SPP 2012 TPL Compliance Report

12/31/2012

Approved by Transmission Working Group: December 19, 2012

SPP Southwest Power Pool

Table of Contents

Executive Summary **2**

Entities Involved **3**

Assessments **4**

Integrated Transmission Planning Near-Term Assessment (TPL-001 through TPL-002) 4

MDWG Models 5

Steady State Study (TPL-001 through TPL-004) 5

Models and Simulation 5

Steady State: TPL-001 Assessment (Category A) 7

Steady State: TPL-002 Assessment (N-1) 7

Steady State: TPL-003/TPL-004 Assessment (N-2/Extreme Events) 7

Steady State: Summary 8

Stability Study (TPL-001 through TPL-004) 9

Attachment 1- Project List **18**

Attachment 2 – TPL-001 Compliance Statement **19**

Attachment 3 – TPL-002 Compliance Statement **24**

Attachment 4 – TPL-003 Compliance Statement **33**

Attachment 5 – TPL-004 Compliance Statement **44**

Executive Summary

To support SPP's compliance, as the Planning Coordinator, with NERC TPL-001-0, TPL-002-0, TPL-003-0, and TPL-004-0 Reliability Standards, the objective of this document is to report findings from the 2012 Compliance Assessment process.

The goals of this assessment are:

1. To identify overloaded branches/transformers (>100% of rate A) under normal conditions. (NERC Category A)
2. To identify potential branch/transformer violations (>100% of rate B) due to the loss of a single element. (NERC Category B)
3. To identify potential branch/transformer violations (>100% of rate B) due to the loss of two elements. (NERC Category C)
4. To identify potential branch/transformer violations (>100% of rate B) due to extreme events. (NERC Category D)
5. To identify voltage performance (0.95 pu - 1.05 pu)[1] under normal conditions. (NERC Category A)
6. To identify potential voltage violations (0.9 pu – 1.05 pu)[1] due to the loss of a single element. (NERC Category B)
7. To identify potential voltage violations (0.9 pu – 1.05 pu) [1] due to the loss of two elements. (NERC Category C)
8. To identify potential voltage violations (0.9 pu – 1.05 pu) [1] due to extreme events. NERC Category D)
9. To identify potential transient stability violations under normal conditions. (NERC Category A)
10. To identify potential transient stability violations due to the loss of a single element. (NERC Category B)
11. To identify potential transient stability violations due to the loss of two elements. (NERC Category C)
12. To identify potential transient stability violations due to extreme events. (NERC Category D)

To support SPP's compliance, as the Planning Coordinator, with the NERC FAC-014-2.1 Reliability Standard, the objective of this document is to ensure that System Operating Limits (SOLs) used in the reliable planning and operation of the Bulk Electric System (BES) are determined based on an established methodology in section 12.3.2 of the SPP Criteria.[2]

[1] Local requirements for individual Entity apply in some cases.
[2] SPP Criteria

All System Operating Limits (SOLs) that were identified in the TPL assessment were mitigated by operating procedures or transmission projects developed or approved by SPP entities and staff. Therefore, there were no Interconnection Reliability Operating Limits (IROLs) for the planning horizon.

Entities Involved

The following entities registered with the SPP Regional Entity were included in these studies.

Entity Name	Registered Function
Arkansas Electric Cooperative Corporation (AECC)	DP,GOP,GO,LSE,PSE,RP,TO
American Electric Power (AEPW)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
East Texas Electric Cooperative (ETEC)	DP,GO,LSE,PSE,RP,TO,TP
Tex-La Electric Cooperative of Texas, Inc (TEXL)	DP,LSE,PSE,RP,TO,TP
Board of Public Utilities (BPU)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
City Utilities of Springfield, MO (SPRM)	BA,DP,GOP,GO,LSE,RP,TOP,TO,TP
Cleco Corporation (CLECO)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP,TSP
Grand River Dam Authority (GRDA)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
Independence Power & Light (INDN)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
ITC Great Plains, LLC (ITCGP)	TOP,TO
Kansas City Power & Light Company (KCPL)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
KCPL - Greater Missouri Operations (KCPL-GMO)	BA,LSE,PSE
Lafayette Utilities System (LAFA)	BA,DP,GOP,GO,LSE,PSE,TOP,TO,TP
Louisiana Energy & Power Authority (LEPA)	BA
Lincoln Electric System (LES)*	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
Midwest Energy, Inc (MIDW)	DP,LSE,PSE,TOP,TO,TP
Nebraska Public Power District (NPPD)*	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP,TSP
Oklahoma Gas & Electric Company (OKGE)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
Oklahoma Municipal Power Authority (OMPA)	DP,LSE,PSE,RP
Omaha Public Power District (OPPD)*	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
Southwestern Power Administration (SWPA)	BA,PSE,RP,TOP,TO,TP,TSP
Southwestern Public Service Company (SPS)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
Sunflower Electric Power Corporation (SECI)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
The Empire District Electric Company (EDE)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
Westar Energy, Inc (WR)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP
Western Farmers Electric Cooperative (WFEC)	BA,DP,GOP,GO,LSE,PSE,RP,TOP,TO,TP

BA : Balancing Authority
DP : Distribution Provider
GOP: Generator Operator
GO: Generation Owner
LSE: Load Serving Entity
PSE: Purchasing-Selling Entity
RP: Resource Planner
TOP: Transmission Operator

TO: Transmission Owner TSP: Transmission Service Provider
TP: Transmission Planner

*Midwest Reliability Organization (MRO) is the current Regional Entity for these entities.

Assessments

SPP staff has conducted various analyses to comply with NERC TPL standard requirements and are summarized here.

NERC TPL Standard	Key Requirement	SPP Analysis
TPL-001-0	Category A	SPP MDWG models, ITP Assessments
TPL-002-0	Category B	Steady State Mitigation Analysis, Stability Analysis, ITP Assessments
TPL-003-0, 004-0	Category C and D	Select N-2 and N-3 Steady State Analysis, Stability Analysis

Each of these analyses is discussed below.

Integrated Transmission Planning Near-Term Assessment (TPL-001 through TPL-002)

The 2013 Integrated Transmission Planning Near-Term Assessment (ITPNT) was completed in 2012 that compliments the 2012 TPL Steady State analysis. The 2013 ITPNT analysis was conducted to create a reliable transmission expansion plan for the SPP footprint through year 2018 and protect long-term firm transmission service. This steady-state assessment reviewed normal conditions (no contingency) and single contingency outage (N-1) scenarios using NERC Reliability Standards, SPP Criteria, and local planning criteria. It also coordinated appropriate mitigation plans to meet the SPP region's reliability needs. The powerflow cases used in this analysis were created from the SPP 2012 MDWG Build 1 Model Series. The generation dispatch in these cases was similar to that in the MDWG cases with exception of excluding generation without Transmission Service; the generation was also dispatched in another scenario to account for all long-term firm transmission service.

The 2013 ITPNT report is summarized in the 2013 SPP Transmission Expansion Plan (STEP) report. The planned system upgrades will be tracked to ensure reliability projects are built in time to meet system needs. The timing of the upgrades is individually listed and discussed as a whole in the 2013 STEP Report[3] (in the report's Appendix A).

MDWG Models

Power flow and stability models are developed by the Model Development Working Group (MDWG) for an annual series of SPP cases.

In April 2012, SPP finalized 16 power flow models in coordination with SPP members through the MDWG. This set of models goes through a validation process in several iterations until all models meet requirements as stated in the SPP MDWG Procedure Manual.[4]

In September 2012, SPP finalized 9 stability models in coordination with SPP members through the MDWG. This set of models goes through a validation process such that all models meet requirements as stated in the SPP MDWG Procedure Manual.

The 2012 SPP MDWG models reflect system condition, for selected years between years 2012 and 2023. These models are updated to reflect the most up-to-date information using the Model On Demand (MOD) program. The SPP 2012 Series MDWG Build 1 Final Powerflow and Dynamic Stability Models used for the compliance assessment have no thermal overloads, voltage violations, or transient instability under N-0, or normal system conditions.

Steady State Study (TPL-001 through TPL-004)

Models and Simulation

SPP used the models in Table 1 for the TPL-001, TPL-002, TPL-003, and TPL-004 steady state analyses.

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Summer Peak	2012MDWGB1_FINAL-13S	April 2012	December 2012
Near-Term	2013 Fall	2012MDWGB1_FINAL-13F	April 2012	December 2012
Near-Term	2013 Winter	2012MDWGB1_FINAL-13W	April 2012	December 2012
Near-Term	2014 Spring	2012MDWGB1_FINAL-14G	April 2012	December 2012

[3] 2013 STEP Report
[4] SPP MDWG Procedure Manual

Near-Term	2014 Summer Peak	2012MDWGB1_FINAL-14S	April 2012	December 2012
Near-Term	2018 Summer Peak	2012MDWGB1_FINAL-18S	April 2012	December 2012
Longer- Term	2023 Summer Peak	2012MDWGB1_FINAL-23S	April 2012	December 2012
Longer- Term	2023 Winter	2012MDWGB1_FINAL-23W	April 2012	December 2012

Table 1: Models Used for Assessment

Physical and Operational Margins (POM) software was used to screen not only the Category B, C, and D lists developed by SPP engineering staff and by member entities but to also run automatically selected (N-k) contingency analysis based on the selection criteria below. Power System Simulation for Engineering (PSS/E) was used as a supplementary tool for analysis and verification.

The complex elements considered for system evaluation under Category B were compiled by SPP-RTO with input from stakeholders and member entities. Additional automatically selected (N-1) elements were selected according to base voltage as shown in Table 2.

Element	Base kV (low side of transformers)	Source
Complex elements	---	SPP Staff and Member Entities
Branch	100 kV and above	Software Selection
Generator	All	Software Selection
Transformer	100 kV and above	Software Selection

Table 2: N-1 Elements Selected

The complex elements considered for system evaluation under Category C and D were compiled by SPP-RTO with input from stakeholders and member entities. Additionally, the automatically selected (N-1) elements studied for TPL-002-0 were paired to form automatically selected (N-2) contingencies for the TPL assessment. Pairs of automatically selected (N-1) elements were chosen according to Table 3.

Element	Selection Rule	Source
Complex elements	---	SPP Staff and Member Entities

Branch-Branch*	Same Zone	Software Selection
Generator-Branch*	Same Area	Software Selection
Generator-Generator	All	Software Selection

*Branch represents both branch and transformer elements

Table 3: N-2 Elements Selected

Steady State: TPL-001 Assessment (Category A)

The SPP 2012 Series MDWG Build 1 Final Powerflow Models used for the compliance assessment have no thermal overloads or voltage violations under N-0, or normal system conditions.

Steady State: TPL-002 Assessment (N-1)

A summary of potential violations found using the Category B complex element assessment list and the automatically selected N-1 list by POM is presented in the table below. SPP members and SPP engineering staff provided mitigation for all these violations.

Season	High Voltage	Low Voltage	Thermal Overloads	Total	Mitigated Findings	Remaining Violations
2013 Summer	103	205	39	347	347	0
2013 Fall	224	92	2	318	318	0
2013 Winter	347	19	5	371	371	0
2014 Spring	122	25	0	147	147	0
2014 Summer	104	127	31	262	262	0
2018 Summer	159	183	46	388	388	0
2023 Summer	96	239	98	433	433	0
2023 Winter	140	161	17	318	318	0

Table 4: TPL-002 Steady State Potential Violations

Steady State: TPL-003/TPL-004 Assessment (N-2/Extreme Events)

A summary of potential violations found using the Category C and D complex element assessment list and the automatically selected N-2 list by POM is presented in the table below. These numbers include the violations which were mitigated by SPP members in addition to the violations which were automatically mitigated by Optimal Mitigation Measures (OPM), which is a tool used to automatically apply mitigation techniques based on operating measures handled by SPP Operations in real-time, and verified by the SPP members.

Season	High Voltage	Low Voltage	Thermal Overloads	Total	Mitigated Findings	Remaining Violations
2013 Summer	505	4877	1899	7281	7281	0
2013 Fall	1069	2730	319	4118	4118	0
2013 Winter	1042	2739	548	4329	4329	0
2014 Spring	1143	1040	94	2277	2277	0
2014 Summer	969	3964	1934	6867	6867	0
2018 Summer	939	3130	1783	5852	5852	0
2023 Summer	682	4182	2538	7402	7402	0
2023 Winter	894	3429	681	5004	5004	0

Table 5: TPL-003 and 004 Steady State Potential Violations

Steady State: Summary

The MDWG models developed by SPP and member entities represent the power system for the SPP footprint. These models have no voltage or thermal potential violations for normal (N-0) operation under Category A. Complex element lists were developed by SPP and entities to simulate selected Category B, C, and D events. These events were simulated by SPP along with automatically selected (N-k) contingency lists. All 100 kV and above potential violations found by SPP assessments were mitigated by operating procedures or transmission projects developed or approved by SPP entities and staff. SPP staff monitored the 60 kV system, but did not require mitigations for violations found on that system. This is explained in further detail in the 2012 TPL Steady State Assessment Report.[5]

A summary of potential violations organized by Model Area is presented in Table 6.

Member	Area Number	Automatic-ally Selected	Category B	Category C and D	Total	Mitigated Findings	Remaining Violations
Cleco Corporation	502	1175	2	7	1184	1184	0
Lafayette Utilities System	503	125	0	0	125	125	0
Louisiana Energy & Power Authority	504	25	4	0	29	29	0
Southwestern Power Administration	515	422	14	4	440	440	0
American Electric Power	520	7982	67	125	8174	8174	0
Grand River Dam Authority	523	220	3	10	233	233	0
Oklahoma Gas & Electric Company	524	2436	2	105	2543	2543	0

[5] Found on SPP.org >> Engineering >> Transmission Planning >> TPL Assessments

Western Farmers Electric Cooperative	525	233	0	7	240	240	0
Southwestern Public Service Company	526	10784	162	103	11049	11049	0
Oklahoma Municipal Power Authority	527	104	0	0	104	104	0
Midwest Energy, Inc	531	1265	0	69	1334	1334	0
Sunflower Electric Power Corporation	534	4851	12	119	4982	4982	0
Westar Energy, Inc	536	4464	17	160	4641	4641	0
KCPL - Greater Missouri Operations	540	454	0	18	472	472	0
Kansas City Power & Light Company	541	491	0	7	498	498	0
Board of Public Utilities Kansas City	542	3	0	0	3	3	0
The Empire District Electric Company	544	228	0	1	229	229	0
Independence Power and Light	545	3	1	0	4	4	0
City Utilities of Springfield, MO	546	29	0	2	31	31	0
Nebraska Public Power District	640	8805	296	369	9470	9470	0
Omaha Public Power District	645	165	2	89	256	256	0
Lincoln Electric System	650	15	0	0	15	15	0

Table 6: Potential Violation Totals by Model Area

Stability Study (TPL-001 through TPL-004)

The MDWG 2012 Series 2013 Light Load and 2018 Summer Peak dynamic models were tested to be stable during normal system conditions.

The Stability Study was conducted for one seasonal light load model, the 2013 Light Load, within the near-term planning window and selected events for one seasonal peak load model, the 2018 Summer Peak, for the longer-term planning window. This assessment provides findings on potential events which could lead to instability within the SPP footprint for all member-submitted Categories (A, B, C and D) of events. A list of 115 NERC Category B, C, and D events were simulated in this assessment and are listed below in the table below. These events were submitted by SPP members and include reliability type contingencies and tower outages (events) to analyze for powerflow and stability performance.

Event	Contingency
B1	3-Ø fault at Wolf Creek 345kV for 3.6 cycles. Trip Wolf Creek – Rose Hill Line. No reclosing.
B2	3-Ø fault at Wolf Creek 345kV for 3.6 cycles. Trip Wolf Creek – Benton Line. No reclosing.
B3	3-Ø fault at Wolf Creek 345kV 3.6 cycles. Trip Wolf Creek – LaCygne Line. No reclosing.
B4	3-Ø fault at JEC 345kV for 3.6 cycles. Trip JEC – Hoyt Line. No reclosing.
B5	3-Ø fault at JEC 230kV for 6 cycles. Trip JEC – Auburn Line. No reclosing.
B6	Tolk GSU outage with unit at 540 MW. No reclosing.
B7	Plant X to Tolk 230 kV line 3-Ø fault. No reclosing
B8	Tolk to Eddy 345 kV line outage. Typical reclosing
B9	Yoakum to Sundown 230 kV line outage. Typical reclosing.
B10	Tolk to TUCO 230 kV line 3-Ø fault. No reclosing
B11	Potter 345/230 kV transformer 3-Ø fault. No reclosing
B12	Iatan to Stranger Creek 345 kV 3-Ø fault. Clear fault 3.6 cycles. No reclosing.
B13	Iatan to Eastowne 345 kV 3-Ø fault. Clear fault 3.6 cycles. No reclosing.
B14	3-Ø fault at S3451 on T3 transformer. Normal clearing.
B15	3-Ø fault at S1211 on the S1211-S1220 line. Normal clearing.
B16	3-Ø fault at S1206 on the S1206-S1232 line. Normal clearing.
B17	3-Ø fault at S3458 on the S3458 - Cooper line. Normal clearing.
B19	N01A: 3PH fault at GGS on GGS-Sweetwater 345 kV Circuit #1; Normal clearing; No reclose attempts
B20	N07A: 3PH fault at GGS on GGS-Red Willow 345 kV; Normal clearing; No reclose attempts.
B21	N25A: 3PH fault at GGS on GGS-North Platte 230 kV Circuit #1; Normal clearing; No reclose attempts.

Event	Contingency
B22	3PH fault at GGS on high side of GGS 345/230 kV T-1 transformer; Normal clearing; No reclose attempts.
B23	Brookline to Monett to Flint Creek 345 kV 3-phase fault, reclosing on one terminal only and rotated every year (549984 – 547481 – 506935).
B24	ANO - Ft. Smith 500 kV Line
B26	3-Ø fault on Knoll-Smoky Hill 230 kV reclose once at 90 cycles and trip permanently.
B27	3-Ø fault on Smoky Hill to Summit 230 kV reclose once at 90 cycles and trip permanently.
B28	LaCygne-Stilwell 345kV 3PH fault at LaCygne, clear fault 3.6 cycles, with no reclosing.
C1	Prior outage of JEC-Auburn 230kV line; 3-Ø fault at JEC 345 kV for 3.6 cycles; Trip JEC-Hoyt line; No reclosing.
C3	Prior outage of Fairport - St Joe 345 kV with a 3-Ø fault near Cooper on Cooper - St Joe 345 kV.
C4	Prior outage of Holcomb generating unit with an outage of Mingo – Red Willow 345 kV line.
C5	3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-Benton line; No reclosing; Reduce Wolf Creek output to 800 MW (Transmission Operating Directive 300); 3-Ø fault for 3.6 cycles at Wolf Creek 345 kV; Trip Wolf Creek-LaCygne line; No reclosing
C6	Summit to Smoky Hills 230 kV 3-Ø fault and outage followed by Circle to Mullergren 230 kV 3-Ø fault, no reclosing.
C7	Knoll to Smoky Hills 230 kV 3-Ø fault and outage followed by Circle to Mullergren 230 kV 3-Ø fault, no reclosing.
C8	Prior outage of Tolk to Roosevelt #1 230 kV circuit with a 3-phase fault near Roosevelt on the Tolk to Roosevelt #2 230 kV circuit -- no reclosing.
C9	Prior outage Iatan-Stranger Creek 345kV, Iatan to Eastowne 345 kV 3-Ø fault, clear fault 3.6 cycles, no reclosing, trip Iatan unit #2.
C10	3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-LaCygne 345 kV line; No reclosing; Reduce Wolf Creek output to 800 MW (Transmission Operating Directive 302); 3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-Benton 345 kV; No reclosing.
C11	DLG fault at the S3451 end of the S3451-S3459 and S3451-S3454 lines. Normal clearing. Fault admittance 2240 - j 24526 MVA fault for 2013LL and 2246 - j 24574 MVA for 2018SP for initial fault.

Event	Contingency
C12	SLG fault at the S3451 end of the S3451-Raun line, followed by a stuck breaker and the opening of transformer T4 at S3451. Fault Admittance 576 - j 6089 MVA for 2013LL and 578 - j 6099 MVA for 2018SP for initial fault. Fault Admittance 450 - j 5339 MVA for 2013LL and 451 - j 5350 MVA for 2018SP after opening S3451-Raun.
C13	SLG fault at S1206 on the S1206 - S1232 line, followed by a stuck breaker and the opening of the S1206 - S1201 line. Fault Admittance 697 - j 5599 MVA for 2013LL and 699 - j 5607 MVA for 2018SP for initial fault. Fault Admittance 637 - j 5273 MVA for 2013LL and 638 - j 5280 MVA for 2018SP after opening S1206-S1232.
C14	N915: SLG fault at GGS on GGS-Sweetwater 345 kV Circuit #2, Stuck Breaker (GGS 3322), Drop GGS-Red Willow 345 kV line; Delayed clearing; No reclose attempts.
C15	Prior Outage of Brookline – Monett - Flint Creek 345 kV with a 3-phase fault near Brookline on Brookline - Morgan 345 kV, with reclosing first at Morgan and then Brookline (549984 – 547481 – 506935, 549984 – 300045).
C16	3-Ø fault and outage of the Brookline - Southwest Power Station (SWPS) John Twitty Energy Center (JTEC) 161 kV line followed by a 3-phase fault near JTEC SWPS on the JTEC SWPS - Southwest Treatment Plant - SPRM Battlefield 161 kV line, no reclosing (549969 – 549954, 549954 – 549960 – 549959).
C17	SLG fault on 531448 HOLCOMB3 which will trip Holcomb3 (531448) - HOLCOMB7 (531449) 345/115 kV transformer with breaker stuck which trips Holcomb3 (531448) to Jones3 (531379) 115 kV line (delayed trip).
C18	SLG Fault on the line Holcomb 3 (531448) to Fletcher3 (531393) 115 kV line with a SLG fault on Holcomb3 (531448) to Pioneer Tap (531392) (Fault at Holcomb).
C19	3-Phase fault on the line from Bus 539695 to bus 539679 with breaker stuck which trips Spearville 345/230 kV transformer (531469/539695).
C20	3-phase fault on the line from Bus 531449 to bus 523853 with stuck breaker which trips the line from Bus 531449 to Bus 531465. Delayed trip.
C22	Prior outage of South Hays-Great Bend 230 kV (530582-539679 Circuit #1) followed by three-phase fault on Knoll-Smoky Hill 230 kV (530558-530592 Circuit #1) reclose once at 90 cycles and trip permanently.
C23	Prior outage of Colby-Mingo 115 kV (530555-531429 Circuit #1) followed by three-phase fault on Colby-Hoxie-Beach 115 kV (530555-530556 Circuit #1 and 530556-530557 Circuit #1) reclose once at 20 cycles and trip permanently.
C24	Fault on Knoll 230/115 kV transformer (530561-530558-530629 ckt 1) with breaker 3010 failure resulting in clearing Knoll-Redline-Beach 115 kV line (530561-530605 Circuit #1 and 530605-530557 Circuit #1).

Event	Contingency
C25	3-Ø fault at Wolf Creek for 3.6 Cycles; Trip Wolf Creek-Rose Hill line; No reclosing; Reduce Wolf Creek output to 800 MW (Transmission Operating Directive 301); 3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-LaCygne line; No reclosing.
C26[1]	Trip all generation at bus 539653 followed by a SLG fault from Holcomb (531448) to Plymell (531393) to PionTAP (Do this contingency for 18Summer) only (531392) (Fault at Pioneer Tap).
C27[1]	3-Ø fault on Crockett (509240) - Latexo (509323) followed by 3 phase fault on Jacksonville (509242) - Overton (509080).
C28[1]	Prior outage of Muskogee - Fort Smith 345 kV; 3-phase fault and trip Valliant - Lydia 345 kV.
C29[1]	Prior outage of Diana - SW Shreveport 345 kV; 3-phase fault and trip Wilkes - Longwood 345 kV.
C30[1]	Prior outage of Welsh - Lydia 345 kV; 3-phase fault and trip Welsh - NW Texarkana 345 kV. Welsh generation at Pmax.
C31[1]	Prior outage of Dolet Hills - Carroll 230 kV; 3-phase fault and trip Dolet Hills - SW Shreveport 345 kV. Dolet Hills Plant at Pmax.
C32[1]	Prior outage of Flint Creek Generator; 3-phase fault and trip GRDA1 - Flint Creek 345 kV.
C33[1]	3-Ø fault and trip Welsh - Wilkes / Welsh - NW Texarkana 345 kV DCT. Welsh generation at Pmax.
C34[1]	3-Ø fault and trip Diana - SW Shreveport / Longwood - SW Shreveport 345 kV DCT
C35[1]	Phase-to-ground fault Welsh - NW Texarkana 345 kV with CB (#10610) failure at Welsh. 15-cycle delayed clearing removing Welsh - Wilkes 345 kV. Welsh generation at Pmax.
C36[1]	Phase-to-ground fault Wilkes - Longwood 345 kV with CB (#1W10) failure at Wilkes. 15-cycle delayed clearing removing Wilkes - Welsh 345 kV. Wilkes generation at Pmax.
C37[1]	Prior outage of Northeastern Station - Tulsa North 345 kV; 3-phase fault and trip Northeastern Station - Oneta 345 kV. Northeastern generation at Pmax.
C38[1]	Prior outage of Northeastern Station - Tulsa North 345 kV; 3-phase fault and trip Northeastern Station - Delaware 345 kV. Northeastern generation at Pmax.

Event	Contingency
C39[1]	Prior outage of Riverside Station - Sapulpa Rd 345 kV; 3-phase fault and trip Riverside Station - Pecan Creek 345 kV. Riverside (Cogentrix) generation at Pmax.
C40[1]	Prior outage of Pittsburg - Muskogee 345 kV; 3-phase fault and trip Pittsburg - Seminole 345 kV. Kiowa generation at Pmax.
C41[1]	Prior outage of Pittsburg - Valiant 345 kV; 3-phase fault and trip Pittsburg - Johnston County 345 kV. Kiowa generation at Pmax.
C42[1]	3-Ø fault and trip Northeastern Station - Tulsa North 345 / 138 kV DCT (90-909 & 81-822). Northeastern generation at Pmax.
C43[1]	Phase-to-ground fault Oneta - Riverside Station 345 kV with CB (#3405A) at Oneta. 15-cycle delayed clearing removing Oneta - Clarksville 345 kV.
C44[1]	Phase-to-ground fault Riverside Station - Red Bud 345 kV with CB (#3405A) at Riverside. 15-cycle delayed clearing removing Riverside - Sapulpa 345 kV. Riverside (Cogentrix) generation at Pmax.
C45[1]	Phase-to-ground fault Pittsburg - Muskogee 345 kV with CB (#3441A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Seminole 345 kV. Kiowa generation at Pmax.
C46[1]	Phase-to-ground fault Pittsburg - Valiant 345 kV with CB (#3329A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Johnston County 345 kV. Kiowa generation at Pmax.
D2	3-Ø fault on Holcomb – Setab 345 kV with breaker failure taking out the 345-115 kV autotransformer.
D3	Jeffrey Energy Center (JEC) to Hoyt 345 kV 3-Ø fault, no reclosing, and trip JEC Unit #2.
D4	3-Ø fault on Auburn-Jeffery Energy Center (JEC) 230 kV; followed by 3-Ø fault on Hoyt-JEC 345 kV, no reclosing, and trip JEC Unit#2.
D5	Run fault on GRDA1 345 kV bus for 5 cycles. Then open Tonnece end of Tonnece - GRDA1 345 kV line, but stuck breaker 9580 at GRDA1. Run for 25 cycles and then drop GRDA 345/161 transformer #1 & breaker 9080 (GRDA bkr 500T opens correctly).
D7	Loss of Ft. Smith 500/345/161 kV Substation.
D9	3-Ø fault at the S3451 on T3 transformer, followed by a stuck breaker and the opening of the S3451-S3459 line.
D10	3-Ø fault at S3458 on the S3458 - Cooper line, followed by a stuck breaker and the opening of the west bus at S3458.
D11	Loss of the entire substation S3456, including the transformer to the 161-kV level.

Event	Contingency
D14	N902 : Simultaneous SLG fault on GGS-Sweetwater 345 kV Circuit #1 and 3PH fault on GGS-Sweetwater 345 kV Circuit #2 at cross point; Normal clearing; Reclose far end.
D15	5 cycle SLG fault on the 84th & Bluff end of the 84th & Bluff - Waverly 115 kV line breaker #7502 fails. The 84th & Bluff - 70th & Bluff 115 kV line is opened to clear the fault. There is no reclosure.
D16	Loss of Summit 230 kV Substation.
D17	Loss of JEC 345 kV Substation.
D18	3-Ø fault w/breaker failure at Hoyt 345 kV; After +4.6 cycles trip Hoyt-Stranger 345 kV line at Stranger; After +9 cycles breaker failure trip Hoyt-JEC line; Hoyt 345-43 breaker failure.
D19	3-Ø fault w/breaker failure at JEC 345 kV; After +4.6 cycles trip JEC-Hoyt line at Hoyt; After +9 cycles breaker failure trip JEC-Hoyt line and JEC 345-230 #26 transformer; JEC 345-17 breaker failure.
D20	3-Ø fault w/breaker failure at JEC 345 kV; After +4.6 cycles trip JEC-Summit line at Summit; After +9 cycles breaker failure trip JEC-Summit line and JEC 345-230 #26 transformer; JEC 345-25 breaker failure.
D21	3-Ø fault w/breaker failure at JEC 345 kV; After +4.6 cycles trip the JEC-Morris line at Morris; After +9 cycles breaker failure trip JEC-Morris line and JEC 345-230 #26 transformer; JEC 345-21 breaker failure.
D22	Loss of Knoll 115 kV Substation.
D23	Loss of Heizer 115 kV Substation.
D24	Brookline 345 kV double Circuit 3-phase fault on 161 kV bus 549969.
D25[1]	3-Ø fault on Holcomb 345/115 kV Transformer (531448-531449-531450) followed by a trip of Holcomb 115/22 kV Transformer (531447-531448).
D26[1]	3-Ø fault Hawthorn 161 kV bus with breaker failure that trips entire bus at 25 cycles.
D27	Loss of Wolf Creek 345 kV Substation.
D28[1]	3-Ø fault Welsh - NW Texarkana 345 kV with CB (#10610) failure at Welsh. 15-cycle delayed clearing removing Welsh - Wilkes 345 kV. Welsh generation at Pmax.
D29[1]	3-Ø fault Wilkes - Longwood 345 kV with CB (#1W10) failure at Wilkes. 15-cycle delayed clearing removing Wilkes - Welsh 345 kV. Wilkes generation at Pmax.
D30[1]	3-Ø fault and trip NW Texarkana 345 kV Station.

Event	Contingency
D31[1]	3-Ø fault and trip Flint Creek 161 kV Station.
D32[1]	3-Ø fault and trip Diana 345 kV Station.
D33[1]	3-Ø fault and trip Welsh 345 kV Station.
D34[1]	3-Ø fault Oneta - Riverside Station 345 kV with CB (#3405A) at Oneta. 15-cycle delayed clearing removing Oneta - Clarksville 345 kV. Oneta generation at Pmax.
D35[1]	3-Ø fault Tulsa SE 138 kV bus tie CB (#1345B) and clear entire station.
D36[1]	3-Ø fault Tulsa PS 138 kV bus tie CB (#1349B) and clear entire station.
D37[1]	3-Ø fault and trip Oneta 345 kV Station.
D38[1]	3-Ø fault and trip Oneta 138 kV Station.
D39[1]	3-Ø fault and trip Riverside 138 kV Station.
D40[1]	3-Ø fault and trip Pittsburg 345 kV Station.
D41[1]	3-Ø fault and trip Tulsa North 138 kV Station.
D42[1]	3-Ø fault and trip Valliant 345 kV Station.
D43[1]	3-Ø fault and trip Oklaunion - Lawton Eastside 345 kV with SPS failure.
D44[1]	3-Ø fault Riverside Station - Red Bud 345 kV with CB (#3405A) at Riverside. 15-cycle delayed clearing removing Riverside - Sapulpa 345 kV. Riverside (Cogentrix) generation at Pmax.
D45[1]	3-Ø fault Pittsburg - Muskogee 345 kV with CB (#3441A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Seminole 345 kV. Kiowa generation at Pmax.
D46[1]	3-Ø fault Pittsburg - Valiant 345 kV with CB (#3329A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Johnston County 345 kV. Kiowa generation at Pmax.
D47[1]	3-Ø fault and trip Riverside Station - Oneta / Red Bud / Pecan Creek 345 kV ROW. Riverside generation (Cogentrix) at Pmax.
D48[2]	3-phase fault on the line from Bus 531449 to bus 523853 with stuck breaker which trips the line from Bus 531449 to Bus 531465. Delayed trip.

[1]: Contingency introduced for 2012 TPL Study
[2]: Formerly known as contingency C20

SPP members provided staff with 28 Category B events that were to be evaluated for transient stability. There were no NERC Category B contingencies that were unstable during this analysis.

Additionally SPP performed an angular stability screening on the SPP Transmission System by applying N-1 contingencies on transmission lines and transformers above 100 kV. The screening was done by applying a 3-phase fault at a specified bus "A" and subsequently tripping the branch or transformer between bus "A" and bus "B". The method would then be repeated with the fault at bus "B". The 3-phase fault was applied for a sufficient duration that produces adequate system stress based on the voltage class. Note this methodology does not indentify instability regarding wind turbines or other types of asynchronous connections. Future plans are to implement a transient voltage response screening tool that will be able to detect voltage deviations in asynchronous machines along with other voltage measurements (voltage recovery and stabilization) during transient events. Currently SPP is developing these transient disturbance performance requirements.

Nine (9) 2013 Light Load and nineteen (19) 2018 Summer Peak contingencies were shown to be unstable during the screening and were found stable through re-evaluation by reducing the screened clearing time to member specified, actual clearing times.

SPP members provided staff with 44 Category C events that were to be evaluated for transient stability. Event C31 caused the Dolet Hills unit to be unstable. Therefore, an operating guide is needed such that the prior outage of Dolet Hills – Carrol 230 kV will necessitate Dolet Hills be curtailed to maximum net output of 400 MW in order to protect for the fault and trip of Dolet Hills – SW Shreveport 345 kV. The owners are developing an operating guide to ensure stability. The remaining Category C unstable events were corrected by correcting existing model data or fault descriptions.

SPP members provided staff with 43 Category D events that were to be evaluated for transient stability. Satisfactory results were found for all Category D events showing instability by disconnecting the unstable units at the member recommended clearing time.

In conclusion, the MDWG 2012 Series 2013 Light Load and 2018 Summer Peak seasons were tested to be stable during normal conditions prior to this study, satisfying NERC TPL Category A requirements. All unstable screened events were found to be stable when the member submitted fault clearing times were tested, satisfying NERC TPL Category B requirements. All unstable, member specified events were found to be stable when the specified mitigation measures were applied, thereby satisfying NERC TPL Category C and D requirements. Category C, Event C31, requires an operating guide, which the owners are developing.

The background material for the 2012 Stability Study and the stability plots will be provided on an as requested basis.

Attachment 1- Project List

The list of all upgrades, details, and in-service dates can be found in Appendix A of the annual SPP Transmission Expansion Plan (STEP) report:

SPP.org> Engineering>Transmission Planning.

Attachment 2 – TPL-001 Compliance Statement

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is planned such that, with all transmission facilities in service and with normal (pre-contingency) operating procedures in effect, the Network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services at all Demand levels over the range of forecast system demands, under the conditions defined in Category A of Table I. To be considered valid, the Planning Authority and Transmission Planner assessments shall:

The Southwest Power Pool (SPP) MDWG models used for the TPL Compliance Assessment were validated in compliance with current SPP Criteria under Criteria 3.3.3 and were documented in ***Criteria 3.3.3 – 2012 Summer.***[6] *SPP has demonstrated with the* ***2012 TPL Compliance Assessment*** *that its portion of the interconnected transmission system has been planned as documented in the 2013 SPP Transmission Expansion Plan such that, with all transmission facilities in service and with normal (pre-contingency) operating procedures in effect, the Network can be operated to supply projected customer demands and projected Firm (non- recallable reserved) Transmission Services at all demand levels over the range of forecast system demands, under the conditions defined in Category A.*

R1.1. Be made annually.

The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the ***MDWG 2012 Build releases****. The TPL Compliance Assessment is conducted annually. The previous iteration of the TPL Compliance Assessment was reported in comprehensive* ***SPP 2011 TPL Compliance Report***[7]*.*

R1.2. Be conducted for near-term (years one through five) and longer-term (years six through ten) planning horizons.

The MDWG powerflow models for seasons ***2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer*** *were used as the basis for the near-term (years one through five) and MDWG models for seasons* ***2023 Summer and 2023 Winter*** *were used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The MDWG dynamic stability model for* ***2013 Light Load*** *was used as the basis for the near-term (years one through five) and MDWG model for* ***2018 Summer*** *was used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The assessment uses MDWG models as outlined in the table below. The timing of needed transmission project upgrades for years in between those explicitly assessed was identified as part of SPP's Attachment O planning process such that the projects will be in service prior to the date needed to resolve the issue.*

[6] SPP Criteria 3.3.3 – 2012 Summer
[7] SPP 2011 TPL Compliance Report

Powerflow Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Summer Peak	2012MDWGB1_FINAL-13S	April 2012	December 2012
Near-Term	2013 Fall	2012MDWGB1_FINAL-13F	April 2012	December 2012
Near-Term	2013 Winter	2012MDWGB1_FINAL-13W	April 2012	December 2012
Near-Term	2014 Spring	2012MDWGB1_FINAL-14G	April 2012	December 2012
Near-Term	2014 Summer Peak	2012MDWGB1_FINAL-14S	April 2012	December 2012
Near-Term	2018 Summer Peak	2012MDWGB1_FINAL-18S	April 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2023 Summer Peak	2012MDWGB1_FINAL-23S	April 2012	December 2012
Longer-Term	2023 Winter	2012MDWGB1_FINAL-23W	April 2012	December 2012

Dynamic Stability Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Light Load	2012MDWGB1_FINAL_13L_R2_DS_RED	September 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2018 Summer Peak	2012MDWGB1_FINAL_18S_R2_DS_RED	September 2012	December 2012

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category A of Table 1 (no contingencies). The specific elements selected (from each of the following categories) shall be acceptable to the associated Regional Reliability Organization(s).

This 2012 TPL Compliance Assessment includes current system simulations that address each of the required categories and also used the 2013 Integrated Transmission Planning Near-Term and the 2012 Integrated Transmission Planning 10-Year Assessments.

R1.3.1. Cover critical system conditions and study years as deemed appropriate by the entity performing the study.

*This assessment uses MDWG models including system conditions for all BA's within the SPP footprint as well as BA's connecting directly to them. These parameters are deemed to be appropriate by SPP engineering staff and members. The MDWG powerflow models for seasons **2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer** were used as the basis for the near-term (years one through five) and MDWG models for seasons **2023 Summer and 2023 Winter** were used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The MDWG dynamic stability model for **2013 Light Load** was used as the basis for the near-term (years one through five) and MDWG model for **2018 Summer** was used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The assessment uses MDWG models as outlined in the table in R1.2.*

R1.3.2. Be conducted annually unless changes to system conditions do not warrant such analyses.

*The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the MDWG **2012 Build 1** release. The continual change and improvement in system conditions warrant this **2012** assessment.*

R1.3.3. Be conducted beyond the five-year horizon only as needed to address identified marginal conditions that may have longer lead-time solutions.

*It was deemed by SPP engineering staff and members that MDWG powerflow models for seasons **2023 Summer and 2023 Winter** and dynamic stability model for season **2018 Summer** were necessary. These models will be sufficient to address and identify longer lead-time solutions for the transmission projects that are examined as mitigation plans to address potential violations.*

R1.3.4. Have established normal (pre-contingency) operating procedures in place.

The MDWG models and software used by SPP incorporate established normal, pre-contingency operating procedures (MVAR dispatch, transformer tap-adjustment, phase-shifter angle regulation, capacitor/reactor switching, MW dispatch, etc) as parts of the power flow solution.

R1.3.5. Have all projected firm transfers modeled.

*The assessment uses the transfers projected by **SPP-2012-MDWG-Data Submittal Forms Master 4/13/2012** submitted by SPP members **Aug 2011 - April 2012**. This data is incorporated in the MDWG models.*

R1.3.6. Be performed for selected demand levels over the range of forecast system demands.

These assessments were performed over the range of seasonal demand levels as reported in the seasonal assessment table in R1.2.

R1.3.7. Demonstrate that system performance meets Table 1 for Category A (no contingencies).

The assessments demonstrate that system performance meets Table 1 for Category A. The MDWG models used include planned upgrades. No violations occurred in models with no contingencies (N-0), meaning the planned upgrades meet the performance requirements of Category A.

R1.3.8. Include existing and planned facilities.

The MDWG models used include all existing and planned facilities for the term modeled.

R1.3.9. Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

The MDWG models used include reactive power resources. The analysis performed ensures that adequate reactive power is available to meet system performance requirements.

R1.4. Address any planned upgrades needed to meet the performance requirements of Category A.

The MDWG models used include planned upgrades. No violations occurred in models with no contingencies (N-0), meaning the planned upgrades meet the performance requirements of Category A.

R2. When system simulations indicate an inability of the systems to respond as prescribed in Reliability Standard TPL-001-0_R1, the Planning Authority and Transmission Planner shall each:

R2.1. Provide a written summary of its plans to achieve the required system performance as described above throughout the planning horizon.

*A continually-updated, written summary of SPP's 10-year and beyond plans to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. These dates cover and exceed the planning horizon.*

R2.1.1. Including a schedule for implementation.

*A continually-updated, written summary of SPP's 10-year and beyond plans to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. This document includes the schedule on which the projects are implemented.*

R2.1.2. Including a discussion of expected required in-service dates of facilities.

A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission

*Expansion Plan, includes projects planned from **January 2013 through December 2030**. This document includes the in-service dates on which the projects are implemented.*

R2.1.3. Consider lead times necessary to implement plans.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. The dates on which the projects are implemented reflect lead-times necessary for members to implement plans.*

R2.2. Review, in subsequent annual assessments, (where sufficient lead time exists), the continuing need for identified system facilities. Detailed implementation plans are not needed.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. The dates on which the projects are implemented reflect lead-times necessary for members to implement plans.*

R3. The Planning Authority and Transmission Planner shall each document the results of these reliability assessments and corrective plans and shall annually provide these to its respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

SPP has documented the results of this reliability assessment and its corrective plans and the results were provided to its NERC RRO as required.

Attachment 3 – TPL-002 Compliance Statement

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is planned such that the Network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand levels over the range of forecast system demands, under the contingency conditions as defined in Category B of Table I. To be valid, the Planning Authority and Transmission Planner assessments shall:

The Southwest Power Pool (SPP) MDWG models used for the TPL Compliance Assessment were validated in compliance with current SPP Criteria under Criteria 3.3.3 and were documented in ***Criteria 3.3.3 – 2012 Summer***[7]*. SPP has demonstrated with its* ***2012*** *TPL Compliance Assessment that its portion of the interconnected transmission system has been planned as documented in the 2013 SPP Transmission Expansion Plan such that the Network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand levels over the range of forecast system demands, under the contingency conditions as defined in Category B.*

R1.1. Be made annually.

The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the ***MDWG 2012 Build releases****. The TPL Compliance Assessment is conducted annually. The previous iteration of the TPL Compliance Assessment was reported in comprehensive* ***SPP 2011 TPL Compliance Report***[8]*.*

R1.2. Be conducted for near-term (years one through five) and longer-term (years six through ten) planning horizons.

The MDWG powerflow models for seasons ***2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer*** *were used as the basis for the near-term (years one through five) and MDWG models for seasons* ***2023 Summer and 2023 Winter*** *were used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The MDWG dynamic stability model for* ***2013 Light Load*** *was used as the basis for the near-term (years one through five) and MDWG model for* ***2018 Summer*** *was used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The assessment uses MDWG models as outlined in the table below. The timing of needed transmission project upgrades for years in between those explicitly assessed was identified as part of SPP's Attachment O planning process such that the projects will be in service prior to the date needed to resolve the issue.*

[8] SPP 2011 TPL Compliance Report

Powerflow Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Summer Peak	2012MDWGB1_FINAL-13S	April 2012	December 2012
Near-Term	2013 Fall	2012MDWGB1_FINAL-13F	April 2012	December 2012
Near-Term	2013 Winter	2012MDWGB1_FINAL-13W	April 2012	December 2012
Near-Term	2014 Spring	2012MDWGB1_FINAL-14G	April 2012	December 2012
Near-Term	2014 Summer Peak	2012MDWGB1_FINAL-14S	April 2012	December 2012
Near-Term	2018 Summer Peak	2012MDWGB1_FINAL-18S	April 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2023 Summer Peak	2012MDWGB1_FINAL-23S	April 2012	December 2012
Longer-Term	2023 Winter	2012MDWGB1_FINAL-23W	April 2012	December 2012

Dynamic Stability Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Light Load	2012MDWGB1_FINAL_13L_R2_DS_RED	September 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2018 Summer Peak	2012MDWGB1_FINAL_18S_R2_DS_RED	September 2012	December 2012

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category B of Table 1 (single contingencies). The specific elements selected (from each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).

*The **2012** TPL Compliance Assessment is supported by several studies, including those using the most up-to-date MDWG models available— the 2012 TPL Steady State and Stability Assessments. The TPL steady state and stability assessment use **2012 Build 1 MDWG models**. For the steady state analysis, the complex elements considered for system evaluation under Category B were developed by SPP-RTO with input from stakeholders and members. Additional (N-1) elements were automatically selected based on base voltage according to the following table.*

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Generator	All
Transformer	100 kV and above

The Stability Study assesses contingency events to identify potential instability within the SPP footprint for all member-submitted categories (A, B, C and D) of events. A list of 28 NERC Category B events were simulated in this assessment and are listed below in the table below. These events were submitted by SPP members and include reliability type contingencies and tower outages (events) to analyze for powerflow and stability performance.

Event	Contingency
B1	3-Ø fault at Wolf Creek 345kV for 3.6 cycles. Trip Wolf Creek – Rose Hill Line. No reclosing.
B2	3-Ø fault at Wolf Creek 345kV for 3.6 cycles. Trip Wolf Creek – Benton Line. No reclosing.
B3	3-Ø fault at Wolf Creek 345kV 3.6 cycles. Trip Wolf Creek – LaCygne Line. No reclosing.
B4	3-Ø fault at JEC 345kV for 3.6 cycles. Trip JEC – Hoyt Line. No reclosing.
B5	3-Ø fault at JEC 230kV for 6 cycles. Trip JEC – Auburn Line. No reclosing.
B6	Tolk GSU outage with unit at 540 MW. No reclosing.
B7	Plant X to Tolk 230 kV line 3-Ø fault. No reclosing
B8	Tolk to Eddy 345 kV line outage. Typical reclosing
B9	Yoakum to Sundown 230 kV line outage. Typical reclosing.
B10	Tolk to TUCO 230 kV line 3-Ø fault. No reclosing

Event	Contingency
B11	Potter 345/230 kV transformer 3-Ø fault. No reclosing
B12	Iatan to Stranger Creek 345 kV 3-Ø fault. Clear fault 3.6 cycles. No reclosing.
B13	Iatan to Eastowne 345 kV 3-Ø fault. Clear fault 3.6 cycles. No reclosing.
B14	3-Ø fault at S3451 on T3 transformer. Normal clearing.
B15	3-Ø fault at S1211 on the S1211-S1220 line. Normal clearing.
B16	3-Ø fault at S1206 on the S1206-S1232 line. Normal clearing.
B17	3-Ø fault at S3458 on the S3458 - Cooper line. Normal clearing.
B19	N01A: 3PH fault at GGS on GGS-Sweetwater 345 kV Circuit #1; Normal clearing; No reclose attempts
B20	N07A: 3PH fault at GGS on GGS-Red Willow 345 kV; Normal clearing; No reclose attempts.
B21	N25A: 3PH fault at GGS on GGS-North Platte 230 kV Circuit #1; Normal clearing; No reclose attempts.
B22	3PH fault at GGS on high side of GGS 345/230 kV T-1 transformer; Normal clearing; No reclose attempts.
B23	Brookline to Monett to Flint Creek 345 kV 3-phase fault, reclosing on one terminal only and rotated every year (549984 – 547481 – 506935).
B24	ANO - Ft. Smith 500 kV Line
B26	3-Ø fault on Knoll-Smoky Hill 230 kV reclose once at 90 cycles and trip permanently.
B27	3-Ø fault on Smoky Hill to Summit 230 kV reclose once at 90 cycles and trip permanently.
B28	LaCygne-Stilwell 345kV 3PH fault at LaCygne, clear fault 3.6 cycles, with no reclosing.

SPP members provided staff with 28 Category B events that were to be evaluated for transient stability. There were no NERC Category B contingencies that were unstable during this analysis.

Additionally SPP performed an angular stability screening on the SPP Transmission System by applying N-1 contingencies on transmission lines and transformers above 100 kV. The screen was performed by applying a 3-phase fault at bus "A" for a specified period of time. Next, the fault was

cleared based on the voltage level of the transmission line. The line was opened from bus "A" to bus "B" without re-closing. The method would then be repeated with the fault at bus "B". This methodology will not indentify unstable situations regarding Wind Turbines or other types of asynchronous connections. The purpose of this assessment was to find areas of potential instability for SPP Member Baseline Generators which are synchronous machines. Nine (9) 2013 Light Load and nineteen (19) 2018 Summer Peak contingencies were found to be unstable during the screening and were made stable by reducing the screened clearing time to member specified, actual clearing times.

Other studies supporting the assessment are the 2013 Integrated Transmission Planning Near-Term and the 2012 Integrated Transmission Planning 10-Year Assessments.

R1.3.1. Be performed and evaluated only for those Category B contingencies that would produce the more severe System results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.

The complex elements considered for system evaluation under Category B were developed by SPP-RTO with input from stakeholders and members.

For steady state analysis, additional elements were automatically selected based on base voltage as outlined in the following table. Branch elements with base voltages less than 100 kV have less critical roles in system capability than those with higher base voltage and produce less severe system results. Transformer elements with base voltages less than 100 kV on all busses have less capacity than those with one or more higher base voltages and produce less severe system results. All generator elements were considered in evaluating system results regardless of base voltage or power capacity.

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Generator	All
Transformer	100 kV and above

For the stability analysis, additional elements were automatically selected based on base voltage as outlined in the following table. Branch elements with base voltages less than 100 kV have less critical roles in system capability than those with higher base voltage and produce less severe system results. Transformer elements with base voltages less than 100 kV on all busses have less capacity than those with one or more higher base voltages and produce less severe system results.

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Transformer	100 kV and above

R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.

*This assessment uses MDWG models including system conditions for all BA's within the SPP footprint as well as BA's connecting directly to them. These parameters are deemed to be appropriate by SPP engineering staff and members. The MDWG powerflow models for seasons **2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer** were used as the basis for the near-term (years one through five) and MDWG models for seasons **2023 Summer and 2023 Winter** were used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The MDWG dynamic stability model for **2013 Light Load** was used as the basis for the near-term (years one through five) and MDWG model for **2018 Summer** was used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The assessment uses MDWG models as outlined in the table in R1.2.*

R1.3.3. Be conducted annually unless changes to system conditions do not warrant such analyses.

*The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the MDWG **2012 Build 1** release. The continual change and improvement in system conditions warrant this **2012** assessment.*

R1.3.4. Be conducted beyond the five-year horizon only as needed to address identified marginal conditions that may have longer lead-time solutions.

*It was deemed by SPP engineering staff and members that MDWG powerflow models for seasons **2023 Summer and 2023 Winter** and dynamic stability model for season **2018 Summer** were necessary. These models will be sufficient to address and identify longer lead-time solutions for the transmission projects that are examined as mitigation plans to address potential violations.*

R1.3.5. Have all projected firm transfers modeled.

*The assessment uses the transfers projected by **SPP-2012-MDWG-Data Submittal Forms Master 4/13/2012** submitted by SPP members **Aug 2011 - April 2012**. This data is incorporated in the MDWG models.*

R1.3.6. Be performed and evaluated for selected demand levels over the range of forecast system Demands.

These assessments were performed over the range of seasonal demand levels as reported in the seasonal assessment table in R1.2.

R1.3.7. Demonstrate that system performance meets Table 1 for Category B contingencies.

The assessments demonstrate that system performance meets Table 1 for Category B. Any violations occurring in models with events resulting in the loss of a single element (N-1) were mitigated by procedures developed by SPP engineering staff and member entities.

R1.3.8. Include existing and planned facilities.

The MDWG models used include all existing and planned facilities for the term modeled.

R1.3.9. Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

The MDWG models used include reactive power resources. The analysis performed ensures that adequate reactive power is available to meet system performance requirements.

R1.3.10. Include the effects of existing and planned protection systems, including any backup or redundant systems.

The Category B contingencies provided by SPP member entities include protection systems including normal clearing of 3-phase breakers for generators, branches, and transformers. The Category B contingencies provided by SPP member entities include backup and redundant systems including load throw-over.

R1.3.11. Include the effects of existing and planned control devices.

The MDWG models and software used include existing and planned control devices including transformer tap adjustments, phase-shifter angle regulation, and capacitor switching.

R1.3.12. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

The MDWG models used include planned outages of bulk electric equipment at demand levels for which those planned outages are performed.

R1.4. Address any planned upgrades needed to meet the performance requirements of Category B of Table I.

The MDWG models used include planned upgrades. All violations occurring in models with events resulting in the loss of a single element (N-1) were mitigated by transmission upgrades or operating procedures developed by SPP engineering staff and member entities; meaning the planned upgrades meet the performance requirements of Category B.

R1.5. Consider all contingencies applicable to Category B.

The complex elements considered for system evaluation under Category B were developed by SPP-RTO with input from stakeholders and members.

For the steady state analysis, additional elements were automatically selected based on base voltage as outlined in the following table. Branch elements with base voltages less than 100 kV have less critical roles in system capability than those with higher base voltage and produce less severe system results. Transformer elements with base voltages less than 100 kV on all busses have less capacity than those with one or more higher base voltages and produce less severe system results. All generator elements were considered in evaluating system results regardless of base voltage or power capacity.

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Generator	All
Transformer	100 kV and above

For the stability analysis, additional elements were automatically selected based on base voltage as outlined in the following table. Branch elements with base voltages less than 100 kV have less critical roles in system capability than those with higher base voltage and produce less severe system results. Transformer elements with base voltages less than 100 kV on all busses have less capacity than those with one or more higher base voltages and produce less severe system results.

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Transformer	100 kV and above

R2. When system simulations indicate an inability of the systems to respond as prescribed in Reliability Standard TPL-001-0_R1, the Planning Authority and Transmission Planner shall each:

R2.1. Provide a written summary of its plans to achieve the required system performance as described above throughout the planning horizon.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. These dates cover and exceed the planning horizon.*

R2.1.1. Including a schedule for implementation.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. This document includes the schedule on which the projects are implemented.*

R2.1.2. Including a discussion of expected required in-service dates of facilities.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. This document includes the in-service dates on which the projects are implemented.*

R2.1.3. Consider lead times necessary to implement plans.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. The dates on which the projects are implemented reflect lead-times necessary for members to implement plans.*

R2.2. Review, in subsequent annual assessments, (where sufficient lead time exists), the continuing need for identified system facilities. Detailed implementation plans are not needed.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. The dates on which the projects are implemented reflect lead-times necessary for members to implement plans.*

R3. The Planning Authority and Transmission Planner shall each document the results of its Reliability Assessments and corrective plans and shall annually provide the results to its respective Regional Reliability Organization(s), as required by the Regional Reliability Organization.

SPP has documented the results of this reliability assessment and its corrective plans and the results were provided to its NERC RRO as required.

Attachment 4 – TPL-003 Compliance Statement

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission systems is planned such that the network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand Levels over the range of forecast system demands, under the contingency conditions as defined in Category C of Table I (attached). The controlled interruption of customer Demand, the planned removal of generators, or the Curtailment of firm (non-recallable reserved) power transfers may be necessary to meet this standard. To be valid, the Planning Authority and Transmission Planner assessments shall:

The Southwest Power Pool (SPP) MDWG models used for the TPL Compliance Assessment were validated in compliance with current SPP Criteria under Criteria 3.3.3 and were documented in ***Criteria 3.3.3 – 2012 Summer***[7]*. SPP has demonstrated with its* ***2012 TPL Compliance Assessment*** *that its portion of the interconnected transmission system has been planned as documented in the 2013 SPP Transmission Expansion Plan such that the network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand levels over the range of forecast system demands, under the contingency conditions as defined in Category C.*

R1.1. Be made annually.

The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the ***MDWG 2012 Build releases****. The TPL Compliance Assessment is conducted annually. The previous iteration of the TPL Compliance Assessment was reported in comprehensive* ***SPP 2011 TPL Compliance Report***[9]*.*

R1.2. Be conducted for near-term (years one through five) and longer-term (years six through ten) planning horizons.

The MDWG powerflow models for seasons ***2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer*** *were used as the basis for the near-term (years one through five) and MDWG models for seasons* ***2023 Summer and 2023 Winter*** *were used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The MDWG dynamic stability model for* ***2013 Light Load*** *was used as the basis for the near-term (years one through five) and MDWG model for* ***2018 Summer*** *was used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The assessment uses MDWG models as outlined in the table below. The timing of needed transmission project upgrades for years in between those explicitly assessed was identified as part of SPP's Attachment O planning process such that the projects will be in service prior to the date needed to resolve the issue.*

[9] SPP 2011 TPL Compliance Report

Powerflow Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Summer Peak	2012MDWGB1_FINAL-13S	April 2012	December 2012
Near-Term	2013 Fall	2012MDWGB1_FINAL-13F	April 2012	December 2012
Near-Term	2013 Winter	2012MDWGB1_FINAL-13W	April 2012	December 2012
Near-Term	2014 Spring	2012MDWGB1_FINAL-14G	April 2012	December 2012
Near-Term	2014 Summer Peak	2012MDWGB1_FINAL-14S	April 2012	December 2012
Near-Term	2018 Summer Peak	2012MDWGB1_FINAL-18S	April 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2023 Summer Peak	2012MDWGB1_FINAL-23S	April 2012	December 2012
Longer-Term	2023 Winter	2012MDWGB1_FINAL-23W	April 2012	December 2012

Dynamic Stability Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Light Load	2012MDWGB1_FINAL_13L_R2_DS_RED	September 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2018 Summer Peak	2012MDWGB1_FINAL_18S_R2_DS_RED	September 2012	December 2012

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category C of Table 1 (multiple contingencies). The specific elements selected (from each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).

*The **2012 TPL Compliance Assessment** is supported by the most up-to-date MDWG models available. The TPL assessment uses **2012 Build 1 MDWG models**. The complex elements considered*

for system evaluation under Category C were developed by SPP-RTO with input from stakeholders and members.

For the steady state analysis, additional (N-1) elements were automatically selected based on base voltage according to the following table.

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Generator	All
Transformer	100 kV and above

These (N-1) elements were paired to form (N-2) contingencies. Pairs of (N-1) elements were chosen according to the following table.

Element	Selection Rule
Complex elements	---
Branch-Branch*	Same Zone
Generator-Branch*	Same Area
Generator-Generator	All

*Branch represents both branch and transformer elements

The Stability Study assesses contingency events to identify potential instability within the SPP footprint for all member-submitted categories (A, B, C and D) of events. A list of 44 NERC Category C events were simulated in this assessment and are listed below in the table. These events were submitted by SPP members and include reliability type contingencies and tower outages (events) to analyze for powerflow and stability performance.

Event	Contingency
C1	Prior outage of JEC-Auburn 230kV line; 3-Ø fault at JEC 345 kV for 3.6 cycles; Trip JEC-Hoyt line; No reclosing.
C3	Prior outage of Fairport - St Joe 345 kV with a 3-Ø fault near Cooper on Cooper - St Joe 345 kV.
C4	Prior outage of Holcomb generating unit with an outage of Mingo – Red Willow 345 kV line.
C5	3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-Benton line; No reclosing; Reduce Wolf Creek output to 800 MW (Transmission Operating Directive

Event	Contingency
	300); 3-Ø fault for 3.6 cycles at Wolf Creek 345 kV; Trip Wolf Creek-LaCygne line; No reclosing
C6	Summit to Smoky Hills 230 kV 3-Ø fault and outage followed by Circle to Mullergren 230 kV 3-Ø fault, no reclosing.
C7	Knoll to Smoky Hills 230 kV 3-Ø fault and outage followed by Circle to Mullergren 230 kV 3-Ø fault, no reclosing.
C8	Prior outage of Tolk to Roosevelt #1 230 kV circuit with a 3-phase fault near Roosevelt on the Tolk to Roosevelt #2 230 kV circuit -- no reclosing.
C9	Prior outage Iatan-Stranger Creek 345kV, Iatan to Eastowne 345 kV 3-Ø fault, clear fault 3.6 cycles, no reclosing, trip Iatan unit #2.
C10	3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-LaCygne 345 kV line; No reclosing; Reduce Wolf Creek output to 800 MW (Transmission Operating Directive 302); 3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-Benton 345 kV; No reclosing.
C11	DLG fault at the S3451 end of the S3451-S3459 and S3451-S3454 lines. Normal clearing. Fault admittance 2240 - j 24526 MVA fault for 2013LL and 2246 - j 24574 MVA for 2018SP for initial fault.
C12	SLG fault at the S3451 end of the S3451-Raun line, followed by a stuck breaker and the opening of transformer T4 at S3451. Fault Admittance 576 - j 6089 MVA for 2013LL and 578 - j 6099 MVA for 2018SP for initial fault. Fault Admittance 450 - j 5339 MVA for 2013LL and 451 - j 5350 MVA for 2018SP after opening S3451-Raun.
C13	SLG fault at S1206 on the S1206 - S1232 line, followed by a stuck breaker and the opening of the S1206 - S1201 line. Fault Admittance 697 - j 5599 MVA for 2013LL and 699 - j 5607 MVA for 2018SP for initial fault. Fault Admittance 637 - j 5273 MVA for 2013LL and 638 - j 5280 MVA for 2018SP after opening S1206-S1232.
C14	N915: SLG fault at GGS on GGS-Sweetwater 345 kV Circuit #2, Stuck Breaker (GGS 3322), Drop GGS-Red Willow 345 kV line; Delayed clearing; No reclose attempts.
C15	Prior Outage of Brookline – Monett - Flint Creek 345 kV with a 3-phase fault near Brookline on Brookline - Morgan 345 kV, with reclosing first at Morgan and then Brookline (549984 – 547481 – 506935, 549984 – 300045).
C16	3-Ø fault and outage of the Brookline - Southwest Power Station (SWPS) John Twitty Energy Center (JTEC) 161 kV line followed by a 3-phase fault near JTEC SWPS on the JTEC SWPS - Southwest Treatment Plant - SPRM Battlefield 161 kV line, no reclosing (549969 – 549954, 549954 – 549960 – 549959).
C17	SLG fault on 531448 HOLCOMB3 which will trip Holcomb3 (531448) - HOLCOMB7 (531449) 345/115 kV transformer with breaker stuck which trips Holcomb3 (531448) to Jones3 (531379) 115 kV line (delayed trip).

Event	Contingency
C18	SLG Fault on the line Holcomb 3 (531448) to Fletcher3 (531393) 115 kV line with a SLG fault on Holcomb3 (531448) to Pioneer Tap (531392) (Fault at Holcomb).
C19	3-Phase fault on the line from Bus 539695 to bus 539679 with breaker stuck which trips Spearville 345/230 kV transformer (531469/539695).
C20	3-phase fault on the line from Bus 531449 to bus 523853 with stuck breaker which trips the line from Bus 531449 to Bus 531465. Delayed trip.
C22	Prior outage of South Hays-Great Bend 230 kV (530582-539679 Circuit #1) followed by three-phase fault on Knoll-Smoky Hill 230 kV (530558-530592 Circuit #1) reclose once at 90 cycles and trip permanently.
C23	Prior outage of Colby-Mingo 115 kV (530555-531429 Circuit #1) followed by three-phase fault on Colby-Hoxie-Beach 115 kV (530555-530556 Circuit #1 and 530556-530557 Circuit #1) reclose once at 20 cycles and trip permanently.
C24	Fault on Knoll 230/115 kV transformer (530561-530558-530629 ckt 1) with breaker 3010 failure resulting in clearing Knoll-Redline-Beach 115 kV line (530561-530605 Circuit #1 and 530605-530557 Circuit #1).
C25	3-Ø fault at Wolf Creek for 3.6 Cycles; Trip Wolf Creek-Rose Hill line; No reclosing; Reduce Wolf Creek output to 800 MW (Transmission Operating Directive 301); 3-Ø fault at Wolf Creek 345 kV for 3.6 cycles; Trip Wolf Creek-LaCygne line; No reclosing.
C26[1]	Trip all generation at bus 539653 followed by a SLG fault from Holcomb (531448) to Plymell (531393) to PionTAP (Do this contingency for 18Summer) only (531392) (Fault at Pioneer Tap).
C27[1]	3-Ø fault on Crockett (509240) - Latexo (509323) followed by 3 phase fault on Jacksonville (509242) - Overton (509080).
C28[1]	Prior outage of Muskogee - Fort Smith 345 kV; 3-phase fault and trip Valliant - Lydia 345 kV.
C29[1]	Prior outage of Diana - SW Shreveport 345 kV; 3-phase fault and trip Wilkes - Longwood 345 kV.
C30[1]	Prior outage of Welsh - Lydia 345 kV; 3-phase fault and trip Welsh - NW Texarkana 345 kV. Welsh generation at Pmax.
C31[1]	Prior outage of Dolet Hills - Carroll 230 kV; 3-phase fault and trip Dolet Hills - SW Shreveport 345 kV. Dolet Hills Plant at Pmax.
C32[1]	Prior outage of Flint Creek Generator; 3-phase fault and trip GRDA1 - Flint Creek 345 kV.

Event	Contingency
C33[1]	3-Ø fault and trip Welsh - Wilkes / Welsh - NW Texarkana 345 kV DCT. Welsh generation at Pmax.
C34[1]	3-Ø fault and trip Diana - SW Shreveport / Longwood - SW Shreveport 345 kV DCT
C35[1]	Phase-to-ground fault Welsh - NW Texarkana 345 kV with CB (#10610) failure at Welsh. 15-cycle delayed clearing removing Welsh - Wilkes 345 kV. Welsh generation at Pmax.
C36[1]	Phase-to-ground fault Wilkes - Longwood 345 kV with CB (#1W10) failure at Wilkes. 15-cycle delayed clearing removing Wilkes - Welsh 345 kV. Wilkes generation at Pmax.
C37[1]	Prior outage of Northeastern Station - Tulsa North 345 kV; 3-phase fault and trip Northeastern Station - Oneta 345 kV. Northeastern generation at Pmax.
C38[1]	Prior outage of Northeastern Station - Tulsa North 345 kV; 3-phase fault and trip Northeastern Station - Delaware 345 kV. Northeastern generation at Pmax.
C39[1]	Prior outage of Riverside Station - Sapulpa Rd 345 kV; 3-phase fault and trip Riverside Station - Pecan Creek 345 kV. Riverside (Cogentrix) generation at Pmax.
C40[1]	Prior outage of Pittsburg - Muskogee 345 kV; 3-phase fault and trip Pittsburg - Seminole 345 kV. Kiowa generation at Pmax.
C41[1]	Prior outage of Pittsburg - Valiant 345 kV; 3-phase fault and trip Pittsburg - Johnston County 345 kV. Kiowa generation at Pmax.
C42[1]	3-Ø fault and trip Northeastern Station - Tulsa North 345 / 138 kV DCT (90-909 & 81-822). Northeastern generation at Pmax.
C43[1]	Phase-to-ground fault Oneta - Riverside Station 345 kV with CB (#3405A) at Oneta. 15-cycle delayed clearing removing Oneta - Clarksville 345 kV.
C44[1]	Phase-to-ground fault Riverside Station - Red Bud 345 kV with CB (#3405A) at Riverside. 15-cycle delayed clearing removing Riverside - Sapulpa 345 kV. Riverside (Cogentrix) generation at Pmax.
C45[1]	Phase-to-ground fault Pittsburg - Muskogee 345 kV with CB (#3441A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Seminole 345 kV. Kiowa generation at Pmax.
C46[1]	Phase-to-ground fault Pittsburg - Valiant 345 kV with CB (#3329A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Johnston County 345 kV. Kiowa generation at Pmax.

[1]: Contingency introduced for 2012 TPL Study

SPP Members provided staff with 44 Category C events that were to be evaluated for transient stability. Event C31 caused the Dolet Hills unit to be unstable. Therefore, an operating guide is needed such that the prior outage of Dolet Hills – Carrol 230 kV will necessitate Dolet Hills be curtailed to 400 MW in order to remain stable upon fault and trip of Dolet Hills – SW Shreveport 345 kV. An op-guide will need to be put in place to ensure stability. The remaining Category C unstable events were corrected by correcting existing model data or fault descriptions.

R1.3.1. Be performed and evaluated only for those Category C contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.

The complex elements considered for system evaluation under Category C were developed by SPP-RTO with input from stakeholders and members.

For the steady state analysis, additional elements were selected based on base voltage as outlined in the following table. Branch elements with base voltages less than 100 kV have less critical roles in system capability than those with higher base voltage and therefore produce less severe system results. Transformer elements with base voltages less than 100 kV on all busses have less capacity than those with one or more higher base voltages and therefore produce less severe system results. All generator elements were considered in evaluating system results regardless of base voltage or power capacity.

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Generator	All
Transformer	100 kV and above

These (N-1) elements were paired to form (N-2). Branch-branch contingencies are most likely to produce severe system results when both elements are in the same zone. Branch-generator contingencies are more likely to produce severe system results when both elements are in the same area. All possible pairs of generator contingencies were assessed. Pairs of (N-1) elements were chosen according to the following table.

Element	Selection Rule
Complex elements	---
Branch-Branch*	Same Zone
Generator-Branch*	Same Area
Generator-Generator	All

*Branch represents both branch and transformer elements

R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.

*This assessment uses MDWG models including system conditions for all BA's within the SPP footprint as well as BA's connecting directly to them. These parameters are deemed to be appropriate by SPP engineering staff and members. The MDWG powerflow models for seasons **2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer** were used as the basis for the near-term (years one through five) and MDWG models for seasons **2023 Summer and 2023 Winter** were used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The MDWG dynamic stability model for **2013 Light Load** was used as the basis for the near-term (years one through five) and MDWG model for **2018 Summer** was used as the basis for longer-term (years six through ten) for the TPL Compliance Assessment. The assessment uses MDWG models as outlined in the table in R1.2.*

R1.3.3. Be conducted annually unless changes to system conditions do not warrant such analyses.

*The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the MDWG **2012 Build 1** release. The continual change and improvement in system conditions warrant this **2012** assessment.*

R1.3.4. Be conducted beyond the five-year horizon only as needed to address identified marginal conditions that may have longer lead-time solutions.

*It was deemed by SPP engineering staff and members that MDWG powerflow models for seasons **2023 Summer and 2023 Winter** and dynamic stability model for season **2018 Summer** were necessary. These models will be sufficient to address and identify longer lead-time solutions for the transmission projects that are examined as mitigation plans to address potential violations.*

R1.3.5. Have all projected firm transfers modeled.

*The assessment uses the transfers projected by **SPP-2012-MDWG-Data Submittal Forms Master 4/13/2012** submitted by SPP members **Aug 2011 - April 2012**. This data is incorporated in the MDWG models.*

R1.3.6. Be performed and evaluated for selected demand levels over the range of forecast system demands.

These assessments were performed over the range of seasonal demand levels as reported in the seasonal assessment table in R1.2.

R1.3.7. Demonstrate that System performance meets Table 1 for Category C contingencies.

The assessments demonstrate that system performance meets Table 1 for Category C. Any violations occurring in models with events resulting in the loss of any two or more elements (N-k) likely to produce severe effects on the system were mitigated by procedures developed by SPP engineering

staff and member entities, or were mitigated by procedures produced by software analysis of evaluation models.

R1.3.8. Include existing and planned facilities.

The MDWG models used include all existing and planned facilities for the term modeled.

R1.3.9. Include Reactive Power resources to ensure that adequate reactive resources are available to meet System performance.

The MDWG models used include reactive power resources. The analysis performed ensures that adequate reactive power is available to meet system performance requirements.

R1.3.10. Include the effects of existing and planned protection systems, including any backup or redundant systems.

The Category C contingencies provided by SPP member entities include protection systems including normal clearing of 3-phase breakers for generators, branches, and transformers. The Category C contingencies provided by SPP member entities include backup and redundant systems including load throw-over.

R1.3.11. Include the effects of existing and planned control devices.

The MDWG models used and software include existing and planned control devices including MVAR dispatch, transformer tap adjustments, phase-shifter angle regulation, capacitor switching, MW dispatch, line switching, and load curtailment.

R1.3.12. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

The MDWG models used include planned outages of bulk electric equipment at demand levels for which those planned outages are performed.

R1.4. Address any planned upgrades needed to meet the performance requirements of Category C.

The MDWG models used include planned upgrades. All violations occurring in models with events resulting in the loss of two or more elements (N-2) were mitigated by operating procedures developed by SPP engineering staff and member entities, or were mitigated by procedures produced by software analysis of evaluation models; meaning the planned upgrades meet the performance requirements of Category C.

R1.5. Consider all contingencies applicable to Category C.

The complex elements considered for system evaluation under Category C were developed by SPP-RTO with input from stakeholders and members.

For the steady state analysis, additional elements were selected based on base voltage as outlined in the following table. Branch elements with base voltages less than 100 kV have less critical roles in system capability than those with higher base voltage and therefore produce less severe system results. Transformer elements with base voltages less than 100 kV on all busses have less capacity than those with one or more higher base voltages and therefore produce less severe system results. All generator elements were considered in evaluating system results regardless of base voltage or power capacity.

Element	Base kV (low side of transformers)
Complex elements	---
Branch	100 kV and above
Generator	All
Transformer	100 kV and above

These (N-1) elements were paired to form (N-2) contingencies. Branch-branch contingencies are most likely to produce severe system results when both elements are in the same zone. Branch-generator contingencies are more likely to produce severe system results when both elements are in the same area. All possible pairs of generator contingencies were assessed. Pairs of (N-1) elements were chosen according to the following table.

Element	Selection Rule
Complex elements	---
Branch-Branch*	Same Zone
Generator-Branch*	Same Area
Generator-Generator	All

*Branch represents both branch and transformer elements

R2. When system simulations indicate an inability of the systems to respond as prescribed in Reliability Standard TPL-001-0_R1, the Planning Authority and Transmission Planner shall each:

R2.1. Provide a written summary of its plans to achieve the required system performance as described above throughout the planning horizon.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. These dates cover and exceed the planning horizon.*

R2.1.1. Including a schedule for implementation.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. This document includes the dates on which the projects are implemented.*

R2.1.2. Including a discussion of expected required in-service dates of facilities.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. This document includes the in-service dates on which the projects are implemented.*

R2.1.3. Consider lead times necessary to implement plans.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. The dates on which the projects are implemented reflect lead-times necessary for members to implement plans.*

R2.2. Review, in subsequent annual assessments, (where sufficient lead time exists), the continuing need for identified system facilities. Detailed implementation plans are not needed.

*A continually-updated, written summary of SPP's 10-year plans and beyond to achieve the required system performance is maintained and provided by SPP. This summary, the 2013 SPP Transmission Expansion Plan, includes projects planned from **January 2013 through December 2030**. The dates on which the projects are implemented reflect lead-times necessary for members to implement plans.*

R3. The Planning Authority and Transmission Planner shall each document the results of these Reliability Assessments and corrective plans and shall annually provide these to its respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

SPP has documented the results of this reliability assessment and its corrective plans and the results were provided to its NERC RRO as required.

Attachment 5 – TPL-004 Compliance Statement

R1. The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed under Category D of Table I. To be valid, the Planning Authority's and Transmission Planner's assessment shall:

The Southwest Power Pool (SPP) MDWG models used for the TPL Compliance Assessment were validated in compliance with current SPP Criteria under Criteria 3.3.3 and were documented in ***Criteria 3.3.3 – 2012 Summer***[7]*. SPP has demonstrated with the TPL Compliance Assessment that its portion of the interconnected transmission system has been evaluated for risks and consequences for extreme contingencies covered under Category D.*

R1.1. Be made annually.

The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the ***MDWG 2012 Build releases****. The TPL Compliance Assessment is conducted annually. The previous iteration of the TPL Compliance Assessment was reported in comprehensive* ***SPP 2011 TPL Compliance Report***[10]*.*

R1.2. Be conducted for near-term (years one through five).

The MDWG powerflow models for seasons ***2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer*** *were used as the basis for the near-term (years one through five), and the MDWG dynamic stability model for* ***2013 Light Load*** *was used as the basis for the near-term (years one through five). Additionally SPP conducted steady state analysis for seasons* ***2023 Summer and 2023 Winter*** *and transient stability analysis for season* ***2018 Summer*** *for this TPL Compliance Assessment. The assessment uses MDWG models as outlined in the table below. The timing of needed transmission project upgrades for years in between those explicitly assessed was identified as part of SPP's Attachment O planning process such that the projects will be in service prior to the date needed to resolve the issue.*

[10] SPP 2011 TPL Compliance Report

Powerflow Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Summer Peak	2012MDWGB1_FINAL-13S	April 2012	December 2012
Near-Term	2013 Fall	2012MDWGB1_FINAL-13F	April 2012	December 2012
Near-Term	2013 Winter	2012MDWGB1_FINAL-13W	April 2012	December 2012
Near-Term	2014 Spring	2012MDWGB1_FINAL-14G	April 2012	December 2012
Near-Term	2014 Summer Peak	2012MDWGB1_FINAL-14S	April 2012	December 2012
Near-Term	2018 Summer Peak	2012MDWGB1_FINAL-18S	April 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2023 Summer Peak	2012MDWGB1_FINAL-23S	April 2012	December 2012
Longer-Term	2023 Winter	2012MDWGB1_FINAL-23W	April 2012	December 2012

Dynamic Stability Models

Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Near-Term	2013 Light Load	2012MDWGB1_FINAL_13L_R2_DS_RED	September 2012	December 2012
Model Scope	Seasonal Assessment	Model Used	Model Released	Assessment Completed
Longer-Term	2018 Summer Peak	2012MDWGB1_FINAL_18S_R2_DS_RED	September 2012	December 2012

R1.3. Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category D contingencies of Table I. The specific elements selected (from within each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).

*The **2012 TPL Compliance Assessment** is supported by the most up-to-date MDWG models available. The TPL assessment uses **2012 Build 1 MDWG models**. The complex elements considered*

for system evaluation under Category D were developed by SPP-RTO with input from stakeholders and members.

The Stability Study assesses contingency events to identify potential instability within the SPP footprint for all member-submitted categories (A, B, C and D) of events. A list of 43 NERC Category D events were simulated in this assessment and are listed in the table below. These events were submitted by SPP members and include reliability type contingencies and tower outages (events) to analyze for powerflow and stability performance.

Event	Contingency
D2	3-Ø fault on Holcomb – Setab 345 kV with breaker failure taking out the 345-115 kV autotransformer.
D3	Jeffrey Energy Center (JEC) to Hoyt 345 kV 3-Ø fault, no reclosing, and trip JEC Unit #2.
D4	3-Ø fault on Auburn-Jeffery Energy Center (JEC) 230 kV; followed by 3-Ø fault on Hoyt-JEC 345 kV, no reclosing, and trip JEC Unit#2.
D5	Run fault on GRDA1 345 kV bus for 5 cycles. Then open Tonnece end of Tonnece-GRDA1 345 kV line, but stuck breaker 9580 at GRDA1. Run for 25 cycles and then drop GRDA 345/161 transformer #1 & breaker 9080 (GRDA bkr 500T opens correctly).
D7	Loss of Ft. Smith 500/345/161 kV Substation.
D9	3-Ø fault at the S3451 on T3 transformer, followed by a stuck breaker and the opening of the S3451-S3459 line.
D10	3-Ø fault at S3458 on the S3458 - Cooper line, followed by a stuck breaker and the opening of the west bus at S3458.
D11	Loss of the entire substation S3456, including the transformer to the 161-kV level.
D14	N902 : Simultaneous SLG fault on GGS-Sweetwater 345 kV Circuit #1 and 3PH fault on GGS-Sweetwater 345 kV Circuit #2 at cross point; Normal clearing; Reclose far end.
D15	5 cycle SLG fault on the 84th & Bluff end of the 84th & Bluff - Waverly 115 kV line breaker #7502 fails. The 84th & Bluff - 70th & Bluff 115 kV line is opened to clear the fault. There is no reclosure.
D16	Loss of Summit 230 kV Substation.
D17	Loss of JEC 345 kV Substation.
D18	3-Ø fault w/breaker failure at Hoyt 345 kV; After +4.6 cycles trip Hoyt-Stranger 345 kV line at Stranger; After +9 cycles breaker failure trip Hoyt-JEC line; Hoyt 345-43 breaker failure.
D19	3-Ø fault w/breaker failure at JEC 345 kV; After +4.6 cycles trip JEC-Hoyt line at Hoyt; After +9 cycles breaker failure trip JEC-Hoyt line and JEC 345-230 #26 transformer; JEC 345-17 breaker failure.

Event	Contingency
D20	3-Ø fault w/breaker failure at JEC 345 kV; After +4.6 cycles trip JEC-Summit line at Summit; After +9 cycles breaker failure trip JEC-Summit line and JEC 345-230 #26 transformer; JEC 345-25 breaker failure.
D21	3-Ø fault w/breaker failure at JEC 345 kV; After +4.6 cycles trip the JEC-Morris line at Morris; After +9 cycles breaker failure trip JEC-Morris line and JEC 345-230 #26 transformer; JEC 345-21 breaker failure.
D22	Loss of Knoll 115 kV Substation.
D23	Loss of Heizer 115 kV Substation.
D24	Brookline 345 kV double Circuit 3-phase fault on 161 kV bus 549969.
D25[1]	3-Ø fault on Holcomb 345/115 kV Transformer (531448-531449-531450) followed by a trip of Holcomb 115/22 kV Transformer (531447-531448).
D26[1]	3-Ø fault Hawthorn 161 kV bus with breaker failure that trips entire bus at 25 cycles.
D27	Loss of Wolf Creek 345 kV Substation.
D28[1]	3-Ø fault Welsh - NW Texarkana 345 kV with CB (#10610) failure at Welsh. 15-cycle delayed clearing removing Welsh - Wilkes 345 kV. Welsh generation at Pmax.
D29[1]	3-Ø fault Wilkes - Longwood 345 kV with CB (#1W10) failure at Wilkes. 15-cycle delayed clearing removing Wilkes - Welsh 345 kV. Wilkes generation at Pmax.
D30[1]	3-Ø fault and trip NW Texarkana 345 kV Station.
D31[1]	3-Ø fault and trip Flint Creek 161 kV Station.
D32[1]	3-Ø fault and trip Diana 345 kV Station.
D33[1]	3-Ø fault and trip Welsh 345 kV Station.
D34[1]	3-Ø fault Oneta - Riverside Station 345 kV with CB (#3405A) at Oneta. 15-cycle delayed clearing removing Oneta - Clarksville 345 kV. Oneta generation at Pmax.
D35[1]	3-Ø fault Tulsa SE 138 kV bus tie CB (#1345B) and clear entire station.
D36[1]	3-Ø fault Tulsa PS 138 kV bus tie CB (#1349B) and clear entire station.
D37[1]	3-Ø fault and trip Oneta 345 kV Station.
D38[1]	3-Ø fault and trip Oneta 138 kV Station.

Event	Contingency
D39[1]	3-Ø fault and trip Riverside 138 kV Station.
D40[1]	3-Ø fault and trip Pittsburg 345 kV Station.
D41[1]	3-Ø fault and trip Tulsa North 138 kV Station.
D42[1]	3-Ø fault and trip Valliant 345 kV Station.
D43[1]	3-Ø fault and trip Oklaunion - Lawton Eastside 345 kV with SPS failure.
D44[1]	3-Ø fault Riverside Station - Red Bud 345 kV with CB (#3405A) at Riverside. 15-cycle delayed clearing removing Riverside - Sapulpa 345 kV. Riverside (Cogentrix) generation at Pmax.
D45[1]	3-Ø fault Pittsburg - Muskogee 345 kV with CB (#3441A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Seminole 345 kV. Kiowa generation at Pmax.
D46[1]	3-Ø fault Pittsburg - Valiant 345 kV with CB (#3329A) at Pittsburg. 15-cycle delayed clearing removing Pittsburg - Johnston County 345 kV. Kiowa generation at Pmax.
D47[1]	3-Ø fault and trip Riverside Station - Oneta / Red Bud / Pecan Creek 345 kV ROW. Riverside generation (Cogentrix) at Pmax.
D48[2]	3-phase fault on the line from Bus 531449 to bus 523853 with stuck breaker which trips the line from Bus 531449 to Bus 531465. Delayed trip.

[1]: Contingency introduced for 2012 TPL Study
[2]: Formerly known as contingency C20

SPP members provided staff with 43 Category D events that were to be evaluated for transient stability. Satisfactory results were found for all Category D events showing instability by disconnecting the unstable units at the member recommended clearing time.

R1.3.1. Be performed and evaluated only for those Category D contingencies that would produce the more severe system results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.

The complex elements considered for system evaluation under Category D were developed by SPP-RTO with input from stakeholders and members. The Category D complex elements include loss of all generation at a facility, loss of substation (one voltage level plus transformers), loss of towerline with three or more circuits, or loss of all transmission circuits on a right-of-way, etc.

R1.3.2. Cover critical system conditions and study years as deemed appropriate by the responsible entity.

*This assessment uses MDWG models including system conditions for all BA's within the SPP footprint as well as BA's connecting directly to them. These parameters are deemed to be appropriate by SPP engineering staff and members. The MDWG powerflow models for seasons **2013 Summer, 2013 Fall, 2013 Winter, 2014 Spring, 2014 Summer, and 2018 Summer** were used as the basis for the near-term (years one through five), and the MDWG dynamic stability model for **2013 Light Load** was used as the basis for the near-term (years one through five). SPP additionally studied the longer-term horizon for the TPL Compliance Assessment using MDWG powerflow models for seasons **2023 Summer and 2023 Winter** and MDWG dynamic stability model for **2018 Summer**. The assessment uses MDWG models as outlined in the table in R1.2.*

R1.3.3. Be conducted annually unless changes to system conditions do not warrant such analyses.

*The MDWG models used for the TPL Compliance Assessment are developed annually. The MDWG models used for this assessment are the MDWG **2012 Build 1** release. The continual change and improvement in system conditions warrant this **2012** assessment.*

R1.3.4. Have all projected firm transfers modeled.

*The assessment uses the transfers projected by **SPP-2012-MDWG-Data Submittal Forms Master 4/13/2012** submitted by SPP members **Aug 2011 - April 2012**. This data is incorporated in the MDWG models.*

R1.3.5. Include existing and planned facilities.

The MDWG models used include all existing and planned facilities for the term modeled.

R1.3.6. Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.

The MDWG models used include reactive power resources. The analysis performed ensures that adequate reactive power is available to meet system performance requirements.

R1.3.7. Include the effects of existing and planned protection systems, including any backup or redundant systems.

The Category D contingencies provided by SPP member entities include protection systems including normal clearing of 3-phase breakers for generators, branches, and transformers. The Category D contingencies provided by SPP member entities include backup and redundant systems including load throw-over.

R1.3.8. Include the effects of existing and planned control devices.

The MDWG models and software used include existing and planned control devices including MVAR dispatch, transformer tap adjustments, phase-shifter angle regulation, capacitor switching, MW dispatch, line switching, and load curtailment.

R1.3.9. Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

The MDWG models used include reactive power resources. The analysis performed ensures that adequate reactive power is available to meet system performance requirements.

R1.4. Consider all contingencies applicable to Category D.

All member-submitted extreme contingencies were assessed. Members had the opportunity to provide mitigations for those resulting potential violations and also review those potential violations mitigated by procedures produced by software analysis of evaluation models.

R2. The Planning Authority and Transmission Planner shall each document the results of its reliability assessments and shall annually provide the results to its entities' respective NERC Regional Reliability Organization(s), as required by the Regional Reliability Organization.

SPP has documented the results of this reliability assessment and its corrective plans and the results were provided to its NERC RRO as required.