

**SPP ANNUAL
ENGINEERING DATA
REQUEST SCHEDULE
2020**

1/24/2020

SPP Engineering

REVISION HISTORY

DATE	AUTHOR	CHANGE DESCRIPTION	COMMENTS
2/15/2016	SPP Engineering	Initial Draft	
2/15/2017	SPP Engineering	Added New Sections	October NITSA Data Submittal, Corrective Action Plans, NERC TPL-001-1 GIC Data Collection for modeling for GMD Assessment, PRC-006-2 UFLS, PRC-021-1 UVLS
2/12/2018	SPP Engineering	Added New Sections	MOD-030-3 Subsystem Files, Facilities Data, Quarterly Project Tracking Data, Resource Adequacy Requirement and EIA-411 Data Submissions, MDWG Dynamic Model Data, MDWG Powerflow and Short Circuit Model Data, Steady State Corrective Action Plans, Stability Corrective Action Plans, Short Circuit Corrective Action Plans,
2/1/2019	SPP Engineering	Added New Sections	MOD-033-1, Generation and Load Review
1/24/2020	SPP Engineering		Updated Section 1. Added Section 27.

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SECTION 1: ENGINEERING DATA REQUEST SCHEDULE

Annually, SPP requests data necessary to commence engineering studies and assessments. SPP developed this document to minimize duplicate engineering data requests while providing transparency for data submittal milestones. The requested data will be disseminated, as needed, within the SPP Engineering department.

The sections below list and describe what engineering data is being requested for various studies and assessments and provides the milestone date for submittal to SPP. **These milestone dates for data submittal are our best current estimates and are subject to change.** Each section in this document describes a different data request with specific request dates and milestone dates. In some cases, especially for request dates beyond the initial annual data request date, a more detailed subsequent data request will be communicated to the entities for clarification purposes. As you submit the engineering data to SPP, please notify the contacts listed in the sections below.

GLOBALSCAPE

For those requests requiring [GlobalScape](#) access, stakeholders must provide SPP with a signed [confidentiality agreement](#). Instructions can be obtained by clicking on the link. Please submit these forms via [SPP's Request Management System \(RMS\)](#) through the "GlobalScape (DocuShare/State Estimator/RA) Access" Quick Pick. After the executed confidentiality agreement is received, an account will be created for the requester on [GlobalScape](#) and an email with instructions for logging on will be sent to the requester. For those that already have a [GlobalScape](#) account, no additional action is necessary.

RMS

[RMS](#) is the preferred method for receiving all inquiries and many of the requests below designate [RMS](#) as their preferred method for receiving data as well. To create a new [RMS](#) account:

- Click on Register Now
- Enter Login Name — This should be your company email address.
- Create a password — Your password must contain at least 8 characters, contain upper and lowercase letters and at least one number. You are required to change your RMS password every 90 days.
- Enter required information (name, address, etc.)
- Click Create My Account button

Upon creation of an account, you are able to immediately submit an inquiry or Request.

To submit an inquiry, select "Submit Request" in the left-hand menu on the Home page. The first drop-down item is "Quick Pick." Selecting the "Engineering Planning" Quick Pick ensures your request or inquiry gets to the appropriate SPP staff quickly.

For additional tips, an [RMS Job Aid](#) can be found on [spp.org](#).

SECTION 2: 2021 INVALID STEADY STATE CONTINGENCIES

MILESTONE: Invalid Steady State Contingencies

Request Date: 08/24/2020

Due by: 09/25/2020

SPP Contacts

[Dara Solomon](#)

[Josh Pilgrim](#)

Entity Scope:

[SPP Transmission Planners](#)

Invalid contingencies should be updated for excluding specific contingencies during the Planning analyses. **For new invalid contingencies, a justification must be provided.**

The Invalid Contingency list can be found on [GlobalScape](#) at this path:

ITP (CEII, RSD) → ITP → Non-Competitive → NDA → 2021 ITP → 2021 ITP Aux Files

Please submit questions and updates via [RMS](#) through the “ITP Submittal > Data Submittal” Quick Pick.

SECTION 3: MOD-030-3 SUBSYSTEM FILES

MILESTONE: MOD-030-3 Subsystem Files

Request Date: 01/13/2020

Due by: 01/20/2020

SPP Contacts

Melanie Hill

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Operators

SPP First-Tier Balancing Authority

In order to simulate transfers between areas, participation points of MW decrease/increase should be specified in the subsystem file(s).

The subsystem file should contain the following:

- Provide units to participate in transfers including participation points. If absent from list, all units in area will participate.
- Provide a list of Independent Power Producers (IPPs) and wind farms that are in-service in the current study ITP model set to be included/excluded (2020 Fall, 2020 Summer, 2020 Winter, 2021 Spring)
- TOPs can specify generators to be excluded from use as participation points, such as generators that serve base load. The generation reduction should be based on economics, operating constraints or other criteria as specified by the Transmission Owner. The participation points used for import will be consistent for all transfer directions. Please use the format below to specify the generators being excluded from participation, circuit ID and reason for exclusion:

SYSTEM 'TEST-E-ALL'

AREA 900

SCALE ALL FOR EXPORT EXCEPT	Generator	Ckt	Reason for exclusion
BUS 999000 /	Name of Gen 34.500	1	wind.distribution
BUS 999001 /	Name of Gen 34.500	2	DVAR device

- Specify whether the subsystem file can be used on all four seasons. If not, provide separate subsystem files per season.

SPP Planning Criteria 6.4.2.3 default parameters will be used if the subsystem file is not reviewed and feedback provided to SPP staff in a timely manner.

SECTION 4: MOD-033-1

MILESTONE: MOD-033-1

Request Date: As Needed

Due by: 30 days after Request Date

SPP Contacts

Shahrokh Akhlaghi

Becca McCann

Entity Scope:

SPP Transmission Operators

Per NERC Standard MOD-033-1, Planning Coordinators are required to establish consistent validation requirements to facilitate the collection of accurate data and building of planning models to analyze the reliability of the interconnected transmission system. As such, SPP, as the PC, must validate powerflow and dynamic model performance against actual system behavior/response in order to determine if there are unacceptable differences.

For the dynamics validation, the target of validation are the events that SPP determines are dynamic local events (which are disturbances on the power system that produce some measurable transient response, such as oscillations) or events which have significant impact on system performance.

The planning model validation requires a comparison of the performance of SPP's portion of the existing system in a planning dynamic model to actual system response during a dynamic event. **Once SPP has selected a system event for validation, event sequence data will be requested from the Transmission Operators. This data may be submitted to SPP in the form of logs, text files, or emails.**

SPP is requesting the following data initially from RC and TOP(s), but may request additional information at a later date:

- Bus voltage magnitude and angle
- Bus frequency
- Real power flow
- Reactive power flow
- Normal loading

The data provided should reflect a timeline of **5 minutes prior to the event through 30 minutes** after the event to adequately review the response of the BES elements on the SPP PC transmission system. Requested data can be provided via one or more of the following sources:

- EMS/State Estimator Data^[1]
 - Load (RC/TOP)
 - Generation Dispatch (RC/TOP)
 - Area Interchange (RC/TOP)
 - Transmission System Topology (RC/TOP)
 - Transmission/Generation Outages (RC/TOP)
 - Transmission/Generation Status (RC/TOP)
- EMS to Planning Model Mapping
 - Including summary of items translated and items that are not during mapping
 - Guidance on remaining components of the model for mapping to the planning model
 - Description of planning model used for mapping. This step should be coordinated with SPP Modeling contacts listed below.

The requested format for the data is summarized in the following table:

DATA	REQUIRED FOR	PROVIDED BY	REQUESTED FORMAT
EMS State Estimator Case	Steady State Validation	SPP EMS Modeling	PSSE .raw format
EMS to Planning Mapping	Mapping the topology, load, generation, interchange, and other model elements	SPP EMS Modeling, SPP Planning Modeling	Text, Microsoft Excel
Outage Information	Steady State Validation, Dynamic Model Validation,	SPP Outage Coordination Group (CROW)	Outages Mapped to PSSE models in EMS State Estimator Case
Synchrophasor Data*	Dynamic Model Validation	SPP Real-Time Engineering Support, TOP in SPP PC footprint	Per unit, Positive sequence data, Text, CSV, or Microsoft Excel
Dynamic DR/ DFR data*	Dynamic Model Validation	TOP in SPP PC footprint	Per unit, Positive sequence data

^[1] EMS/State Estimator Data can be provided as part of the EMS to Planning Model Mapped Case

Sequence of Event	Dynamic Model Validation, Steady State Validation	SPP RC, TOP in SPP	Log files, text, email.
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* This information should include the PMU location, PMU bus number, any pi data (SCADA measurement), and single line diagram.

If you are unable to provide this data related to the event being requested, you must provide a written response to SPP indicating such within 30 days of the date of this request.

Please submit questions and updates by contacting the [SPP MOD-033 Team](#).

SECTION 5: 2021 FACILITIES DATA

MILESTONE: 2021 Facilities Data

Request Date: 8/3/2020

Due by: 8/17/2020

SPP Contacts

Joshua Pilgrim
Reliability Planning

Entity Scope:

SPP Transmission Owners

The facilities data request provides planning engineers a detailed list of which reactive devices can be adjusted to maintain reliability during a contingency. This list helps reduce the number of invalid needs that make their way to the Needs Assessment. SPP transmission owners will be requested to provide updates to any facility data previously submitted, including new installations or removals of equipment. This information will include technical specifications for the following equipment types:

- Generators
- Transformers
- Switched shunts
- Conductors

SECTION 6: 2022 ITP MARKET ECONOMIC MODEL GENERATION AND LOAD REVIEW

MILESTONE: Market Economic Model Generation and Load Review

Pass 1 Trial 1

Request Date: 09/28/2020

Due by: 10/19/2020

Pass 1 Trial 2

Request Date: 11/16/2020

Due by: 11/23/2020

Pass 2

Request Date: 01/20/2021

Due by: 01/25/2021

SPP Contacts

Brooke Keene

Charlton Hill

Entity Scope:

SPP Generator Owners

SPP Resource Planners

SPP Load Responsible Entities

SPP Load Serving Entities

SPP staff requests review of the economic parameters for generation and load model data to be utilized in the Integrated Transmission Planning (ITP) market economic models. An Excel workbook will be provided and will contain data to be reviewed and data to be surveyed.

Data to be reviewed is provided to SPP Stakeholders for review and does not require updates. Data to be surveyed is data that should be reviewed and updated as necessary and is provided by SPP Stakeholders to SPP.

SECTION 7: QUARTERLY PROJECT TRACKING DATA

MILESTONE: Quarterly Project Tracking

Q1 Request Date: 11/1/2019

Due by: 11/11/2019

Q2 Request Date: 1/29/2020

Due by: 2/11/2020

Q3 Request Date: 4/29/2020

Due by: 5/11/2020

Q4 Request Date: 10/28/2020

Due by: 11/9/2020

SPP Contacts

[John O'Dell](#)

[Tammy Bright](#)

Entity Scope:

[SPP Transmission Owners](#)

SPP's Project Tracking program actively monitors the progress of approved SPP Transmission Expansion Plan (STEP), SPP Aggregate Study and TO planned projects. Each quarter, SPP staff polls transmission owners to determine the progress made on each approved project. This data is then compiled into a quarterly report for the Markets and Operations Policy Committee (MOPC), Regional State Committee (RSC), and SPP Board of Directors.

On a quarterly basis, the initial Project Tracking portfolio will be sent via email with a due date for requested updates. Staff will then request cost variance justifications for projects with estimates outside their respective bandwidth thresholds. SPP Staff will notify TOs and the PCWG of cost estimates outside the precision bandwidth of +/- 20%.

Please make all updates in [TAGIT-SCERT](#). If you make any changes to the in-service dates of projects, please make these changes in Model on Demand (MOD), as well.

Please refer to the [Project Tracking & NTCs page](#) of spp.org and the [2019-2020 Quarterly Project Tracking Schedule](#) for a more information.

SECTION 8: 2021 ITP/TPL STEADY STATE TPL-001-4 P1, P2, P3, P4, P5, P6, P7 AND EXTREME EVENTS

MILESTONE: Steady State TPL-001-4 P1, P2, P3, P4, P5, P6, P7 and Extreme Events

Request Date: 08/10/2020

Due by: 9/14/2020

SPP Contacts

[Neeya Toleman](#)

Entity Scope:

[SPP Transmission Planners](#)

Integrated Transmission Planning (ITP) and Transmission Planning (TPL) assessments require specific data sets for contingent elements. Additionally, the TPL studies utilize contingencies specified by Table 1 of the NERC TPL-001-4 standard. Steady State TPL-001-4 Table 1 P1, P2, P3, P4, P5, P6, P7 and Extreme Events are required to commence various system planning studies. Contingencies must include circuit IDs where applicable.

Please refer to the [NERC TPL-001-4 Contingency Steady State Request](#) and the [Contingency Naming Convention](#) sections below for specifics of contingency creation.

SECTION 9: 2021 ITP/TPL STEADY STATE AND STABILITY TPL-001-4 FIRST-TIER CONTINGENCIES

MILESTONE: Steady State and Stability TPL-001-4 First-Tier Contingencies

Request Date: 09/14/2020

Due by: 10/19/2020

SPP Contacts

Jason Terhune

Neil Robertson

Reliability Planning

Scott Jordan

Nathan Bean

Compliance and Advanced Studies

Entity Scope:

SPP PC First-Tier Planning Coordinators, SPP PC First-Tier Transmission Planners

SPP TP First-Tier Planning Coordinators, SPP TP First-Tier Transmission Planners

Per the NERC TPL-001-4 standard R3.4.1 and R4.4.1, SPP PC is required to coordinate with adjacent Planning Coordinators (PCs) and Transmission Planners (TPs) (First-Tier entities) to ensure that contingencies on adjacent Systems which may impact the SPP System are included in the contingency file used in SPP transmission planning studies. Steady State and Stability TPL-001-4 First-Tier contingencies are required to commence various system planning studies. Contingencies must include circuit IDs where applicable.

Steady State contingencies

3.4.1. The Planning Coordinator and Transmission Planner shall coordinate with adjacent Planning Coordinators and Transmission Planners to ensure that Contingencies on adjacent Systems which may impact their Systems are included in the Contingency list.

Stability contingencies

4.4.1. Each Planning Coordinator and Transmission Planner shall coordinate with adjacent Planning Coordinators and Transmission Planners to ensure that Contingencies on adjacent Systems which may impact their Systems are included in the Contingency list.

Please refer to the [NERC TPL-001-4 Contingency Steady State Request](#) section and the [Contingency Naming Convention](#) section for specifics of contingency creation.

SECTION 10: LOCAL PLANNING CRITERIA

MILESTONE: Company-Specific Planning Criteria

Request Date: 02/14/2020

Due by: 04/01/2020

SPP Contact(s)

Joshua Pilgrim
Reliability Planning

Entity scope:

SPP Transmission Owners

The Integrated Transmission Plan (ITP) studies include local planning criteria to monitor facilities at a more stringent voltage criteria as well as implement local planning requirements. Attachment O, Section II.5 of the [SPP Tariff](#) requires that SPP Transmission Owners provide their local planning criteria to the Transmission Provider at least once a year, by April 1, in order for Zonal Reliability Upgrades to be assessed and included in the SPP Transmission Expansion Plan.

If an SPP Transmission Owner has an established waiver to allow local planning criteria that is less stringent than SPP Criteria, this waiver should be provided to SPP Engineering for consideration in the engineering planning studies.

NOTE: This data will be used for the 2021 ITP needs assessment. If there are any changes to your criteria between April 1 and September 1, please communicate them to the SPP Contact(s) above.

SECTION 11: 2021 ITP/TPL BES INCLUSION / EXCLUSION LIST

MILESTONE: BES Inclusion/Exclusion list

Request Date: 09/14/2020

Due by: 10/19/2020

SPP Contact

Jason Terhune

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners

Entities have the option to include facilities that would normally not be included as a Bulk Electric System facility (Inclusions) or to exclude facilities that would normally not be excluded as a Bulk Electric System facility (Exclusions) in system planning studies.

Inclusions:

- I1:** Transformers – 2 winding need to have both windings over 100kV, 3 winding at least two windings need to be over 100kV.
- I2:** Generators – 20MW single, 75MW aggregate through the high side of the step-up transformer.
- I3:** Blackstart resources.
- I4:** Wind and solar, other renewables – 75MW aggregate or more connected at 100kV or higher.
- I5:** SVCs, Cap banks, Reactors – connected at 100kV either directly or through step-up transformers.

Exclusions:

- E1:** Radials with the listed criteria.
- E2:** Behind the meter generation.
- E3:** Local networks.
- E4:** SVCs or Cap banks used for local voltage support, not on the BES.

The NERC BES reference document can be found [here](#).

The SPP BES Quick Reference Guide can be found [here](#).

SECTION 12: 2021 ITP/TPL TPL-001-4 SPARE EQUIPMENT STRATEGY LIST

MILESTONE: TPL-001-4 Spare Equipment Strategy List

Request Date: 09/14/2020

Due by: 10/19/2020

SPP Contact

Jason Terhune
Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners

The NERC TPL-001-4 R2.1.5 standard states: *“When an entity’s spare equipment strategy could result in the unavailability of major Transmission equipment that has a lead time of one year or more (such as a transformer), the impact of this possible unavailability on System performance shall be studied. The studies shall be performed for the P0, P1, and P2 categories identified in Table 1 with the conditions that the System is expected to experience during the possible unavailability of the long lead time equipment.”*

Suggested format for data submittal:

Three Winding Transformers							
From Bus Number	From Bus Name	To Bus Number	To Bus Name	Last Bus Number	Last Bus Name	Id	Name

Two Winding Transformers				
From Bus Number	From Bus Name	To Bus Number	To Bus Name	Equipment

SECTION 13: 2020 TPL-001-4 PROTECTION SCHEME CONTINGENCIES

MILESTONE: TPL-001-4 Base and Sensitivity Models Protection Scheme Contingencies

Request Date: 03/09/2020

Due by: 04/22/2020

SPP Contact

Jason Terhune

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners

Steady State Contingencies

3.3.1 Simulate the removal of all elements that the Protection System and other automatic controls are expected to disconnect for each Contingency without operator intervention. The analyses shall include the impact of subsequent:

3.3.1.1. Tripping of generators where simulations show generator bus voltages or high side of the generation step up (GSU) voltages are less than known or assumed minimum generator steady state or ride through voltage limitations. Include in the assessment any assumptions made.

3.3.1.2. Tripping of Transmission elements where relay loadability limits are exceeded.

Stability contingencies

4.3.1. Simulate the removal of all elements that the Protection System and other automatic controls are expected to disconnect for each Contingency without operator intervention. The analyses shall include the impact of subsequent:

4.3.1.1. Successful high speed (less than one second) reclosing and unsuccessful high speed reclosing into a Fault where high speed reclosing is utilized.

4.3.1.2. Tripping of generators where simulations show generator bus voltages or high side of the GSU voltages are less than known or assumed generator low voltage ride through capability. Include in the assessment any assumptions made.

4.3.1.3. Tripping of Transmission lines and transformers where transient swings cause Protection System operation based on generic or actual relay models.

Contingencies must include circuit IDs where applicable.

Please refer to the [NERC TPL-001-4 Contingency Steady State Request](#) section and the [Contingency Naming Convention](#) section for specifics of contingency creation.

SECTION 14: 2020 TPL-001-4 STABILITY P1, P2, P3, P4, P5, P6, P7 AND EXTREME EVENTS

MILESTONE: Stability TPL-001-4 P1, P2, P3, P4, P5, P6, P7 and Extreme Events

Request Date: 01/27/2020

Due by: 03/27/2020

SPP Contacts

Scott Jordan

Nathan Bean

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners

An Excel workbook (Stability Contingency Form.xlsx) will be provided in a subsequent data request by the data request date.

Contingencies must include circuit IDs where applicable.

SECTION 15: 2021 ITP/TPL TPL-001-4 SHORT CIRCUIT ANSI FAULT CURRENT CALCULATION PARAMETERS

MILESTONE: TPL-001-4 Short Circuit ANSI Fault Current Calculation Parameters

Request Date: 10/05/2020

Due by: 11/06/2020

SPP Contact

Jason Terhune

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners

Transmission Planners (TPs) that require ANSI Fault Current calculation will provide to the Planning Coordinator (PC) the following ANSI Fault Current Calculation parameters to be used for each bus within the TP area:

- Divisors
 - For branches in positive sequence
 - For machines in positive sequence
 - For branches in zero sequence
 - For machines in zero sequence
- Fault multiplying factors
 - DC decrement only or AC and DC decrement
- Max operating voltage, in PU
- Contact parting times, in seconds

SECTION 16: MW-MILE OWNER LENGTH DATA

MILESTONE: MW-Mile Owner Length Data

Request Date: April 2020

Due by: 10/31/2020

SPP Contacts

[Chris Haley](#)

[Ashlyn Johnson](#)

[Compliance and Advanced Studies](#)

Entity Scope:

[SPP Transmission Owners](#)

SPP utilizes MW-Mile analysis to determine proper allocation for the Billing and Revenue Distribution Process. Accurate Transmission Owner data and correct line length for each transmission branch in the SPP footprint are essential for this allocation process. Transmission line owner length format will be provided in a subsequent data request by the data request date.

If the submitting entity has verified that the branch data in the 2019 MDWG model can be used to accurately represent the MW-Mile owner data, an email attestation may be submitted in lieu of the additional data requested.

SECTION 17: OCTOBER NITSA DATA SUBMITTAL

MILESTONE: NITSA DATA SUBMITTAL

Request Date: 08/31/2020

Due by: 09/30/2020

SPP Contacts

[Joshua Ross](#)

[Bryce Bowie](#)

Entity Scope:

[SPP Transmission Customers](#)

System Planning & Protection

The Network Customer shall provide the Transmission Provider and Host Transmission Owner the following information:

A ten (10) year projection by summer and winter peak for the following:

- a. Demands with the corresponding power factors and annual energy requirements on an aggregate basis for each delivery point. If there is more than one delivery point, the Network Customer shall provide the summer and winter peak demands and energy requirements at each delivery point for the normal operating configuration;
- b. Planned generating capabilities and committed transactions with third parties for which resources are expected to be used by the Network Customer to supply the peak demand and energy requirements provided in (a);
- c. Estimated maximum demand in kilowatts that the Network Customer plans to acquire from the generation resources owned by the Network Customer, and generation resources purchased from others; and
- d. A projection for each of the next ten (10) years of transmission facility additions to be owned and/or constructed by the Network Customer for which facilities are expected to affect the planning and operation of the transmission system within the Host Transmission Owner's Zone.

Please refer to the [Open Access Transmission Tariff Attachment G Section 4.1a – 4.1d](#). The template can be found [here](#).

SECTION 18: RESOURCE ADEQUACY DATA SUBMISSIONS

MILESTONE: Attachment AA and NERC Standard MOD-031-2 data submissions

Request Date: 10/1/2019

Due by: 2/14/2020

SPP Contact(s)

Alex Crawford

Chris Haley

Ashlyn Johnson

Resource Adequacy

Entity scope:

Market Participants

Generator Owners

Load Responsible Entities

Data submitted for Resource Adequacy is used to validate the requirements outlined in Attachment AA of the SPP Open Access Transmission Tariff (OATT) and NERC Standard MOD-031-2. The data is submitted through the Engineering Data Submission Tool (EDST) and contains, but is not limited to, resource specific information (including Deliverability Study results), purchases and sales information, and demand information for the previous year, current year, and future 10 years. GlobalScape is also used to submit documents for verifying requirements in Attachment AA that cannot be submitted through the EDST. Any questions about Resource Adequacy or gaining access to the EDST or GlobalScape for Resource Adequacy should be directed to the SPP contacts listed in this section.

Attachment AA can be located on the SPP Website using the following path;

<https://www.spp.org> → Engineering → Resource Adequacy → Attachment AA Tariff.pdf

NERC Standard MOD-031-2 can be located using the following link;

<https://www.nerc.com> → Reliability Standards → United States → MOD-031-2 - Demand and Energy Data

The EDST can be located using the following link:

<https://edstool.spp.org/EDST/>

The Data Instruction Manual and User Guide for the EDST can be located on the SPP Website using the following paths:

<https://www.spp.org> → Engineering → Resource Adequacy → ResourceAdequacyWorkbookInstructionManual.docx

<https://www.spp.org> → Engineering → Resource Adequacy → EDST Materials → EDST User Guide.docx

Globalscape can be located using the following link:

<https://sppdocushare.spp.org/EFTClient/Account/Login.htm>

SECTION 19: MDWG DYNAMIC MODEL BUILD

MILESTONE: MDWG Dynamic Model Data

Request Date: 01/14/2020

Due by: 02/27/2020

SPP Contact(s)

Shahrokh Akhlaghi

Zach Sabey

Sunny Raheem

Entity scope:

This data request typically goes out to all entities applicable to NERC standard [MOD-032](#) and/or entities defined in the SPP Open Access Transmission Tariff which are required to provide modeling data in accordance with the SPP MDWG Model Development Procedure Manual.

- **Data Submitter entities as defined in the Scope of Applicability section of the SPP MDWG Model Development Procedure Manual.**

All Powerflow and Short Circuit Data submitted to SPP Modeling shall conform to the requirements guidelines set forth in the [SPP MDWG Model development Procedure Manual](#) posted on the *MDWG Reference Documents* link under the Model Development Working Group (MDWG) page on [SPP website](#). A detailed schedule comprising a set of models to be built is created by the MDWG on an annual basis based on the corresponding MDWG powerflow model build series. Once finalized by the Model Development Working Group (MDWG), the 2020 Series MDWG model build schedule will be posted to the SPP website at the following link: [2020 Series MDWG Powerflow and Short Circuit Model Build Schedule](#). The model build typically starts mid-January and completes around the December timeframe of the same year.

Requested Data:

- 1) All dynamic and power flow data submitted to SPP Modeling Staff should conform to the guidelines set forth in the [SPP MDWG Model Development Procedure Manual](#) posted on the MDWG Documents Link under the MDWG area on SPP.ORG.
- 2) MDWG recognizes the NERC acceptable model list in accordance with the language contained in the MDWG manual section 4.
- 3) Please supply any dynamic data changes for machine models listed in the posted DOCU output files (from the final 2018 series MDWG dynamic models). The dynamic DOCU files contain machine data based on last year's models can be found on [GlobalScope: Modeling \(CEIL, RSD\)→MDWG Series →Dynamics→2020 Series →B. Initial Member Data Update](#). The updates should be supplied in member feedback subfolder.
- 4) The dyre file update submissions should include:

- Outdated generator, exciter, governor, and power system stabilizer models commented out with the “/old/” tag at the beginning of the line of the model data

```

/OLD/ 999999 'LCFB1' '1' 1 1 0.01 1.0 0.01 0.1 0.5 0.005 0.05 / \ 01/01/1996 12/31/2300
/OLD/ 999999 'GENROU' '1' 7.9 0.04 0.54 0.085 5.489 0.0 1.8 1.72 0.21 0.405 0.155 0.115
/OLD/ 0.0731 0.3945 / GENROU UPDATE \ 01/01/1996 12/31/2300
/OLD/ 999999 'GAST' '1' 0.05 0.4 0.1 3.0 1.0 2.0 1.0 -0.05 0.0 / \ 01/01/1996 12/31/2300
/OLD/ 999999 'EXAC2' '1' 0.01 1.0 1.0 1000.0 0.01 8.6 -8.6 1.0 13.9 -13.9 0.66 4.0 0.0 0.05
/OLD/ 1.0 0.1 0.8 1.0 10.79 4.73 0.02 3.55 0.01 / \ 01/01/1996 12/31/2300

999999 'USRMDL' '1' 'GENTPJU1' 1 1 0 16 6 1 7.9 0.04 0.54 0.085 5.489 0.0 1.8 1.547 0.21 0.405 0.155
0.155 0.115 0.0600 0.4000 0 / UPDATE \
999999 'AC7B' '1' 0 27.241 27.241 0 0.45 60.3 -54.1 90.8 82.6 60.3 -54.1 0 99 0 0.7 0 1 1
2.1 1 1.2 99 0 4.5 0.001 6 0.01 / \
999999 'PSS2B' '1' 1 0 3 0 5 1 2.0 2.0 0.0 2.0 2.0 0.4555 1.0 0.5 0.1 10.0 0.2
0.03 0.15 0.02 1 1 2 -2 2 -2 0.1 -0.01 / \
999999 'GGOV1' '1' 1 0 0.05 2.5 0.05 -0.05 6 1.4 0 0.05 1 0.15 0.5 1.55 0.13 0.5 0 0
3 2 0.67 1 0 0.1 -0.1 0 0.01 10 0.1 0 0.00025 4 5 99 -99 / \ 01/01/1996 12/31/2300

```

- Parameter changes
 - Renamed or renumbered units
- 5) In addition to updating existing dynamic information, please provide dynamic data for new generators and dynamic devices introduced in the 2020 MDWG power flow models that are subject to NERC standards for inclusion in dynamic models.
 - 6) Machines that are over 20 MVA will need to have a detailed model associated with them.
 - 7) Review of renewable energy resource machine power flow updates:
 - Power flow data updates in PSS/E version 34.6.1 format to accurately model facilitates at the generator kV bus which is typically below 1 kV are required. SPP power flow DocuCheck reports are provided to associated data submitters on [GlobalScope: Modeling \(CEII, RSD\)→MDWG Series →Dynamics→2020 Series→B. Initial Member Data Update→Powerflow_DocuCheck.xlsx](#). Data submitters should provide detail and updates to accurately model the renewable energy resources at their appropriate generator kV level. The appropriate wind flag, power factor, and voltage schedule set point should be modeled based on PSS/E documentation and dynamic model manufacturer’s recommendations.
 - 8) Governor Response Type for Frequency Response:
 - Provide and update governor response type for frequency response as part of MMWG data collection requirements
 - 9) CMLD data:
 - The SPP Dynamic Load Task Force (DLTF) has developed and benchmarked Industrial load representations for the CMLD_2 dyre file representing 3-phase motor and electronic loads. The CMLD_2 load model is being added in order to comply with a TPL-001-4 Requirement 2.4.1 that the dynamic simulations take into account the expected dynamic behavior of Loads that could impact the study area, considering the behavior of induction motor Loads. The MDWG approved an addition to the MDWG Manual stating non-scalable loads greater than or equal to 10 MW are required to have a dynamic load model representation. CLOD and CMLD_1 models are considered obsolete and should be replaced with CMLD_2 models.

The CMLD workbook is located at [GlobalScape](#): Modeling (CEII, RSD)→MDWG Series
→Dynamics→2020 Series→B. Initial Member Data Update→ CMLD2_Workbooks.zip

SECTION 20: 2021 MDWG POWERFLOW AND SHORT CIRCUIT MODEL BUILD

MILESTONE: MDWG Powerflow and Short Circuit Model Data

Request Date: 07/01/2020

Due by: 03/07/2021

SPP Contact(s)

Moses Rotich

Lottie Richardson

Hugh Benfer

Entity scope:

This data request typically goes out to all entities applicable to NERC standard **MOD-032** and/or entities defined in the SPP Open Access Transmission Tariff which are required to provide modeling data in accordance with the SPP MDWG Model Development Procedure Manual.

- **Data Submitter entities as defined in the Scope of Applicability section of the SPP MDWG Model Development Procedure Manual.**

All Powerflow and Short Circuit Data submitted to SPP Modeling shall conform to the requirements guidelines set forth in the [SPP MDWG Model development Procedure Manual](#) posted on the *MDWG Reference Documents* link under the Model Development Working Group (MDWG) page on [SPP website](#). A detailed schedule comprising a set of models to be built, is created by the MDWG on an annual basis prior to the commencement of the model build. Once finalized by the Model Development Working Group (MDWG), the 2021 Series MDWG model build schedule will be posted to the SPP website at the following link: [2021 Series MDWG Powerflow and Short Circuit Model Build Schedule](#). The model build typically starts mid-July and completes around the March timeframe of the following year.

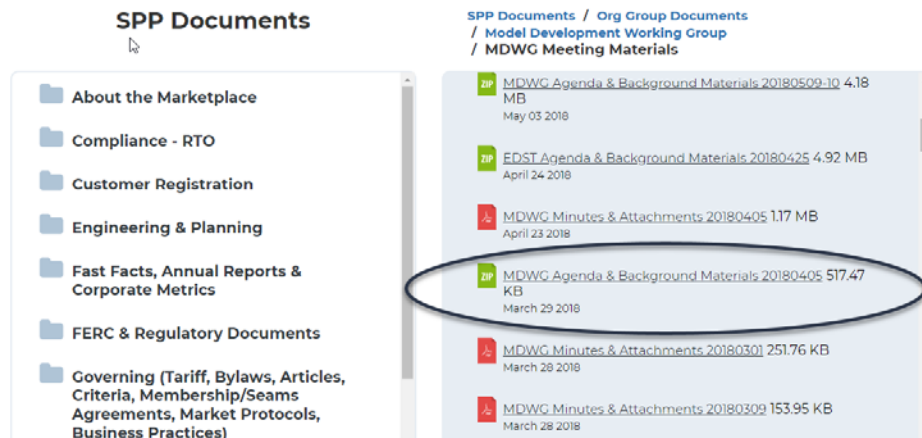
The model build normally entails several passes/iterations where Data Submitters have a chance to submit data, review the models developed by SPP staff, and provide corrections congruent with the approved schedule. Depending on the type of modeling data, SPP utilizes the following avenues to collect updates:

- **[Model On Demand \(MOD\)](#).**
 - This is a database with a web-based interface through which Data Submitters can upload the following information (**steady state and short circuit**):
 - Future planned projects (generation resources, transmission)
 - As-built information of transmission and generation projects
 - Load and Generation profiles up to 10 years out
 - Device Control profiles such as transformer taps, switchable shunt voltage bands, etc.

- Short Circuit information (mutual, positive, negative & zero sequence data)
 - ETC
 - All Data Submitters are expected to do MOD training in order to submit projects and profile data directly through the MOD web interface.
 - **NOTE:** The MOD hyperlink may not be active when the new model build starts so make sure to contact SPP staff for an updated link.
- **GlobalScape**
 - Secure file-share site used by SPP to store confidential data
 - SPP uses this site to share model data with Data Submitters and vice versa
 - Model information is stored on GlobalScape such as PSSE models, supplemental model data, SPP modeling contact list, EDST training material, MOD training material.
- **Engineering Data Submission Tool (EDST)**
 - This tool replaced the old Data Submittal Workbook and is used primarily to coordinate and store transactions, PC-PC tie lines, and other data not readily found in the PSSE models (Refer to the SPP Model Development Procedure Manual for more details on EDST).
 - Data Submitters who are unsure of whether they need to submit information through EDST should contact SPP staff
 - EDST training material can be found on both the SPP website
 - <https://www.spp.org/spp-documents-filings/?id=18456>

Note that results returned by the SPP Documents & Filings search tool may differ slightly from those returned by the site-wide search tool accessible at the top of each page. SPP.org's Document and Calendar search features use a different algorithm and indexing software than the site-wide search. Where the site-wide search scans document titles, for example, this more granular search tool within the document library scans the titles, content and other metadata each document record.

INDEX SEARCH *[search document content]* ▼



- **NOTE:** The EDST hyperlink may not be active when the new model build starts so make sure to contact SPP staff for an updated link.

The models will be built using Siemens PTI PSS/E software (PSSE V34.6 or higher) and the data below is normally requested congruent with the format specified in the MDWG manual.

- Data Coordination Workbook: MOD-032-1 applicable entities are required to fill out this workbook to let SPP know if they'll be submitting data for themselves or on behalf of other entities as well.

- The *MOD-032 Data Submitter Designee Letter of Notice* (can be found in the appendix section of the model development manual) is also required in addition to the *Data Coordination Workbook*.
- Powerflow and Short Circuit Data in accordance with Attachment 1 of NERC standard MOD-032-1 and the SPP MDWG Model Development Procedure manual.

Furthermore, status calls are held during the data submission period of each pass to solicit feedback and discuss any issues or questions about the model build. Detailed data request emails will be sent out to all Data Submitters throughout the model building process to signify the beginning of each pass.

If you are an applicable Data Submitter and need to be added to the modeling contacts distribution list, please contact the SPP staff listed in this section. Furthermore, Data Submitters unacquainted with the SPP modeling process are encouraged to sign up for the MDWG Exploder list on the SPP website to stay abreast of anything modeling related in SPP's Planning department.

The MDWG Procedure Manual can be found on the SPP Website at this path:

<https://www.spp.org> → Engineering → Modeling → Reference Documents → SPP MDWG Model Development Procedure Manual ***OR***

<https://www.spp.org> → Organizational Groups → Model Development Working Group → MDWG Reference Documents → SPP MDWG Model Development Procedure Manual

SECTION 21: 2020 TPL-001-4 STEADY STATE CORRECTIVE ACTION PLANS

MILESTONE: TPL-001-4 R2.7 Corrective Action Plan

Request Date: 03/02/2020

Due by: 06/29/2020

SPP Contacts

Jason Terhune

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners

See the TPL-001-4 Scope document for details about the format in which CAPs will need to be submitted.

SECTION 22: 2020 TPL-001-4 STABILITY CORRECTIVE ACTION PLANS AND SYSTEM ADJUSTMENTS

MILESTONE: TPL-001 R2.7 Corrective Action Plans and System Adjustments

Request Date: 9/11/2020

Due by: 10/16/2020

SPP Contacts

Scott Jordan

Nathan Bean

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners

See the TPL-001-4 Scope document for details about the format in which CAPs and system adjustments will need to be submitted.

SECTION 23: 2020 TPL-001-4 SHORT CIRCUIT CORRECTIVE ACTION PLANS

MILESTONE: TPL-001-4 R2.7 Corrective Action Plan

Request Date: 03/02/2020

Due by: 04/01/2020

SPP Contacts

[Jason Terhune](#)

[Compliance and Advanced Studies](#)

Entity Scope:

[SPP Transmission Planners](#)

See the TPL-001-4 Scope document for details about the format in which CAPs will need to be submitted.

SECTION 24: NERC TPL-007 GIC MODELING DATA COLLECTION FOR GMD ASSESSMENT

MILESTONE: GIC Data Collection in Support of TPL-007-3

Request Date: March 2020

Due by: June 2020

SPP Contacts

Scott Jordan, Technical Questions

Zach Sabey, GIC Data Template

Moses Rotich, GIC Data Template

Compliance and Advanced Studies

Background:

A GMD model-based set of steady-state models that incorporate GIC-related effects. The GMD Model Set is developed in two stages. First, the GIC System model containing GIC-related system information (such as substation grounding values, latitude/longitude, etc.) is used to determine the magnitude of GIC currents. Second, GIC currents are integrated into System models, translating GIC effects to the AC power system representations. The resultant set of System models, containing the GIC-related impacts, is referred to as the GMD Model Set. The Requirements R2 of the NERC TPL-007-3 standard (standard) became effective July 1, 2019. SPP, the Planning Coordinator (PC), with guidance from the SPP TPL Task Force, requests Table 1 contingencies from the Transmission Planners (TPs) for the annual TPL assessment.

Entity Scope:

SPP Transmission Owners and Generation Owners

SPP, as Planning Coordinator (PC), requests that Transmission Owners and Generation Owners within the SPP PC area provide to SPP, as a Planning Coordinator:

- Data and information in support of the SPP GMD Model Set, or
- An explanation of the technical basis for an exception within 90 days of receipt of written notification from SPP

A “GIC Data Collection Template” will be sent out by SPP in a data request to facilitate the gathering of the necessary GIC data.

SECTION 25: PRC-006 UFLS

MILESTONE: Updated Information for Under Frequency Load Shed Database for PRC-006 R8

Request Date: 10/01/2020

Due by: 12/2/2020

SPP Contact(s)

Nathan Bean

Scott Jordan

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Owners, Distribution Providers, and Generator Owners

R8. Each UFLS entity shall provide data to its Planning Coordinator(s) according to the format and schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.

All TO/DP/GO Entities that fall within the SPP PC footprint are required to complete and upload a "UFLS Attestation Form" form via [GlobalScape](#). This form indicates if the Entity owns/operates:

- Armed UFLS relays
- Armed Automatic Load Restoration (ALR) relays
- Generator protective relays (set within the no-trip zone, PRC-006, Attachment 1), and/or
- Automatic equipment used to control over-voltage as a result of Under-frequency load shedding in the SPP PC footprint.

- 1. Updated Model Database:** The UFLS Model Database (DB) contains the current powerflow model bus, load, machine, branch, and transformer data. The SPP PC UFLS Entities will mark all their entity loads in the UFLS Model DB.
- 2. Updated Inventory Database:** Entities who own and operate *UFLS relays, Automatic Load Restoration, and/or generator protective relays (set within the no-trip zone, PRC-006, Attachment 1), Automatic equipment used to control over-voltage as a result of Under-frequency load shedding* in the SPP PC footprint equipment shall complete their "Inventory Database." Instructions for completing and posting the Inventory Database will be in the Reporting Instructions.

Previous data in support of PRC-006 will be provided by the PC at the time of the formal request.

SECTION 26: PRC-010 UVLS

MILESTONE: Updated Under-Voltage Load Shed Information for PRC-010

Request Date: 10/1/2020

Due by: 12/2/2020

SPP Contact(s)

Nathan Bean

Scott Jordan

Compliance and Advanced Studies

Entity Scope:

SPP Transmission Planners and Under-Voltage Load Shed Entities (Distribution Providers and Transmission Owners)

R1. Each Transmission Owner and Distribution Provider that owns a UVLS program to mitigate the risk of voltage collapse or voltage instability in the BES shall annually update its UVLS data to support the Regional UVLS program database. The following data shall be provided to the Regional Reliability Organization for each installed UVLS system:

R1.1. Size and location of customer load, or percent of connected load, to be interrupted.

R1.2. Corresponding voltage set points and overall scheme clearing times.

R1.3. Time delay from initiation to trip signal.

R1.4. Breaker operating times.

R1.5. Any other schemes that are part of or impact the UVLS programs such as related generation protection, islanding schemes, automatic load restoration schemes, UFLS and Special Protection Systems.

Previous data in support of PRC-010 will be provided upon request to the PC.

SECTION 27: MAX FAULT EXCEPTIONS

MILESTONE: Max Fault Exceptions

Request Date: 7/1/2020

Due by: 8/3/2020

SPP Contact(s)

Michael Odom

Hugh Benfer

Entity Scope:

Data Submitters*

In the Max Fault Short Circuit models, all available transmission and generation facilities are put in service to provide the maximum fault current possible in the transmission system. In certain scenarios Data Submitters request that particular facilities remain out of service for indicated reasons, e.g. a Normally Open transmission line. These facilities that Data Submitters request to not be put in service in the Max Fault Short Circuit model should be submitted to SPP as part of the Max Fault Exceptions file, so that these facilities will not be put in service during the Max Fault Short Circuit model build.

Any facilities that should be included in the Max Fault Exceptions file should be submitted to SPP per the applicable MDWG / ITP Short Circuit Model build schedule. This request for these exceptions will be included in the model data request during the MDWG / ITP Short Circuit Model build.

*Data Submitters as defined in the SPP MDWG Model Development Procedure Manual

APPENDIX A: NERC TPL-001-4 STEADY STATE CONTINGENCY REQUEST

The initial requirements of the NERC TPL-001-4 standard (standard) became effective January 1, 2015. SPP, the Planning Coordinator (PC), with guidance from the SPP TPL Task Force, requests Table 1 contingencies from the Transmission Planners (TPs) for the annual TPL assessment.

The PC requests that the TPs provide one contingency file per Table 1 ‘P’ event (P1, P2, P4, P5, and P7) and one contingency file for all Table 1 steady state extreme events. The table below defines the naming convention of each file that the TPs will provide. Contingency file name example: XXXX is the PSS/E control area, e.g., NPPD_P1.con. Contingencies must include circuit IDs where applicable.

File name	Voltage level	Description
Not applicable	N/A	P0: No contingency
XXXX_P1.con	All	P1.1: Single Contingency (Generator)
	All ¹	P1.2: Single Contingency (Transmission Circuit)
	100 kV+	P1.3: Single Contingency (Transformer ²)
	100 kV+	P1.4: Single Contingency (Shunt)
	All	P1.5: Single Contingency (Single Pole of a DC line)
XXXX_P2.con	100 kV+	P2.1: Single Contingency (No fault line section)
	100 kV+	P2.2: Single Contingency (Bus section)
	100 kV+	P2.3: Single Contingency (Internal Breaker Fault [non-Bus-tie breaker])
	100 kV+	P2.4: Single Contingency (Internal Breaker Fault [Bus-tie breaker])
XXXX_P4.con	100 kV+	P4.1: Multiple Contingency ³ (Fault ⁴ on Generator, Stuck Breaker)
	100 kV+	P4.2: Multiple Contingency ³ (Fault ⁴ on Transmission Circuit, Stuck Breaker)
	100 kV+	P4.3: Multiple Contingency ³ (Fault ⁴ on Transformer ² , Stuck Breaker)
	100 kV+	P4.4: Multiple Contingency ³ (Fault ⁴ on Shunt, Stuck Breaker)
	100 kV+	P4.5: Multiple Contingency ³ (Fault ⁴ on Bus Section, Stuck Breaker)
	100 kV+	P4.6: Multiple Contingency ³ (Fault on Bus-tie Breaker Bus, Stuck Bus-tie Breaker)
XXXX_P5.con	100 kV+	P5.1: Multiple Contingency ³ (Fault on Generator, Primary relay failure on Generator)
	100 kV+	P5.2: Multiple Contingency ³ (Fault on Transmission Circuit, Primary relay failure on Transmission Circuit)
	100 kV+	P5.3: Multiple Contingency ³ (Fault on Transformer ² , Primary relay failure on Transformer)
	100 kV+	P5.4: Multiple Contingency ³ (Fault on Shunt, Primary relay failure on Shunt)
	100 kV+	P5.5: Multiple Contingency ³ (Fault on Bus Section, Primary relay failure on Bus Section)
XXXX_P7.con	100 kV+	P7.1: Multiple Contingency (Any two adjacent circuits on common structure)

¹ This voltage level has been updated from the previous TPL study P1.2 events

² Low side voltage

³ All elements in this contingency must be at or above the associated Voltage level

⁴ Non-Bus-tie Breaker

File name	Voltage level	Description
	All	P7.2: Multiple Contingency (Loss of a bipolar DC line)
XXXX_EExxx.con	All	EExxx 1-3b: See TPL-001-4 Standard page 11 for the event types needed

Software Generated Contingencies

When developing the contingency files, keep in mind that the PC will be automatically analyzing many contingencies through automatic N-1 & N-2 simulations. The auto-contingency feature allows all single contingencies (N-1) and combination of single contingencies (N-2) to be taken. It is important to note the contingency name of the auto-contingency analysis will not follow the recommended contingency naming convention. **To avoid duplicate results, a Transmission Planner may exclude a contingency in the applicable contingency file if the contingency will be analyzed during the auto-contingency analysis⁵.** The contingencies that will be captured during the auto-contingency analysis are listed below.

N-1 contingencies⁶:

1. Generator
2. Shunt device
3. Single Pole of a DC line
4. Transmission branch⁷

N-2 contingencies will be generated in the POM software using the following conditions:

1. All Generators – All Generators
2. All Generators – Transmission branch⁶ in same Area
3. All Generators – Shunt device in same Zone
4. Transmission branch⁶ – Transmission branch⁶ in same Zone
5. Transmission branch⁶ – Shunt device in same Zone
6. Shunt device – Shunt device in same Zone

Contingency Naming

The PC requests that the TPs follow the [SPP Contingency Naming Convention document](#) when naming each contingency that will be submitted to the PC per this request.

Invalid Contingencies

The PC requests that the TPs provide a current list of invalid contingencies formatted as specified in the SPP Contingency Naming Convention document.

⁵ Transmission Planner submitted contingency names will be retained.

⁶ P1.2 is considered a breaker to breaker contingency and therefore not included in the automatic contingency simulation unless breakers are at each end of the transmission line segment.

⁷ Transmission branch = Transformer or Transmission line segment.

APPENDIX B: SPP CONTINGENCY NAMING CONVENTION

Naming Structure

At a minimum, the required and optional fields of the contingency names should follow this structure:

1. Contingency name lengths are limited to 128 characters⁸.
2. Use colon ":" as a field delimiter (to separate fields).
3. Use back-to-back colons "::" for empty fields (null fields).

Required Field Descriptions

Fields one through three are considered static fields, meaning that the field types should be consistent for all contingencies.

Field 1: TPL-001-4 Table 1 Planning Event

For Planning Events P1, P2, P4, P5, P7, provide the Category and Event type with no delimiter. For example, a Category P1 paired with Event 1 should be listed as P11. Other examples include: P12, P13, P14, P15, P21, P23, etc.

For Extreme Event contingencies provide the event type "EExxx." For example, the loss of all transmission lines on a common right-of-way should be listed as EE2B. Other examples include: EE1, EE2A, EE2C, EE2D, EE2E, EE3A1, EE3A2, etc.

Field 2: Nominal Voltage

For Planning Events P1, P2, P4, P5, P7 and Extreme Events, provide the Nominal Voltage per the guidelines below.

- Numerical voltages should be given as a three-digit integer in kV, with a leading zero for sub-BES voltages, e.g., 069, 161.
- For contingencies that involve generators and GSUs, the generator high-side voltage is the nominal voltage⁹.
- For contingencies that involve non-GSU transformers, both low-side and high voltages with a dash "-" between the voltages, in that order, are the nominal voltage.

⁸ PSS/E 33 limitation; Contingency names may be truncated in PSS/E standard reports. However, PSS/E will import and export the full 128-character name. MUST runs will limit the Contingency naming to 42 characters.

⁹ TPL-001-4 Table 1, footnote 5

- For contingencies that involve any two adjacent circuits on a common structure and are different voltage levels, both low-side and high voltages with a dash “-” between the voltages, in that order, are the nominal voltage.

Field 3: Transmission Owner

For Planning Events P1, P2, P4, P5, P7 and Extreme Events, provide the Transmission Owner abbreviation per the guidelines below.

- Provide the TO abbreviation as listed in the planning model.
- For jointly owned facilities, provide each TO abbreviation separated by a dash “-” with the Contingency Owner listed first.

Optional Field Descriptions

Fields four through six are considered dynamic fields and can be used to help improve communications between two entities sharing contingency information.

Field 4: Operational Facility Names

For Planning Events P1, P2, P4, P5, P7 and Extreme Events, Field 4 may be used to link the contingency with familiar historical or Operations naming conventions.

- Line Name
- EMS Station Name
- Event Name
- Existing Shorthand Contingency Name
- Etc.

Field 5: Nameplate Values

For Planning Events P1, P2, P4, P5, P7 and Extreme Events, Field 5 may be used to list PMAX of generators, QMAX of shunt device.

Field 6: Event Description

For Planning Events P1, P2, P4, P5, P7 and Extreme Events, Field 6 may be used to list the applicable descriptions of the event.

- For contingencies that involve a generator, provide Unit PSSE Bus Name and Unit ID.
- For contingencies that involve a transmission line, provide the From and To PSSE Bus Names and Circuit ID.
- For contingencies that involve a transformer, provide the PSSE Transformer name and Circuit ID.
- For contingencies that involve a shunt device, provide the PSSE Bus Name.
- For contingencies that involve a DC line, provide the From and To PSSE Bus Name.
- When opening a line section without a fault, provide the Opened End and Closed End PSSE Bus Names.
- For a loss of two adjacent circuits on a common structure, provide Lower kV Line Name, and Higher kV Line Name.

EXAMPLES:

“P11:345:AEPW: *Optional Descriptor(s)*” (Generator Contingency)

(Contingency Type: P1.1, Point of Interconnection voltage kV: 345, Transmission Owner: AEPW, Optional Descriptor(s))

“P12:345:GRDA: *Optional Descriptor(s)*” (Transmission Circuit Contingency)

(Contingency Type: P1.2, kV: 345, Transmission Owner: GRDA, Optional Descriptor(s))

“P13:069-138:SPRM: *Optional Descriptor(s)*” (Transformer Contingency)

(Contingency Type: P1.3, Secondary kV: 69, “-”, Primary kV: 138, Transmission Owner: SPRM, Optional Descriptor(s))

“P14:345:WAPA: *Optional Descriptor(s)*” (Shunt Device Contingency)

(Contingency Type: P1.4, highside connected kV: 345, Transmission Owner: WAPA, Optional Descriptor(s))

“P15:350:WERE: *Optional Descriptor(s)*” (Single Pole of a DC Line Contingency)

(Contingency Type: P1.5, kV:350, Transmission Owner: WERE, Optional Descriptor(s))

“P21:345:SPS: *Optional Descriptor(s)*” (Opening of a line section w/o fault)

(Contingency Type: P2.1, kV: 345, Transmission Owner: SPS, Optional Descriptor(s))

“P22:115:NPPD: *Optional Descriptor(s)*” (Bus Section Fault Contingency)

(Contingency Type: P2.2, kV: 115, Transmission Owner: NPPD, Optional Descriptor(s))

“P23:115:LES: *Optional Descriptor(s)*” (Internal non-Bus-tie Breaker Fault Contingency)

(Contingency Type: P2.3, kV: 115, Transmission Owner: LES, Optional Descriptor(s))

“P24:161:EMDE: *Optional Descriptor(s)*” (Internal Bus-tie Breaker Fault Contingency)

(Contingency Type: P2.4, kV: 161, Transmission Owner: EMDE, Optional Descriptor(s))

“P41:138:OMPA: *Optional Descriptor(s)*” (Stuck non-Bus-tie breaker attempting to clear a generator Fault)

(Contingency Type: P4.1, Point of Interconnection voltage kV: 138, Transmission Owner: OMPA, Optional Descriptor(s))

“P42:138:MIDW: *Optional Descriptor(s)*” (Stuck non-Bus-tie breaker attempting to clear a Transmission Circuit Fault)

(Contingency Type: P4.2, kV: 138, Transmission Owner: MIDW, Optional Descriptor(s))

“P43:161-345:SUNC: *Optional Descriptor(s)*” (Stuck non-Bus-tie breaker attempting to clear a Transformer Fault)

(Contingency Type: P4.3, Secondary kV: 161, “-”, Primary kV: 345, Transmission Owner: ITCM, Optional Descriptor(s))

“P44:345:KCPL: *Optional Descriptor(s)*” (Stuck non-Bus-tie breaker attempting to clear a Shunt Device Fault)

(Contingency Type: P4.4, highside connected kV: 345, Transmission Owner: KCPL, Optional Descriptor(s))

“P45:115:KACY: *Optional Descriptor(s)*” (Stuck non-Bus-tie breaker attempting to clear a Bus Section Fault)

(Contingency Type: P4.5, kV: 115, Transmission Owner: KACY, Optional Descriptor(s))

“P46:138:EMDE: *Optional Descriptor(s)*” (Stuck Bus-tie breaker attempting to clear an associated Bus Fault)

(Contingency Type: P4.6, kV: 138, Transmission Owner: EMDE, Optional Descriptor(s))

“P51:138:SPS: *Optional Descriptor(s)*” (Failure of a non-redundant relay protecting a generator)

(Contingency Type: P5.1, Point of Interconnection voltage kV: 138, Transmission Owner: SPS, Optional Descriptor(s))

“P52:138:AEPW: *Optional Descriptor(s)*” (Failure of a non-redundant relay protecting a Transmission Circuit)

(Contingency Type: P5.2, kV: 138, Transmission Owner: AEPW, Optional Descriptor(s))

“P53:161-345:OPPD: *Optional Descriptor(s)*” (Failure of a non-redundant relay protecting a Transformer)

(Contingency Type: P5.3, Secondary kV: 161, Primary kV: 345, Transmission Owner: OPPD, Optional Descriptor(s))

“P54:345:WAPA: *Optional Descriptor(s)*” (Failure of a non-redundant relay protecting a Shunt Device)

(Contingency Type: P5.4, highside connected kV: 345, Transmission Owner: WAPA, Optional Descriptor(s))

“P55:138:LES: *Optional Descriptor(s)*” (Failure of a non-redundant relay protecting a Bus Section)

(Contingency Type: P5.5, kV: 138, Transmission Owner: LES, Optional Descriptor(s))

“P71:115-230:OKGE-WFEC: *Optional Descriptor(s)*” (Loss of 2 adjacent circuits on a common structure)

(Contingency Type: P7.1, Lower kV: 115, “-”, Higher kV: 230, Transmission Owner: OKGE and WFEC, Optional Descriptor(s))

“P72:350:NPPD: *Optional Descriptor(s)*” (Loss of a bipolar DC Line)

(Contingency Type: P7.2, kV: 350, Transmission Owner: NPPD, Optional Descriptor(s))

“EE2A:161:SWPA: *Optional Descriptor(s)*” (Steady State Extreme Event)

(Contingency Type: Extreme Event, kV: 161, Transmission Owner: SWPA, Optional Descriptor(s))

APPENDIX C: BES QUICK REFERENCE GUIDE

Definition:

Bulk Electric System (BES): Unless modified by the lists shown below, all Transmission Elements operated at 100 kV or higher and Real Power and Reactive Power resources connected at 100 kV or higher. This does not include facilities used in the local distribution of electric energy.

Inclusions:

I1 – Transformers with the primary terminal and at least one secondary terminal operated at 100 kV or higher unless excluded by application of Exclusion E1 or E3.

I2 – Generating resource(s) including the generator terminals through the high-side of the step-up transformer(s) connected at a voltage of 100 kV or above with:

- a) Gross individual nameplate rating greater than 20 MVA; or
- b) Gross plant/facility aggregate nameplate rating greater than 75 MVA.

I3 – Blackstart Resources identified in the Transmission Operator’s restoration plan.

I4 – Dispersed power producing resources that aggregate to a total capacity greater than 75 MVA (gross nameplate rating), and that are connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage of 100 kV or above. Thus, the facilities designated as BES are:

- a) The individual resources, and
- b) The system designed primarily for delivering capacity from the point where those resources aggregate to greater than 75 MVA to a common point of connection at a voltage of 100 kV or above.

I5 – Static or dynamic devices (excluding generators) dedicated to supplying or absorbing Reactive Power that are connected at 100 kV or higher, or through a dedicated transformer with a high-side voltage of 100 kV or higher, or through a transformer that is designated in Inclusion I1 unless excluded by application of Exclusion E4.

Exclusions:

E1 – Radial systems: A group of contiguous transmission Elements that emanates from a single point of connection of 100 kV or higher and:

- a) Only serves Load, or
- b) Only includes generation resources, not identified in Inclusions I2, I3, or I4, with an aggregate capacity less than or equal to 75 MVA (gross nameplate rating), or
- c) Where the radial system serves Load and includes generation resources, not identified in Inclusions I2, I3 or I4, with an aggregate capacity of non-retail generation less than or equal to 75 MVA (gross nameplate rating).

Note 1 – A normally open switching device between radial systems, as depicted on prints or one-line diagrams, for example, does not affect this exclusion.

Note 2 – The presence of a contiguous loop, operated at a voltage level of 50 kV or less, between configurations being considered as radial systems, does not affect this exclusion.

E2 – A generating unit or multiple generating units on the customer’s side of the retail meter that serve all or part of the retail Load with electric energy if: (i) the net capacity provided to the BES does not exceed 75 MVA, and (ii) standby, back-up, and maintenance power services are provided to the generating unit or multiple generating units or to the retail Load by a Balancing Authority, or provided pursuant to a binding obligation with a Generator Owner or Generator Operator, or under terms approved by the applicable regulatory authority.

E3 – Local networks (LN): A group of contiguous transmission Elements operated at less than 300 kV that distribute power to Load rather than transfer bulk power across the interconnected system. LNs emanate from multiple points of connection at 100 kV or higher to improve the level of service to retail customers and not to accommodate bulk power transfer across the interconnected system. The LN is characterized by all of the following:

- a) Limits on connected generation: The LN and its underlying Elements do not include generation resources identified in Inclusions I2, I3, or I4 and do not have an aggregate capacity of non-retail generation greater than 75 MVA (gross nameplate rating);
- b) Real Power flows only into the LN and the LN does not transfer energy originating outside the LN for delivery through the LN; and
- c) Not part of a Flowgate or transfer path: The LN does not contain any part of a permanent Flowgate in the Eastern Interconnection, a major transfer path within the Western Interconnection, or a comparable monitored Facility in the ERCOT or Quebec Interconnections, and is not a monitored Facility included in an Interconnection Reliability Operating Limit (IROL).

E4 – Reactive Power devices installed for the sole benefit of a retail customer(s).

Note – Elements may be included or excluded on a case-by-case basis through the Rules of Procedure exception process.

Quick reference:

Inclusions:

- I1:** Transformers – 2 winding need to have both windings over 100kV, 3 winding at least two windings need to be over 100kV.
- I2:** Generators – 20MW single, 75MW aggregate through the high side of the step-up transformer.
- I3:** Blackstart resources.
- I4:** Wind and solar, other renewables – 75MW aggregate or more connected at 100kV or higher.
- I5:** SVCs, Cap banks, Reactors – connected at 100kV either directly or through step-up transformers.

Exclusions:

- E1:** Radials with the listed criteria.
- E2:** Behind the meter generation.
- E3:** Local networks.
- E4:** SVCs or Cap banks used for local voltage support, not on the BES.

The better document for this is the NERC guidance document “[Bulk Electric System Definition Reference Document](#).”

Key to diagram color coding:

- **Blue** indicates that an Element is included in the BES
- **Green** indicates that an Element is not included in the BES
- **Orange** indicates ‘points of connection’
- **Black** indicates Elements that are not evaluated for the specific inclusion depicted in the individual diagrams being shown

APPENDIX D: NERC TPL-001-4 STABILITY CONTINGENCY REQUEST

The initial requirements of the NERC TPL-001-4 standard (standard) became effective January 1, 2015. SPP, the Planning Coordinator (PC), with guidance from the SPP TPL Task Force, requests Table 1 contingencies from the Transmission Planners (TPs) for the annual TPL assessment.

The PC requests on annual basis that the TPs provide a contingency spreadsheet per Table 1 for all 'P' events (P1, P2, P4, P5, and P7) and Table 1 steady state Extreme Events. The table below defines the naming convention for of each contingency that the TPs can provide in the spreadsheet. The spreadsheet tab labeled "form" is the location that the TP will insert the time domain description of the fault definition (sequence of events) or actions taken on the topology contained in the power flow model. SPP Staff will provide the necessary support to TPs in order to compile the fault definitions within the spreadsheet by request. The spreadsheet tab labeled "Submitter" is the location that the TP will insert their name, contact information, and the case or cases the contingency is to be applied. The number of contingencies requested will vary by year and will be contained in the formal request sent out via e-mail. The list below summarizes the type of contingency data the PC expects to receive during the annual contingency request:

- Events Expected to Produce More Severe Impacts (includes events coordinated with adjacent systems)
 - Rationale for Event Selections
- Relay models
 - PSS/E Dynamic Relay Models for DYRE file, and/or
 - Description of time domain relay actions that replicate the expected removal of elements
- Description of successful and unsuccessful high speed (less than one (1) second) reclosing
- Description of generator low voltage ride through characteristics if not already contained in DYRE file
- Remedial Action Schemes
- Generic or actual relay models for tripping of transmission lines and transformers where transient swings cause protection system operations
- Specific generator scaling that will be required to balance generation/load when generation is removed as a "prior outage" for a contingency.

Category	Initial Condition	Category	Event	Fault Type
P0 No Contingency	Normal System			
P1 Single Contingency	Normal System	P1_1	Generator	3 ϕ
		P1_2	Transmission Circuit	3 ϕ
		P1_3	Transformer	3 ϕ
		P1_4	Shunt Device	3 ϕ
		P1_5	Single pole of DC line	SLG
P2 Single Contingency	Normal System	P2_1	Opening a line section w/o a Fault	N/A
		P2_2	Bus section fault	SLG
		P2_3	Internal Breaker Fault (non-Bus-tie Breaker)	SLG
		P2_4	Internal Breaker Fault (Bus-tie Breaker)	SLG
P3 Multiple Contingencies	Loss of Generator followed by System Adjustment	P3_1	Generator	3 ϕ
		P3_2	Transmission Circuit	3 ϕ
		P3_3	Transformer	3 ϕ
		P3_4	Shunt Device	3 ϕ
		P3_5	Single pole of DC line	SLG
P4 Multiple Contingencies (Fault plus stuck breaker)	Normal System	P4_1	Generator	SLG
		P4_2	Transmission Circuit	SLG
		P4_3	Transformer	SLG
		P4_4	Shunt Device	SLG
		P4_5	Bus section fault	SLG
		P4_6	Loss of multiple elements caused by a stuck breaker	SLG
P5 Multiple Contingencies (Fault plus relay failed to operate)	Normal System	P5_1	Generator	SLG
		P5_2	Transmission Circuit	SLG
		P5_3	Transformer	SLG
		P5_4	Shunt Device	SLG
		P5_5	Bus section fault	SLG
P6 Multiple Contingencies (Two overlapping singles)	Loss of a Transmission Circuit followed by a System adjustment	P6_1		
		P6_1_1	Transmission Circuit	3 ϕ
		P6_1_2	Transformer	3 ϕ
		P6_1_3	Shunt Device	3 ϕ
		P6_1_4	Single pole of DC line	SLG
	Loss of a Transformer followed by a System adjustment	P6_2		
		P6_2_1	Transmission Circuit	3 ϕ
		P6_2_2	Transformer	3 ϕ
		P6_2_3	Shunt Device	3 ϕ
		P6_2_4	Single pole of DC line	SLG
		P6_3		

Category	Initial Condition	Category	Event	Fault Type	
	Loss of a Shunt Device followed by a System adjustment	P6_3_1	Transmission Circuit	3 ϕ	
		P6_3_2	Transformer	3 ϕ	
		P6_3_3	Shunt Device	3 ϕ	
		P6_3_4	Single pole of DC line	SLG	
	Loss of a Single Pole of DC line followed by a System adjustment	P6_4			
		P6_4_1	Transmission Circuit	3 ϕ	
		P6_4_2	Transformer	3 ϕ	
		P6_4_3	Shunt Device	3 ϕ	
		P6_4_4	Single pole of DC line	SLG	
P7 Multiple Contingencies (Common Structure)	Normal System	P7_1	Any two adjacent circuits on common structure	SLG	
		P7.2	Loss of bipolar DC line	SLG	
Extreme Events (EE) A. Simulate the removal of all elements that Protection Systems and automatic controls are expected to disconnect. B. Simulate Normal Clearing unless otherwise specified		Extreme_1			
	Local or wide area events affecting the Transmission System	Extreme_2			
	3 ϕ fault on generator with stuck breaker or a relay failure resulting in Delayed Fault Clearing	Extreme_2_a			
	3 ϕ fault on Transmission Circuit with stuck breaker or a relay failure resulting in Delayed Fault Clearing	Extreme_2_b			
	3 ϕ fault on generator with stuck breaker or a relay failure resulting in Delayed Fault Clearing	Extreme_2_c			

Category	Initial Condition	Category	Event	Fault Type
	3 ϕ fault on bus section with stuck breaker or a relay failure resulting in Delayed Fault Clearing	Extreme_2_d		
	3 ϕ internal breaker fault	Extreme_2_e		
	Other events based on operating experience	Extreme_2_f		