating

R8 – Distribution of Planning Assessment

- Working with SPP Compliance to gather the proper contacts
- Setting up an internal process to handle requests

Table 1 – Planning Events

- **P0**
 - **N-0, No Contingencies**
- **P1**
 - **N-1, Single Contingency**
 - **Must use footnote 12 to have Non-consequential load loss or curtailment of Firm Transmission service**
 - **Steady State**
 - **Use auto N-1 to capture all possible combinations**
 - **Stability**
 - **Use Fast Fault Scan to determine events for study**

Table 1 – Planning Events

- **P2**
 - **N-1, Single Contingency**
 - **Steady State**
 - TP submitted 230 kV and above
 - Captured in auto N-1
 - Script written to capture opening line section without fault
 - **Stability**
 - Use Fast Fault Scan to determine events for study
 - TP submitted 230 kV and above

Table 1 – Planning Events

- **P3**
 - **G-1, N-1, Multiple Contingency**
 - **Must use footnote 12 to have Non-consequential load loss or curtailment of Firm Transmission service**
 - **Steady State**
 - **First contingent element will be a generator**
 - **System Adjustments are made**
 - **Second contingent element will be in same area as first**
 - **Stability**
 - **Use Fast Fault Scan to determine events for study**
 - **TP submitted 230 kV and above**

Table 1 – Planning Events

- **P4**
 - **N-k + stuck breaker, Multiple Contingency**
 - **Can use Non-consequential load loss and curtailment of Firm Transmission service for HV (<300kV)**
 - **Steady State**
 - **TP submitted 230 kV and above**
 - **Stability**
 - **TP submitted 230 kV and above**

Table 1 – Planning Events

- **P5**
 - **N-k + non-redundant relay failure, Multiple Contingency**
 - **Can use Non-consequential load loss and curtailment of Firm Transmission service for HV (<300kV)**
 - **Steady State**
 - **TP submitted 230 kV and above**
 - **Stability**
 - **TP submitted 230 kV and above**

Table 1 – Planning Events

- **P6**
 - **N-1-1, Multiple Contingency**
 - **No Generator contingencies**
 - **Can use Non-consequential load loss and curtailment of Firm Transmission service**
 - **Steady State**
 - **First contingent element will not be a generator**
 - **System Adjustments are made**
 - **Second contingent element will be in same area as first**
 - **Stability**
 - **Use Fast Fault Scan to determine events for study**
 - **TP submitted 230 kV and above**

Table 1 – Planning Events

- **P7**
 - **N-2, Multiple Contingency**
 - **Common Structure or loss of a bipolar DC line**
 - **Can use Non-consequential load loss and curtailment of Firm Transmission service**
 - **Steady State**
 - **TP will provide to PC**
 - **Stability**
 - **TP will provide to PC**

Table 1 – Planning Events

- **Extreme Events**
 - **N-k +, Multiple Contingency**
 - **Steady State**
 - TP will provide to PC
 - **Stability**
 - TP will provide to PC

TPL Task Force

- **February 2014**
 - SPP RTO formed TPL Task Force to address gaps between existing TPL standards and TPL-001-4
- **March 2014 – September 2014**
 - TPL Task Force reviewed TPL-001-4
- **October 2014**
 - TPL Task Force will draft TPL-001-4 guidance document
- **November 2014**
 - TPL Task Force will request approval of guidance document from Transmission Working Group