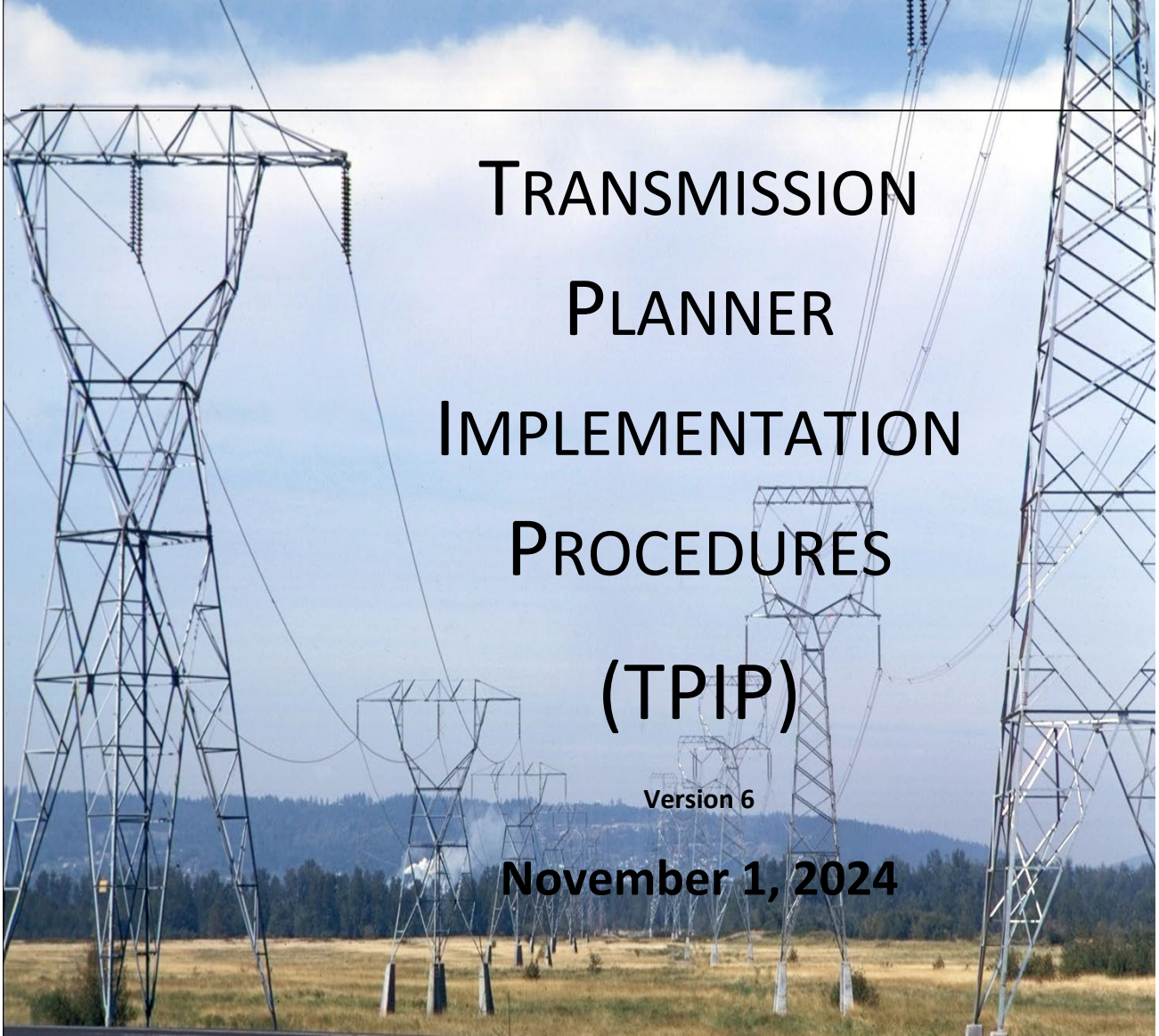


BONNEVILLE POWER ADMINISTRATION



TRANSMISSION PLANNER IMPLEMENTATION PROCEDURES (TPIP)

Version 6

November 1, 2024

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Definitions

Capitalized terms used within this document shall have meaning as defined in this section.

1. **ADE –Annual Data Exchange** - BPA’s annual process for ensuring WECC models and base cases are up to date and accurate for our planning footprint (includes standards like MOD-032, FAC-008, TPL-007, PRC-024, and MOD-026/027).
2. **BES** - Bulk Electric System¹ - All Transmission Elements operated at 100 kV or higher and Real Power and Reactive Power resources connected at 100 kV or higher.
3. **BPA** - Bonneville Power Administration
4. **CAP** - Corrective Action Plan. A list of actions and an associated timetable for implementation to remedy a specific problem.
5. **CFR** - Coordinated Functional Registration
6. **CFR Matrix** - Coordinated Functional Registration Matrix - the CFR Matrix contains the delineation of requirements of the Parties entered into a CFR contract.
7. **CSE** - Customer Service Engineer
8. **CSRP** - Customer Services Reliability Program - Group within BPA that administers the TP CFR project.
9. **Customer(s)** - Transmission Owner or Generation Owner for which BPA is the Transmission Planner or shares responsibilities.
10. **Customer Compliance Packet (TP CFR)** – includes: Spare Equipment Strategy, Short Circuit Study, Corrective Action Plans, the annual TPL-001 Data Request response, and the annual Planning Assessment results for each entity.
11. **Effective Date** - the effective date of the executed TP CFR contract.
12. **Entities** - A NERC registered utility.
13. **FISMA** - Federal Information Security Management Act
14. **GIC** - Geomagnetically Induced Currents
15. **GO** - Generator Owner.⁵ Entity that owns and maintains generating units.

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16. **GOP** - Generator Operator.⁶ The entity that operates generating unit(s) and performs the functions of supplying energy and Interconnected Operations Services.
17. **GO TP Customer** – a Generation Owner with whom BPA is interconnected and which is mapped to BPA for purposes of the GO's compliance with applicable TP related reliability standards.
18. **NERC** - North American Electric Reliability Corporation. NERC was designated by FERC as the Electric Reliability Organization (or the successor organization) responsible for the oversight of Regional Entities established to ensure the reliability and stability of regions.
19. **NERC ERO Portal** - the NERC Electric Reliability Organization Portal is a tool used to manage NERC account information and various NERC resources.
20. **PC** - Planning Coordinator.⁴ The responsible entity that coordinates and integrates transmission Facilities and service plans, resource plans, and Protection Systems.
21. **Annual Planning Assessment** - Documented evaluation of future Transmission System performance and Corrective Action Plans to remedy identified deficiencies.
22. **SOL** - System Operating Limit. The value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria.
23. **TO** – Transmission Owner. Entity that owns and maintains BES transmission.
24. **TP** - Transmission Planner.³ The entity that develops a long-term (generally one year and beyond) plan for the reliability (adequacy) of the interconnected bulk electric transmission systems within its portion of the Planning Authority area.
25. **TP CFR Customer** – a Transmission Owner for which BPA and the customer share TP responsibilities with a CFR contract.
26. **TPL-001 Data Request** – the annual data request sent to TP CFR and TP GO Customers for updated data to ensure accurate studies and a complete annual Planning Assessment.

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27. **WECC** - Western Interconnection Coordinating Council. WECC was designated by NERC as the Regional Entity responsible for the oversight of Regional Utilities to ensure the reliability and stability of the Western Interconnected power grid.

1, 2, 3, 4, 5, 6

[NERC Glossary of Terms](#)

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	7/18/18	Initial process creation/added version block	L. Jones	6/29/18
Rev. 1	5/1/19	<ul style="list-style-type: none">• Updated Customer definitions• Added Customer Compliance Packet definition• Added Transmission Owner definition• Added for “TP CFR Customer” and “GO TP Customer” definition	L. Jones	3/26/19
Rev. 2	8/1/20	<ul style="list-style-type: none">• Added definition for ADE• Added definition for annual Planning Assessment from NERC glossary• Added definition for TPL-001 Data Request• Redefined Customer Compliance Packet	L. Jones	8/1/20
Rev. 3	9/3/21	<ul style="list-style-type: none">• NERC Glossary of Terms updated• Errata changes	L. Cardoza	7/30/21
Rev. 4	12/1/22	<ul style="list-style-type: none">• Added GIC - Geomagnetically Induced Currents to Glossary of Terms	R. Sporseen	12/28/22

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Purpose

This Transmission Planner Implementation Procedures (TPIP) is a collection of processes and procedures, explanations, and other materials necessary to facilitate BPA's ability to carry out TP responsibilities related to Customer's BES equipment, as agreed upon between BPA, and certain TO, and GO Customers. Reliability standards that are wholly owned by one entity (Customer or BPA) are the sole responsibility of that entity.

The development of the TPIP is intended to be collaborative and transparent between BPA and Customers to ensure successful execution of TP responsibilities.

These TPIP processes and procedures are required in order to demonstrate compliance for the mandatory TP related requirements and in order for BPA to reliably plan its share of the Interconnection. The processes and procedures contained in the TPIP are mandatory for BPA and Customers. The processes and procedures specifically contained within the TPIP pertain to the planning functions primarily focusing on the TP role.

These procedures contain, but are not limited to:

- Necessary actions which must be taken by the Customer, in order to achieve compliance for TP related standards and/or requirements.
- BPA may issue data requests that the Customer must follow, in order for BPA to fulfill its TP function obligations.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none">• Moved Purpose in CFR section below the definitions• Changed language to include GO's and TO's• Errata change: grammar changes	L. Jones	3/26/19
Rev. 2	9/3/21	Errata change: grammar	L. Cardoza	7/30/21

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TPIP Updates and Revisions

General Overview

The process for creating and/or updating within the TPIP are driven by:

- Updated or new Reliability Standards relating to the TP function
- Customer requests a new process, or a change to an existing process
- BPA identifies a need to change an existing process or to create a new process

The purpose of the TPIP Updates and Revisions process is to ensure consistent management of TPIP processes and guidance that set expectations for BPA and Customers for compliance with the TP reliability standards. This will result in increased user visibility, transparency, collaboration, ownership and clarity of roles and responsibilities.

Version Control of the TPIP

The TPIP has a summary of changes at the end of the document that will track programmatic changes using whole number version control (i.e. Version 1, Version 2...).

Examples of programmatic changes include but are not limited to:

- Cost Allocation Process changes
- Contract Exhibit Update Process changes
- Additions and/or changes to definitions
- New TP Standards

Each standard and associated process will have separate version control that will track changes in Standards, requirements, or compliance processes and will use decimals (i.e. Version 1.1, Version 1.2...). The TPIP version control process will mimic the NERC Standards versioning process, errata changes will use sub-numbering, and content changes will use whole numbering.

Examples of standards and associated process changes include, but are not limited to:

- Existing Standard or requirements change, requiring an update of the associated process
- Retirement of a Standard or requirement
- Data request time frames altered by BPA

Establishment of New or Updated Process

New or updated process/guidance is required:

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- a) BPA requests or approves need for new process/guidance and assigns individual process owner
- b) BPA Customer requests a new process/guidance or revision/update to current process/guidance
- c) BPA stake holder requests a new process/guidance or revision/update to current process/guidance

BPA and Customer Collaboration

CSRP will facilitate collaboration with BPA Customers by:

- Communicating process/guidance via email upon request or as needed
- Post draft TPIP on the BPA TP [external website](#) for 30-day Customer comment period, as applicable
 - CSRP will respond to Customer comments
- Finalize TPIP
 - CSRP performs the following:
 - Finalizes process/guidance document with approval date
 - Post final process/guidance to the BPA TP [external website](#)
 - Send out communication when document is posted
- Reviewing process/guidance at the annual Customer meeting

Periodic Review

CSRP and BPA Subject Matter Experts (SMEs) are responsible to periodically review the TPIP document to ensure all processes and guidance documents are current and adequate.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none">• Added bullet point to send out the TPIP after has been finalized• Moved Updates/Revisions before Section 1, as it applies to all Customers• Updated verbiage to include all Customers• Errata change: Updated link to external website; grammar changes	L. Jones	3/26/19
Rev. 2	8/1/20	Errata change: Grammar	L. Jones	8/12/20
Rev. 3	9/3/21	<ul style="list-style-type: none">• Errata change: Grammar• Errata change: Clarified BPA external website	L. Cardoza	7/30/21

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SECTION 1 - COORDINATED FUNCTIONAL REGISTRATION (CFR)

CFR Background

The Bonneville Power Administration (BPA) has determined that the most sensible and effective approach for achieving compliance for Transmission Planner (TP) related standards and/or requirements is to offer flexible compliance options to qualifying Customers within our Planning Coordinator (PC) area.

The TP CFR allows BPA and TP CFR Customers to:

- Simplify the audit process by allowing either BPA or the TP CFR Customer to be accountable for individual reliability standards
- Reduce the compliance burden for each of the entities involved in the CFR agreement
- Limit the scope of compliance to the delineated responsibilities identified in the CFR Matrix

CFR NERC Registration

Each TP CFR Customer will be required to register with the Regional Entity (WECC) for the TP function in order to participate in the TP CFR project. Details and information about registering as a TP can be found [here](#).

CFR ERO Portal

General Instructions

The TP CFR Customer with a TP CFR Contract will be required to have at least one contact registered in the NERC ERO Portal. The registration details can be found [here](#).

The CFR Portal will allow the registered TP CFR Customer to view the Matrix associated with the TP CFR Agreement.

The CFR Portal is setup to generate notifications for each step in the process for the registered TP CFR Customer contact.

CFR Creation

BPA, as the Lead Entity on the ERO Portal, will create a CFR for each of the participating entities. The responsibilities set for TP related standards and/or requirements in the CFR Portal will match what is outlined in Exhibit B – Matrix of the TP CFR Contract. The TP CFR Contract will also be uploaded to the CFR Portal.

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CFR Status

Overall, the CFR state can either be *Registered*, *Not-Registered*, or *Terminated*, with the default status being *Not-Registered*. The CFR status can be in five different states, depending on where it is in the process of being reviewed. The states are: *Draft*, *Pending*, *Returned*, *Accepted*, or *Rejected*, with the default state being *Draft*.

Once the CFR has been submitted it will be in a Pending Status and sent over to WECC (Regional CFR Administrator) for review. When the CFR is reviewed and approved by WECC, the information will be registered with NERC. The CFR will be active effective on the date specified in the CFR Portal.

CFR Matrix

General Overview

The CFR Matrix contains the delineation of requirements between BPA and TP CFR Customers entered into a TP CFR contract. For each applicable NERC standard and/or requirement, the CFR Matrix identifies compliance responsibility as BPA or the TP CFR Customer. If BPA is designated as the responsible party, this means that BPA is responsible for compliance with the specified requirement. If the TP CFR Customer is designated as the responsible party, the TP CFR Customer is responsible for compliance with the specified requirement. The complete CFR matrix, with the delineation of responsibilities will be available on the CFR Portal, and available in Exhibit B of the TP CFR Contract.

Updates to the CFR Matrix

NERC will notify the participants involved in a TP CFR agreement of any new Reliability Standard(s), retired Reliability Standard(s), or updates to existing Reliability Standard(s) that are related to the TP function. Upon notice of a new or revised Reliability Standard that is applicable to the TP CFR, BPA and the TP CFR Customer shall confer regarding their respective compliance responsibilities for the new or revised Standard(s) and agree upon a revision to the CFR Matrix to address the new or revised Standard(s). BPA will update the matrix on the CFR Portal, and Exhibit B of the TP CFR Contract, prior to the mandatory date of the new or revised Standard.

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	7/18/18	Initial process creation	L. Jones	6/29/18
Rev 0.1	7/18/18	Removed redundant sentence in CFR matrix section	L. Jones	7/10/18
Rev 0.1	7/18/18	Errata change: Grammar	L. Jones	7/10/18
Rev. 1	5/1/19	<ul style="list-style-type: none"> Added Section 1 and 2 to delineate the CFR and GO responsibilities Changed revision language to match Exhibit B, inserted “prior to the mandatory date of the new or revised Standard” Updated CFR background section: <ul style="list-style-type: none"> Completed sentence for bullet point #3 “Limit the scope of compliance to the delineated responsibilities identified in the CFR Matrix” Moved paragraphs regarding TPIP definition from Background to Purpose Errata change: added CFR in front of headers for clarity 	L. Jones	3/26/19
Rev. 3	8/1/20	Errata change: Grammar	L. Jones	8/12/20
Rev. 4	9/3/21	<ul style="list-style-type: none"> Errata change: Grammar Updated links 	L. Cardoza	7/30/21
Rev. 5	11/1/22	<ul style="list-style-type: none"> Updated language on FERC notice 	R. Sporseen	12/28/22

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CFR STANDARDS

TP CFR Customers retain responsibility for NERC requirements that pertain to non-Transmission Planner functions and are applicable to the TP CFR Customer's registration status.

FAC-002-4 – Facility Interconnection Studies

CFR Customer responsibility

The purpose of this Standard is to study the impact of interconnecting new or materially modified Facilities on the Bulk Electric System.

This [link](#) will direct you to BPA's Line and Load Interconnection Procedures Page. On this page you will find the link that will take you to BPA's Definition of a Qualified Change.

To meet the intent of the CFR agreement, there are two options available to satisfy the requirements of the standard:

1. TP CFR Customer chooses to use BPA's Line Load Interconnection Request Process (LLIR) or Generator Interconnection Process. Customer would be required to provide the information, as requested in BPA's Interconnection Study Process, to ensure accuracy when performing interconnection studies.
2. TP CFR Customer chooses to perform their own interconnection study. If the study doesn't identify any issue(s) that would affect BPA, the TP CFR Customer would just take the necessary steps to document their compliance. If the study identifies issue(s) that affect BPA, the TP CFR Customer would need to provide that information to BPA.

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 0.1	7/10/18	Errata change: Grammer	L. Jones	7/18/18
Rev. 0.1	7/10/18	Clarified choices: BPA or customer process	R. Sporseen	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none"> Identified standard section as "CFR Standards" Added statement applicable to all Standards: <i>" CFR Customers retain responsibility for NERC requirements that pertain to non-Transmission Planner functions and are applicable to the Customer's registration status"</i> 	L. Jones	3/26/19
Rev. 2	9/3/21	Changed standard version to FAC-002-3	L. Cardoza	7/30/21
Rev. 3	11/01/24	<ul style="list-style-type: none"> Changed standard version to FAC-002-4 Updated the purpose statement 	A.Crisman	6/15/2024

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FAC-014-3 – Establish and Communicate SOLs

BPA responsibility

The purpose of this Standard is to ensure that System Operating Limits (SOLs) used in the reliable operation of the Bulk Electric System (BES) are determined based on an established methodology or methodologies and that Planning Assessment performance criteria is coordinated with these methodologies.

BPA's planning group uses Facility Ratings, System steady-state voltage limits and stability criteria in its Planning Assessment of Near-Term Transmission Planning Horizon that are equally limiting or more limiting than the criteria for Facility Ratings, System Voltage Limits and stability described in the RC West SOL methodology. The BPA Operations Planning group applies the RC West SOL Methodology when conducting operations planning analysis. The BPA Transmission Planning group plans the system to align with Operations Planning.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 0.1	7/10/18	Errata change: Grammar	L. Jones	7/18/18
Rev. 1	5/1/19	Errata change: Capital C for Communicate	L. Jones	3/26/19
Rev. 2	10/8/24	<ul style="list-style-type: none">Updated the standard version to FAC-014-3Added the purpose statement	A. Crisman	6/15/24

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IRO-017-1 – Outage Coordination Process

BPA responsibility

The purpose of this Standard is to ensure that outages are properly coordinated in the Operations Planning time horizon (0 days to 1 year) and Near-Term Transmission Planning Horizon (1 to 5 years).

IRO-017-1 R3 (providing the annual Planning Assessment to the Reliability Coordinator (RC) and R4 (working with the RC and affected parties if there are outage conflicts) are dependent on the annual Planning Assessment, and any outages identified in the annual Planning Assessment.

BPA will coordinate with TP CFR Customers on the annual TPL-001 Data Request to assess Long Duration Outages and to determine if they should be included in the annual Planning Assessment.

To ensure proper documentation security, the annual Planning Assessments must be uploaded to the RC's secure web portal. BPA has access and upload permissions to this secure portal. BPA will assist the TP CFR Customer by uploading applicable data and analysis to the RC's secure portal.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 0.1	7/10/18	Errata change: Grammar	L. Jones	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none">Added reference to data request and BPA responsibility to upload applicable customer data to the RC portalChanged standard responsibility from Customer to BPA	L. Jones	3/26/19
Rev. 2	8/1/20	<ul style="list-style-type: none">Clarification of TPL-001 Data Request	L. Jones	8/12/20

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MOD-031-3 – Demand and Energy Data

BPA responsibility

The purpose of this Standard is to provide authority for applicable entities to collect demand, energy and related data to support reliability studies and assessments and to enumerate the responsibilities and obligations of requestors and respondents of that data.

Annually, BPA's Load Forecasting and Analysis group requests and collects general information on Customer's Direct Control Load Management (DCLM), Demand-Side Management (DSM), Interruptible Demands, and rate making activities and practices consistent with the requirements housed in this NERC Standard.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 0.1	7/10/18	Errata change: Grammar	L. Jones	7/18/18
Rev. 1	9/3/21	Updated Standard to MOD-031-3	L. Cardoza	7/30/21

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MOD-032-1 – Power System Modeling Data

BPA responsibility

The purpose of this Standard is to establish consistent modeling data requirements and reporting procedures for development of planning horizon cases necessary to support analysis of the reliability of the interconnected transmission system.

Pursuant to requirement R1 of MOD-032-1, BPA established a set of common procedures for submitting data needed for developing the WECC interconnection planning models, found in the BPA MOD-032 Model Data Requirements & Reporting Procedures document. This document outlines these data reporting procedures needed to support the development of power flow and dynamics simulation base case models in a manner compliant with MOD-032 that realistically simulate steady state and dynamic behavior of the transmission system. This data exchange might also include additional data requirements. TP CFR Customers shall comply with the Annual Data Exchange format and schedule(s) issued by BPA.

BPA Policy Reference

TP CFR Customers are expected to comply with BPA's MOD-032 Model Data Requirements & Reporting Procedures, available at the following [link](#).

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/1/18
Rev. 0.1	7/10/18	Errata change: Grammar	L. Jones	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none">Moved top paragraph to CFR Standard Section, as applicable to all standardsAdded -1 to Standard nameErrata change: clarified seasonal vs. planning and added Standard version	L. Jones	3/26/19
Rev. 2	9/3/21	<ul style="list-style-type: none">Updated language to match the TOPICUpdated link to MOD-032 process document	L. Cardoza	7/30/21

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PRC-010-2 – Under Voltage Load Shedding

BPA responsibility

The purpose of PRC-010 is to establish an integrated and coordinated approach to the design, evaluation, and reliable operation of Undervoltage Load Shedding Programs (UVLS Programs).

This standard is not implemented by BPA because BPA does not ‘own’ or ‘operate’ a coordinated ‘UVLS Program.’ BPA utilizes localized UVLS schemes which, in aggregate, do not constitute the ‘UVLS Program’ designation.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18

BONNEVILLE POWER ADMINISTRATION

TPL-001-5 – Transmission System Planning Performance Requirements

BPA and TP CFR Customer Responsibility

TPL-001-5 Implementation Timeline:

- 7/1/2023 – TPL-001-5 becomes effective.
- 7/1/2025 – CAPs required for all failures to meet Table 1 performance requirements, but the planned System is not required to meet the performance requirements in Table 1 for category P5 events only.
- 7/1/2029 – TPL-001-5 fully enforceable.

The purpose of this Standard is to establish Transmission System Planning Performance Requirements within the planning horizon to develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable contingencies.

This portion of the document represents the scope and schedule for the NERC TPL-001-5 annual Planning Assessment. CSRP will coordinate with each TP CFR Customer to ensure that BPA has the information that is necessary to complete the annual Planning Assessment.

Annually, during the month of April, BPA will send a TPL-001 Data Request to TP CFR Customers. The TP CFR Customer will have 30 days from the time the request was sent to respond to the data request. The intent of the data request is to collect the information required to complete the annual Planning Assessment, taking into account specific TP CFR Customer requests and requirements. BPA will use default assumptions and existing data to complete the annual Planning Assessment in the event of a non response to the TPL-001 Data Request.

(R2.1.4 & R2.4.4) Selected known outages in the Near-Term Planning Horizon

When known outage(s) of generation or Transmission Facility(ies) are planned in the Near-Term Planning Horizon, the impact of selected known outages on System performance shall be assessed. The TP CFR customer will provide detail for known BES Transmission and Generation outages in the Near Term Planning Horizon (5 years). (R1.1.4) Commitments for Firm Transmission Service and Interchange

TP CFR Customer will provide information regarding their known commitments for firm transmission service or interchange.

If the Customer has firm commitments, they will need to provide the following:

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- MW of commitment
- Start and end date of commitment
- Rollover option with terms and conditions

(R2.1.5 & 2.4.5) Spare Equipment Strategy

In order to meet TPL-001-5 sub-requirements R2.1.5 & R2.4.5, TP CFR Customers will need to develop a spare equipment strategy for facilities in their own system. The spare equipment strategy is a listing of major transmission equipment, and the corresponding lead times necessary to replace that equipment in the event of a failure. If the lead time to replace the equipment is one year or more, then the TP CFR Customer needs to assess the impact of the unavailability of that equipment in accordance with TPL-001-5 Requirement R2.1.5 and R2.4.5.

(R2.3) Short Circuit Analysis

In order to meet TPL-001-5 sub-requirement R2.3, TP CFR Customers will need a short circuit analysis for their portion of the BES system. This short circuit analysis is used to determine whether circuit breakers have adequate interrupting capabilities for expected fault duties. The analysis should cover the Near-Term Planning Horizon time period.

BPA maintains a regional short circuit model using ASPEN One-liner software, which includes the Northwest portion of the WECC transmission system. Annually, TP CFR Customers voluntarily provide their most updated, “as-built” transmission system information to be incorporated in the next year’s official BPA short circuit model. This information is submitted to BPA by the TP CFR customer using the procedure defined in Section 4 of the [“BPA MOD-032 Model Data Requirements and Reporting Procedures”](#) document, during the Annual Data Exchange (MOD-032) process. BPA provides TP CFR Customers with updated fault current or MVA values at their BES buses for the following types of faults: 3-phase, 1-phase-ground, 2-phase-ground, and phase-phase. The TP CFR Customer can use these values to perform their short circuit assessment. By comparing the fault current or MVA values with the ratings of their circuit breakers the TP CFR Customer can determine if their breakers have adequate interrupting capability.

If the circuit breakers’ ratings are not adequate, then a Corrective Action Plan (CAP) needs to be developed by the TP CFR customer and provided annually to BPA, with the TPL-001 Data Request, so they can be incorporated into BPA’s next annual Planning Assessment.

(R2.1.3) System Sensitivities (Steady State Studies)

In order to meet TPL-001-5 sub-requirement R2.1.3, BPA will request input from each TP CFR Customer on the sensitivity (ies) relevant for their system, for consideration in the annual planning assessment.

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(R2.6) Past Studies

BPA utilizes past studies where appropriate to complete the annual Planning Assessment. This is consistent with R2.6 of TPL-001-5 and BPA will ask TP CFR Customers annually whether there have been material changes to their transmission systems.

(R4.1 and R4.3) Stability Contingency Analysis

In order to meet TPL-001-5 sub-requirements R4.1 and R4.3, BPA will require input from each TP CFR Customer on the following items:

- R4.1.1 – Information regarding any Special Protection Systems.
- R4.3.1.1. Successful high speed (less than one second) reclosing and unsuccessful high speed reclosing into a Fault where high speed reclosing is utilized.
- R4.3.1.2. 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.
- R4.3.1.3. Tripping of Transmission lines and transformers where transient swings cause Protection System operation based on generic or actual relay models.
- R4.3.2. Simulate the expected automatic operation of existing and planned devices designed to provide dynamic control of electrical system quantities when such devices impact the study area. These devices may include equipment such as generation exciter control and power system stabilizers, static var compensators, power flow controllers, and DC Transmission controllers.

A Corrective Action Plan (CAP) is a list of actions, and an associated timetable for implementation to remedy a specific problem identified in a Planning Assessment. If BPA identifies a system deficiency on a TP CFR Customer's system, BPA will notify the TP CFR Customer of the issue in writing in conjunction with the TPL-001-5 Annual Data Request. The TP CFR Customer will be responsible for developing and implementing the CAP in order to remedy the deficiency. The TP CFR Customer will provide their CAP(s) to BPA in writing by May so that they can be accurately modeled in the subsequent annual Planning Assessment.

(Table 1 – P5) Steady State & Stability Planning Events

Annually, during the month of April BPA will request TP CFR Customers provide information on any non-redundant components of their Protection Systems. The data request will require information about equipment type, which Facility the equipment is associated with and whether the equipment is both monitored and reported at a Control Center.

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Annual Planning Assessment Data Coordination Matrix

In addition to supplying the data requested identified in the section(s) above, TP CFR Customers will be required to provide additional data about their BES assets in order for BPA to complete the annual Planning Assessment. The table below outlines the data that the TP CFR Customer is required to provide. CSRP will send out the data requests in the timeframes specified in table below.

Standard	Requirement	Request Title	Request Date	Response Due By	Frequency of Request
TPL-001-5	R1.1.4	Firm Commitments	April	May	Annual
TPL-001-5	R2.1.3	System Sensitivities (Steady State Studies)	April	May	Annual
TPL-001-5	R2.1.4 & R2.4.4	Selected known outages in the Near-Term Planning Horizon	April	May	Annual
TPL-001-5	R2.1.5 & R2.4.5	Spare Equipment Strategy Table	April	May	Annual
TPL-001-5	R2.3	Short Circuit Analysis (included in Annual Data Exchange (ADE))	October	November	Annual
TPL-001-5	R2.4.3	Suggested Sensitivity Cases (Stability Studies)	April	May	Annual
TPL-001-5	R4.1.1	Remedial Action Schemes	April	May	Annual
TPL-001-5	R4.3	Stability Contingency Analysis	April	May	Annual
Table 1 – P5	NA	Non-redundant Protection System Components	April	May	Annual

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Once all the data has been processed, CSRP will send a notification to the TP CFR Customers that all of the information necessary for the annual Planning Assessment has been received, and the TP CFR Customers have met their annual data request obligations.

Customer Compliance Packet

CSRP will consolidate the TP CFR Customer's Planning Assessment Appendix, Short Circuit Study, CAPs (when applicable) and TPL-001 Data Request response annually and distribute to the customer. The timing of the Compliance Packet will coincide with the completion and distribution of the annual Planning Assessment.

Annual Planning Assessment Distribution

Once completed, BPA will distribute the annual Planning Assessment results within 90 calendar days of completion to adjacent PCs, TPs, and it's RC. Due to the nature of the information contained in the assessment, BPA will require the recipients to sign a Federal Information Security Management Act (FISMA) attestation prior to receiving the annual Planning Assessment.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 0.1	7/10/18	Errata change: Grammar	L. Jones	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none">Moved requirement number to front of title for clarityChanged name from Customer Planning Assessment to Customer Compliance PacketIdentified delivery time for CAP's as annuallySystem Sensitivities will be considered in the annual assessmentChanged Long <u>Term</u> Outage to Long <u>Duration</u> OutageRemoved redundant statements in Short Circuit Analysis section7. Errata changes: Grammar changes and	L. Jones	3/26/19

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		used acronym for defined roles		
Rev. 2	8/1/20	<ul style="list-style-type: none"> Added section for Customer Compliance Packet, reworded language defining the TPL-001 Data Request Added R2.6 to the table of requirements that require Customer data. Removed reference to CEII – redefined Consolidated the language around the annual TPL-001 Data Request for each requirement 	L. Jones	8/12/20
Rev. 3	9/3/2021	<ul style="list-style-type: none"> Clarified Assessment Appendix in Compliance Packet. Short Circuit Analysis – Clarified bus fault data will be included in the annual MOD-032 data exchange process. Data Coordination Matrix – changed request date to January for R2.3. Removed redundant paragraph for annual Planning Assessment timeline. 	L. Cardoza	7/30/21
Rev. 4	11/1/22	<ul style="list-style-type: none"> Added Implementation timeline Updated standard and requirements for TPL-001-5 Updated Data Coordination Matrix Updated timeline of Short Circuit Analysis – now in ADE Added Table P5 to Data Coordination Matrix 	R. Sporseen	12/1/22

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TPL-007-4 – Transmission System Planned Performance for Geomagnetic Disturbance Events

BPA and CFR Customer Responsibility for TP requirements

The purpose of this Standard is to establish requirements for Transmission system planned performance during Geomagnetic Disturbance (GMD) events.

BPA will assume the Transmission Planner role for this standard, except for the requirements pertaining to the Corrective Action Plans (CAP). It is the TP CFR Customer's responsibility to ensure that all qualified transformers are included in the applicable models through the Annual Data Exchange (ADE) process. A qualifying transformer is defined per the standard as: *"Facilities that include power transformer(s) with a high side, wye-grounded winding with terminal voltage greater than 200 kV."*

The TP CFR customer will be responsible for R6 and R10 if the GIC flow value of qualifying transformers meets the threshold of 75 A per phase or greater for the bench mark GMD event, or 85A per phase or greater for the supplemental event. **At this time this is not applicable to any TP CFR participants.*

The TP CFR customer will be required to submit a CAP for R7 and R11 addressing how the performance requirements will be met, if the vulnerability assessment in R4 and R8 indicate a deficiency of the performance requirements. **Compliance for R7 and R11 is not until 2024 – no action required at this time.*

This standard has a phased implementation for compliance:

- Compliance Date for TPL-007-4 Requirements R1, R2, R5, and R9 – currently enforceable.
- Compliance Date for TPL-007-4 Requirements R12 and R13 – currently enforceable.
- Compliance Date for TPL-007-4 Requirements R6 and R10 – currently enforceable.
- Compliance Date for TPL-007-4 Requirements R3, R4, and R8 – January 1, 2023.
- Compliance Date for TPL-007-4 Requirement R7 and R11 – January 1, 2024.

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 0.1	7/10/18	Errata change: Grammar	L. Jones	7/10/18
Rev. 1	5/1/19	<ul style="list-style-type: none"> • Changed Standard reference to TPL-007-3 • Updated GIC flow verbiage • Updated assisting customer verbiage from SME • Errata change: Grammar 	L. Jones	3/26/19
Rev. 2	8/1/20	<ul style="list-style-type: none"> • Updated standard name to include version 4 – effective 10/1/2020 • Rewrote verbiage to include phased implementation • Errata change: Formatting 	L. Jones	8/12/20
Rev. 3	9/3/21	<ul style="list-style-type: none"> • Updated standard to TPL-007-4 • Updated TPL-007-4 Requirements R12 and R13 – currently enforceable 	L. Cardoza	7/30/21
Rev 4	11/1/22	<ul style="list-style-type: none"> • Updated TPL-007-4 Requirements R6 and R10 – currently enforceable 	R. Sporseen	12/28/22

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CFR Contract Exhibit Update Process

General Overview

The process for updating a contract exhibit within a TP CFR contract is triggered by a change in Equipment, Cost, Contact Information, and/or Requirement Updates in the CFR Matrix. The purpose of this process is to ensure that TP CFR contract exhibits are updated in a timely and consistent manner.

Annually in calendar year Q3, CSRP will validate the accuracy of all data within all exhibits and update as necessary.

Exhibit A, BES Equipment Subject to this Agreement Updates

TP CFR Customer shall notify CSRP by submitting the [System/Equipment Change Form](#) posted on BPA's [external website](#) prior to any change in BES equipment. Please CC your Customer Service Engineer (CSE). BPA will coordinate with the TP CFR Customer on BES determination. A change in BES equipment may include, but is not limited to the following:

- Adding new equipment
- Replacing or rebuilding existing equipment
- Upgrading equipment to have increased capacity or a higher rating
- Reconfiguring existing facilities (such as sectionalizing, bypassing, or modifying the layout of a substation)
- Adding, modifying, or removing Remedial Action Schemes or Special Protection Systems or other automatic controls that affect the BES
- Retiring or removing equipment

The TP CFR Customer's official notice of change must occur a minimum of 210 days and/or as formally agreed prior to the change.. More notice is preferred to ensure timely coverage of equipment in the planning or operations horizon. BPA will update Exhibit A – BES Equipment Subject to this Agreement to reflect equipment changes, share a draft with TP CFR Customer to ensure changes are captured accurately, and offer a revised exhibit for signature.

Exhibit B, Coordinated Functional Registration Matrix

Upon approval of any new Reliability Standard(s), change(s) to existing Reliability Standards, or retirement of existing Reliability Standards, the Parties shall confer regarding their respective compliance responsibilities for the new, revised, or retired Standard(s) and agree upon a revision to the CFR Matrix to address the new, revised, or retired Standard(s). The Parties shall complete the revision to the CFR Matrix prior to the mandatory enforceable date of the new, revised, or retired Standard(s). The revised CFR Matrix shall replace and supersede the previous version on a going-forward basis.

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Exhibit C, Billing Determinants Updates

Exhibit C updates will be driven by the annual cost reconciliation and cost allocation processes. TP CFR Customers will have the opportunity to review draft budget numbers at the fall/winter annual Customer meeting in the summertime timeframe. Exhibit revisions reflecting updated costs for the following calendar year will be finalized by October 1st.

Exhibit D, Notices Updates

Exhibit D notices updates can be triggered by either party any time there is an update to contact information. If TP CFR Customer information changes, TP CFR Customer will notify CSRP by submitting the [Notices Change Form](#) found on the [external website under the Transmission Planner dropdown](#). CSRP will update the exhibit and issue the revision. If BPA contact information changes, CSRP will issue a revised exhibit.

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none"> Added new language to the “Exhibit A, BES Equipment Subject to this Agreement Updates” section regarding customer coordination and customer notice of change Added in Ex. A / Ex. C form submission process with link to forms Identified Q3 as timeframe for exhibit validation Identified the CFR Matrix revision time to “30 days before mandatory date” Added Ex D Notices 	L. Jones	3/26/19
Rev. 2	8/1/20	<ul style="list-style-type: none"> Changed 90 day notice to 160 day notice per RC West timeline Added timeframe of fall/winter for annual cost review in billing determinants 	L. Jones	8/12/20
Rev. 3	11/1/22	<ul style="list-style-type: none"> Updated external links Changed from 160 to 210 days to accommodate RC West requirements Modified language to account for ‘emergency’ projects “210 days and/or as formally agreed” 	R. Sporseen	12/28/22
Rev. 4	11/1/24	<ul style="list-style-type: none"> Revised Billing determinants language to match the TOPIC Revised Notices Updates language 	A.Crisman	11/1/24

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CFR Cost Allocation

General Overview

TP CFR services costs are allocated across participating TP CFR Customers based upon peak load, the number of BES lines and buses covered under the contract, and the base charge spread across all TP CFR Customers.

The total costs to be recovered in each calendar year are based upon the forecast cost of incremental resources BPA hires to implement the service. Program costs will not include any penalties or fines assessed by the TP. The incremental resource cost is adjusted annually to reflect actual costs and projected changes for the upcoming calendar year. Based upon this adjustment, the program determines a net cost to be allocated across participating Customers.

Each calendar year's cost is split across four billing determinants. For example, in 2023, forty-four percent of the total cost is allocated to the base rate, twenty-two percent of the total cost is allocated based upon Customer load, and the remaining thirty four percent is split equally between lines and buses. Based upon the sum of all participating Customer loads and equipment, rates are derived per megawatt, per line, and per bus.

The derived rates are applied to each TP CFR Customer's specific load and equipment, the base charge is included, and the total becomes the TP CFR Customer's share of the annual cost.

Charges for BES equipment changes outside the annual billing cycle will be prorated beginning when the asset is energized. The BES Equipment List (Exhibit A) and Billing Determinants (Exhibit C) will be updated to reflect the TP CFR Customer asset changes. Changes will only apply to the asset owner and will not affect the overall cost allocation to each participating TP CFR Customer until the next year's billing cycle.

Process Steps

Step 1 – CSRP to pull the cost adjustment (over/under payment) from previous year(s) to update the Cost Spreadsheet.

Step 2 – CSRP will seek validation from the internal organizations with allocated resources. Each organization will forecast their resource needs for the upcoming calendar year.

Step 3 – CSRP to confirm TP CFR Customer assets with the TP CFR Customer and the Customer Service Engineer (CSE).

Step 4 – CSRP to update the calendar year Cost Spreadsheet.

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Example:

TITLE	2018 COSTS	2019 COSTS	2020 COSTS
Project Annual Cost	\$455,000	\$455,000	\$455,000
Actual Cost	\$375,000	\$490,000	
Over/Under payment from previous calendar year		<\$80,000> due to over collection in 2018	+\$35,000 due to under collection in 2019
Adjusted Calendar Year Projected Cost		\$375,000	\$490,000

Step 5 – The Cost Spreadsheet will calculate the new billing rates per:

- MW/cost (pulled from the previous calendar year FERC 714 report)
- Number of lines
- Number of Busses

* Base cost stays constant

Step 6 – CSRP will update and distribute all participating Exhibit C Billing Determinants no later than October 1st annually

- CSRP will roll out draft numbers in the late summer timeframe to the TP CFR Customers.
- CSRP will answer cost-related questions at the Fall/Winter Annual TP CFR Working Group Session.
- CSRP will forward any contract actions to the TP CFR Customer point of contact.

Step 7– Exhibit C – Billing Determinants will be effective on January 1st

Reference Material

- BPA FERC 714 Report
<https://transmission.bpa.gov/Business/Operations/FERC714/>

FERC-714 Use

The FERC-714 Annual Power System Reports is a collection of annual reports to FERC including generation capabilities & peaks, Balancing Authority area loads & interconnections, scheduled and actual interchange, Customer load peaks, and system load forecasts. For TP CFR Services contractual costs, BPA uses the highest peak demand (MW) load shown on the “PT III, Sch1” tab as part of the calculation for determining Customer annual rate.

General Responsibilities

The CSRP Program Manager has been assigned by the Tier II Manager whose organization has lead responsibility for sustaining, maintaining, and updating the Customer costs associated to

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the TP CFR Services performed by BPA for the life cycle of the contractual agreement. The Program Manager:

- a) Establishes the Rate for each calendar year.
- b) Ensures TP costs are communicated in a clear transparent manner.
- c) Provides continual emphasis on BPA's position of "Net-Zero."

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	7/18/18
Rev. 1	5/1/19	<ul style="list-style-type: none">Defined prorating for BES assetsUpdated language for Ex C "Billing Determinants"Errata change: Grammar	L. Jones	3/26/19
Rev. 2	8/1/20	Redefined timeframe of annual customer meeting to mirror TOPIC	L. Jones	8/12/20
Rev.3	8/1/24	<ul style="list-style-type: none">Updated outdated years as examples of billingUpdated the language in this section to mirror the cost section in the TOPIC	A.Crisman	6/15/24

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CFR Cost Reconciliation

General Overview

This is the process for identifying how costs and revenue (net zero) are reconciled from one year to the next. The purpose of this process is to ensure reconciliation of costs are performed consistently, to demonstrate the mechanics of how costs are reconciled, and to add transparency between BPA and its TP CFR Customers.

Reference Document

- BPA FERC 714 Report
<https://transmission.bpa.gov/Business/Operations/FERC714/>

Process Steps

1. Annually beginning in June, CSRP will begin the Cost Reconciliation process.
2. CSRP requests from Budget Office the allocated actuals (incremental to rate case) for CFTE/BFTE.
3. CSRP requests Customer Billing to run a report against the TP services contract number correlating to individual TP CFR Customers.
 - a. CSRP to Q/A Exhibit C (Billing Determinants) against participating transmission bill(s).
4. CSRP will seek validation from the internal organizations with allocated resources. Each organization will validate their resource expenditures for the current calendar year.
5. Each year, CSRP to compare numbers and maintain Cost Spreadsheet.
6. CSRP to calculate the over/under collection to be applied to the following calendar year.
7. The next year's rates will be estimated by July and locked down by October 1 annually.
8. CSRP will roll out draft numbers and answer any cost-related questions in the fall/winter TP Working Group Session.

General Responsibilities

The CSRP Program Manager has been assigned responsibility by the Tier II Manager for sustaining, maintaining, and updating the TP CFR Customer costs associated to the TP Services performed by BPA for the life-cycle of the contractual agreement.

CSRP Program Manager

- Establishes the Rate for each calendar year
- Ensures TP costs are communicated in a clear transparent manner
- Provides continual emphasis on BPA's position of "Net-0" rate

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	6/29/18	Initial process creation	L. Jones	6/29/18
Rev. 1	5/1/19	Errata changes: <ul style="list-style-type: none">• Combined process steps #8 and #9• Updated Program Manager (c)• Added rate to “Net-0”	L. Jones	3/26/19
Rev. 2	6/1/20	<ul style="list-style-type: none">• Removed Summer Customer meeting option, moving to just one annual Customer meeting	L. Jones	8/12/20
Rev. 3	8/1/24	<ul style="list-style-type: none">• Added FERC 714 resource link• Updated the language in this section to mirror the cost section in the TOPIC	A. Crisman	6/15/24

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Version Summary of Changes

This summary provides a high level view of the changes made throughout Section 1 – Coordinated Function Registration

Version	Action	Date
Rev. 0	Creation	July 2018
Rev. 1	<p>Changes were made to the following sections, see each version control block for details</p> <ul style="list-style-type: none"> • IRO-017 • TPL-001-4 • TPL-007-3 • Removed MOD-026/027 • MOD-032 • Exhibit Updates • Cost Allocation • Cost Reconciliation • Identified and defined CFR/GO customer 	March 2019
Rev. 2	<p>Changes were made to the following sections, see each version control block for details. <i>Note, this table does not include errata changes that correct grammar or help define a process. Please see redlines for these updates.</i></p> <ul style="list-style-type: none"> • Definitions • TPL-001-4 • TPL-007-3/4 • CFR Contract Exhibit Update Process • Cost Allocation (regarding customer meeting timeframe) • Cost Reconciliation (regarding customer meeting timeframe) 	August 2020
Rev. 3	<p>Changes were made to the following sections, see each version control block for details. <i>Note, this table does not include errata changes that correct grammar or help define a</i></p>	September 2021

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	<p><i>process. Please see redline for these updates.</i></p> <ul style="list-style-type: none"> • TPIP Updates & Revisions • CFR NERC Registration • FAC-002-3 • MOD-031-3 • MOD-032-1 • TPL-001-4 • TPL-007-4 	
Rev. 4	<ul style="list-style-type: none"> • MOD-020 • TPL-001-5 • TPL-007-4 • Ex A – Equipment • Ex D - Notices 	December 2022
Rev. 5	<ul style="list-style-type: none"> • FAC-002-4 • FAC-014-3 • MOD-004 • Cost Section 	November 2024

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SECTION 2 - GENERATOR OWNERS (GO)

Background

The Bonneville Power Administration (BPA) has determined that the most sensible and effective approach for achieving compliance with Transmission Planner (TP) related standards and/or requirements, is to offer flexible compliance options to Generator Owner (GO) Customers mapped to BPA as a Transmission Planner (TP).

BPA as TP for GO's

BPA accepting TP mapping from GO Customers will:

- Close existing planning gaps between the PC and registered GO's.
- Enhance reliability by formalizing the planning partnership.
- Clarify compliance responsibility between registered entities.
- Ensure that BPA as the PC/TP has the data necessary to adequately model the system.

Planning Assessment Data Coordination Matrix

TP GO Customers will be required to provide additional data about their BES assets in order for BPA to complete the annual Planning Assessment. The table below outlines the data that the TP GO Customer is required to provide BPA. CSRP will send out a data request in the timeframes specified below.

Standard	Requirement	Request Title	Request Date	Response Due By	Frequency of Request
TPL-001-5	R1.1.4	Customer Firm Commitments	April	May	Annual
TPL-001-5	R2.1.4 & R2.4.4	Selected known outages in the Near-Term Planning Horizon	April	May	Annual
TPL-001-5	R4.3	Stability Contingency Analysis	April	May	Annual
Table 1 – P5	NA	Non-redundant Protection System Components	April	May	Annual

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19
Rev. 1	9/3/21	Planning Assessment Data Coordination Matrix was added	L. Cardoza	7/30/21
Rev. 2	11/1/22	Updated data coordination table to reflect requirements for the new standard TPL-001-5	R. Sporseen	12/28/22

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GO STANDARDS

GO TP Customers retain responsibility for requirements that pertain to Non-Transmission Planner functions and are applicable to the GO TP Customer's registration status.

MOD-025-2 - Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability

GO TP Customer responsibility

The purpose of this standard is to ensure that accurate Generator gross and net Real and Reactive Power capability is available for planning models used to assess Bulk Electric System (BES) reliability.

GO's and TO's are required to provide data to their TP's under this standard. BPA gathers this data, as it is submitted, to ensure generator and synchronous condenser units are modeled accurately. In order to ensure the submittal process for this standard, NERC has established a 5 year testing schedule for applicable GO TP Customers to submit their test report data to BPA. BPA gathers data from GO TP Customers, where BPA is the TP, to enter into the WECC base case. In order to successfully gather this data, BPA requests its GO TP Customer coordinate testing schedules and data submissions as described in the BPA MOD-025/026/027 Model Validation Process in [Appendix 1](#).

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19
Rev. 1	9/3/21	Language added for 5 year testing schedule	L. Cardoza	9/3/21
Rev. 2	11/1/22	Removed 'quarterly' from the testing schedule, updated coordination language	R. Sporseen	12/28/22

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MOD-026-1 - Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions

GO TP Customer and BPA responsibility

The purpose of this Standard is to verify that the generator excitation control system or plant volt/var control function model (including the power system stabilizer model and the impedance compensator model) and the model parameters used in dynamic simulations accurately represent the generator excitation control system or plant volt/var control function behavior when assessing Bulk Electric System (BES) reliability.

BPA gathers data from GO TP Customers, where BPA is the TP, to enter into the WECC base case. In order to successfully gather this data, BPA requests its GO TP Customer coordinate testing schedules and data submissions as described in the BPA MOD-025/026/027 Model Validation Process in [Appendix 1](#).

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19
Rev. 2	11/1/22	Removed 'quarterly' from the testing schedule, updated coordination language	R. Sporseen	11/1/22

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MOD-027-1 - Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

GO TP Customer and BPA responsibility

The purpose of this Standard is to verify that the turbine/governor and load control or active power/frequency control model and the model parameters, used in dynamic simulations that assess Bulk Electric System (BES) reliability, accurately represent generator unit real power response to system frequency variations.

BPA gathers data from GO TP Customers, where BPA is the TP, to enter into the WECC base case. In order to successfully gather this data, BPA requests its GO TP Customer coordinate testing schedules and data submissions as described in the BPA MOD-025/026/027 Model Validation Process in [Appendix 1](#).

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19
Rev. 2	11/1/22	Removed 'quarterly' from the testing schedule, updated coordination language	R. Sporseen	11/1/22

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TPL-001-5 – Transmission System Planning Performance Requirements

GO TP Customer Responsibility

The purpose of this requirement is to establish Transmission System Planning Performance Requirements within the planning horizon to develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable contingencies.

This portion of the document represents the scope and schedule for the NERC TPL-001-5 annual Planning Assessment. CSRP will coordinate with each GO TP Customer to ensure that BPA has the information that is necessary to complete the annual Planning Assessment.

(R2.1.4 & R2.4.4) Selected known outages in the Near-Term Planning Horizon

GO TP Customers will provide information to BPA regarding known transmission and generation outages on their system during the Near-Term Planning Horizon (Year 1-5). This information will be included in the model as applicable for the annual Planning Assessment.

Annually, during the month of April, BPA will submit a written data request to GO TP Customers for a list of their known transmission and generation outages. The GO TP Customer will have 30 days from the time the request was sent to respond to the data request. If no response is received within the 30 day timeframe, the GO TP Customer is implicitly validating that there are no known transmission or generation outages scheduled during the Near-Term Planning Horizon. If there is no response, BPA will not model any outages for the GO TP Customer in that year's assessment.

(R1.1.4) Commitments for Firm Transmission Service and Interchange

GO TP Customer will provide information regarding their known commitments for firm transmission service or interchange.

Annually, during the month of April, BPA will submit a written data request to GO TP Customers for a list of their known firm transmission service and interchange obligations. The GO TP Customers will have 30 days from the time the request was sent to respond to the data request. If no response is received within 30 days then no firm transmission service or interchange obligations will be modeled for the GO TP Customer in that year's assessment.

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(R4.3) Stability Contingency Analysis

In order to meet TPL-001-5 Stability Contingency Analysis requirements, BPA will require input from each GO TP Customer for R4.3 and sub requirements:

- R4.3.1.1. Successful high speed (less than one second) reclosing and unsuccessful high speed reclosing into a Fault where high speed reclosing is utilized.
- R4.3.1.2. 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.
- R4.3.1.3. Tripping of Transmission lines and transformers where transient swings cause Protection System operation based on generic or actual relay models.
- R4.3.2. Simulate the expected automatic operation of existing and planned devices designed to provide dynamic control of electrical system quantities when such devices impact the study area. These devices may include equipment such as generation exciter control and power system stabilizers, static var compensators, power flow controllers, and DC Transmission controllers.

Annually, during the month of April BPA will submit a written data request to GO TP Customers for the information described above in order to meet requirement R4.3. The GO TP Customer will have 30 days to respond to the data request. If no response is received within 30 days, then BPA will apply the following assumptions for the GO TP Customer in that year's assessment: BPA will assume the GO's trip based on the voltage ride through Time Duration Curve in the NERC Standard PRC-024-3.

(Table 1 – P5) Steady State & Stability Planning Events

Annually, during the month of April BPA will request GO entities provide information on any non-redundant components of their Protection Systems. The data request will require information about equipment type, which Facility the equipment is located in and whether the equipment is both monitored and reported at a Control Center.

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19
Rev. 1	11/1/22	<ul style="list-style-type: none">• Updated standard and requirements for TPL-001-5• Updated Data Coordination Matrix• Added Table P5 to Data Coordination Matrix• Updated version to -3 on PRC-024• Removed 'quarterly from testing schedule for:<ul style="list-style-type: none">○ MOD-025○ MOD-026○ MOD-027	R. Sporseen	12/28/22

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Appendix 1

BPA MOD-025/026/027 Model Validation Process

Background

Accurate and up to date power plant models are essential for reliable and economic grid operation and planning. This BPA Process follows and supports existing and upcoming NERC Reliability Standards relating to MOD-025, MOD-026, and MOD-027 as indicated below to ensure data accuracy:

- NERC MOD-025 requires periodic verification of generator active power and reactive power capabilities
- NERC MOD-026 and MOD-027 standards require verification of dynamic models for excitation and turbine-governor controls respectively
- The Standards and BPA Process also require Transmission Planners (TP) to review the model data before it is included in the WECC dynamic data file.
- BPA will be the TP only for Generator Owners (GO) that have mapped to BPA in webCDMS and received a letter of confirmation that BPA is the TP for the GO.

This paper describes the process for GO TP Customers to coordinate and communicate with BPA to meet the requirements of the NERC standards referenced above.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19

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MOD-025-2 - Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability

GO's and TO's are required to provide data to their TP under this standard for Generators and Synchronous Condensers that are 20MVA and above, as well as for Aggregate Plant/Facilities that are 75 MVA and above. BPA gathers this data as submitted to ensure generator and synchronous condenser units are modeled accurately. In order to ensure the submittal process for this standard, NERC has established a five (5) year testing schedule for applicable GO TP Customers to submit their test report data to BPA. In order to successfully gather this data, BPA requests its GO TP Customers adhere to the testing schedules sent out by BPA's Customer Service Reliability Group (CSRP). In so doing, GO TP Customers will be able to submit their data in a timely manner and allow BPA the necessary time to process the data to be in compliance.

(R1-R2) GO TP Customer Requirements

GO TP Customer must provide verification of the Real Power capability of their applicable facilities by confirming the Real Power capability of their generating units in accordance with Attachment 1 from the NERC MOD-025-2 Standard. Additionally GO TP Customers must submit a completed Attachment 2 (see NERC MOD-025-2 Standard) to BPA within 90 calendar days of either:

- a. The date the data is recorded for a staged test or
- b. The date the data is selected for verification using historical data (if operational data for different points recorded on different days, designate earliest as verification date-new units must be verified within 12 months of commercial ops date).

Additionally, GO TP Customers shall provide to BPA, in accordance with Attachment 1 (see MOD-025-2 Standard) the Reactive Power capability of its generating units and the Reactive Power capability of its synchronous condenser units.

Data Submission Details

- Full data files from which a PQ curve can be constructed from (i.e. data from historical data archiving systems see ([PQ curve Figure for example](#))).
- Complete PQ curve showing Over Excitation Limit (OEL, which is not voltage dependent) and the Under Excitation Limit (UEL, which is voltage dependent).
- Units > 20 MVA at plant <75 MVA aggregate – individual or aggregate.

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- Units > 20 MVA must be verified individually.
- Check auxiliary equipment in-service for expected normal operation.
- AVR-in service for Q capability verification.
- Operational data within 2 years prior to verification date acceptable as long as it meets criteria and 90% of previous staged test.
- Previous test must have demonstrated at least 50% of D-curve Q capability.
- If previously test was unduly restricted, then another staged test is required:
 - For Hydrogen-cooled units, verify at normal operating hydrogen pressure.
 - Provide a simplified one-line diagram showing P and Q and associated connections of each unit verified, including:
 - GSU and/ or system interconnection and auxiliary transformers.
 - Show Q flow with directional arrows.
 - If metering does not exist, provide engineering estimate.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19

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MOD-026-1 - Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions

BPA gathers data from GO TP Customers, where BPA is the TP, to enter in to the WECC base case. In order to successfully gather this data, BPA requests its GO TP Customer adhere to the testing schedules sent out by BPA's Customer Service Reliability Group (CSRP). In so doing, GO TP Customers will be able to submit their data in a timely manner and allow BPA the necessary time to process the data to be in compliance. Additionally, in order to submit a valid test report, GO TP Customers must only use WECC approved models to verify their applicable units (see [WECC approved dynamic models for reference](#)) and submit the data in a dyd format (for examples of this format, please see the [attached dyd example](#)).

(R1) Acceptable Models and Sharing of Existing Model Data GO TP Customer Requirements

BPA as the TP will ensure that GO TP Customers have instructions for obtaining WECC's list of excitation control system or plant volt/var control function models and dynamic excitation control system or plant volt/var control functional model library block diagrams. In addition, BPA will provide existing unit specific model data already in use in models.

(R2 & R4) GO TP Customer Requirements

R2: GO TP Customer must provide a verified generator excitation control system or plant volt/var control function model based upon the data and timing requirements outlined below.

- GO TP Customer will be required to follow a schedule for model validation that BPA will maintain. Initial dates for model submissions will be based on past submission dates and BPA's need to manage workload.
- BPA requests that the GO TP Customer follow the 10 year schedule and not submit model validation reports before their due date unless pre-arranged with BPA.
- Revised model data or plans as determined in R4 of the standard should be submitted to BPA as soon as available.

The model data must be in the format used by General Electric's PSLF program (a powerflow tool used by WECC). Also, model data must use WECC-approved dynamic models, with bus numbers, unit names, and IDs matching the WECC model database. If a GO TP Customer does not have this information readily available, they can request instructions on how to obtain the latest approved model list and associated block diagrams from the TP.

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Data Submission Details

- Accurate parameter heading of applicable WECC approved models used.
- WECC Approved Generator, Exciters, Governor and Power System Stabilizer to accurately represent units.
- Documentation demonstrating the applicable unit's model response matches the recorded response for a voltage excursion from either a staged test or a measured system disturbance.
- Manufacturer, model number (if available), and type of the excitation control system including, but not limited to static, AC brushless, DC rotating, and/or the plant volt/var control function (if installed).
- Model structure and data including, but not limited to reactance, time constants, saturation factors, total rotational inertia, or equivalent data for the generator.
- Model structure and data for the excitation control system, including the closed loop voltage regulator if a closed loop voltage regulator is installed or the model structure and data for the plant volt/var control function system.
- Compensation settings (such as droop, line droop, differential compensation) if used and model structure and data for power system stabilizer, if so equipped.
- Corrected model data including the source of revised model data such as discovery of manufacturer test values to replace generic model data or updating of data parameters based on an on-site review of the equipment.

Where to Submit Reports

GO TP Customers submit Generator Data Report (GDR) to BPA CSReliabilityProgram@bpa.gov. GDR submittal should include the Power Plant Model Data Report and Baseline Model Development Report / Model Validation Report for BPA to perform model data review.

(R6) BPA's Response to GO TP Customer Data Submission

BPA will provide a written response to the submitting GO TP Customer within 90 calendar days of receipt of a verified model in accordance with Requirement 2, that the model was usable or not usable, as well as instructions on how to obtain the list of excitation control system or plant volt/var control function models that are acceptable for use in dynamic simulation.

BPA will provide instructions on how to obtain the dynamic excitation control system or plant volt/var control function model library block diagrams and/ or data sheets for acceptable models. Lastly, BPA will also provide model data for any of the GO TP Customers existing

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applicable unit specific excitation control system or plant volt/var control function contained in its dynamic database from the current (in-use) models, including generator MVA base.

BPA will submit the verified GDR to WECC's staff associated with an indication of complete or incomplete and notify the GO TP Customer.

If the model is not usable, BPA will provide a technical description of why the model is not usable.

Synchro-phasor Data Validation

BPA has installed Phasor Measurement Units (PMU) at Point-of-Interconnection at many power plants. BPA uses the data for generator model validation and performance assessment when available. BPA will formally notify the GO TP Customer if PMU data shows significant differences between modeled and observed power plant responses to grid disturbances.

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19
Rev. 1	9/3/21	Language added to emphasize BPA's request that GO's adhere to the 10 year model validation schedule.	L. Cardoza	7/30/21

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MOD-027-1 - Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

BPA gathers data from GO TP Customers, where BPA is the TP, to enter in to the WECC base case. In order to successfully gather this data, BPA requests GO TP Customers to adhere to the testing schedules sent out by BPA's Customer Service Reliability Group (CSRP). In so doing GO TP Customers will be able to submit their data in a timely manner and allow BPA the necessary time to process the data to be in compliance. Additionally, in order to submit a valid test report, GO TP Customer must only use WECC approved models to verify their applicable units (see [WECC approved dynamic models document](#)) and submit the data in a dyd format (for examples of this format, please see the [attached dyd example](#)).

(R1) Acceptable Models and Sharing of Existing Model Data

BPA as the TP will ensure that GO TP Customers have instructions for obtaining WECC's list of turbine/governor and load control or active power/frequency control system models that are acceptable to BPA as the TP. If model data for the GO TP Customer exists in the dynamic database, BPA will provide that data to the GO TP Customer.

(R2 & R4) GO TP Customer Requirements

GO TP Customers must provide a verified turbine/governor and load control or active power/frequency control model, (for each applicable unit) to BPA as the TP as outlined below:

- GO TP Customers are required to follow a schedule for model validation that BPA will maintain. Initial dates for model submissions will be based on past submission dates and BPA's need to manage workload.
- BPA requests that the GO TP Customer follow the 10 year schedule and not submit model validation reports before their due date unless pre-arranged with BPA.
- Revised model data or plans as determined in R4 of the standard should be submitted to BPA as soon as available.

Data Submission Details

- Accurate parameter heading of applicable WECC approved models used.
- WECC Approved Generator, Exciters, Governor and Power System Stabilizer to accurately represent units.
- Document and data for each applicable unit, a verified turbine/governor and load control or active power/frequency control model.

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- Documentation comparing the applicable units MW model response to the recorded MW response for either:
 - A frequency excursion from a system disturbance that meet the specifications highlighted in MOD-027 Attachment 1 Note 1, with the applicable unit on-line
 - A speed governor reference change with the applicable unit on-line or
 - A partial load rejection test
 - Type of governor and load control or active power control/frequency control equipment.
 - A description of the turbine (e.g. for hydro turbine – Kaplan, Francis or Pelton; for steam turbine – boiler type, normal fuel type and turbine type; for gas turbine – the and manufacturer; for variable energy plant – type and manufacturer)
 - Model structure and data for turbine/governor and load control or active power/frequency control and
 - Representation of the real power response effects of outer loop controls (such as operator set point controls and loads but excluding AGC control) that would override the governor response (including blocked or nonfunctioning governors or modes of operation that limit Frequency Response), if applicable.

(R5) BPA's Response to GO TP Customer Data Submission

BPA will provide a written response to the submitting GO TP Customer within 90 calendar days of receipt of a verified model in accordance with R2 that the model was usable or not usable. BPA will also provide instructions on how to obtain the list of turbine/governor and load control system or active power/frequency control system models that are acceptable to the TP for use in dynamic simulation.

BPA will provide instructions on how to obtain the dynamic turbine/governor and load control or active power/frequency control function model library block diagrams and/or data sheets for acceptable models. Lastly, BPA will provide model data for any of the GO TP Customer's existing applicable unit specific turbine/governor and load control or active power/frequency control system contained in its dynamic database from the current (in-use) models, including generator MVA base.

If the model is not usable, BPA will provide a technical description of why the model is not usable.

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Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Jones	5/1/19
Rev. 1	9/3/21	<ul style="list-style-type: none">• Planning Assessment Data Coordination Matrix added• MOD-026 and MOD-027 content updates	L. Cardoza	9/3/21
Rev. 2	11/1/22	<ul style="list-style-type: none">• Updated standard and requirements for TPL-001-5• Updated Data Coordination Matrix• Added Table P5 to Data Coordination Matrix• Updated Approved Dynamic Models link	R. Sporseen	12/28/22

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PQ Curve Figure Example

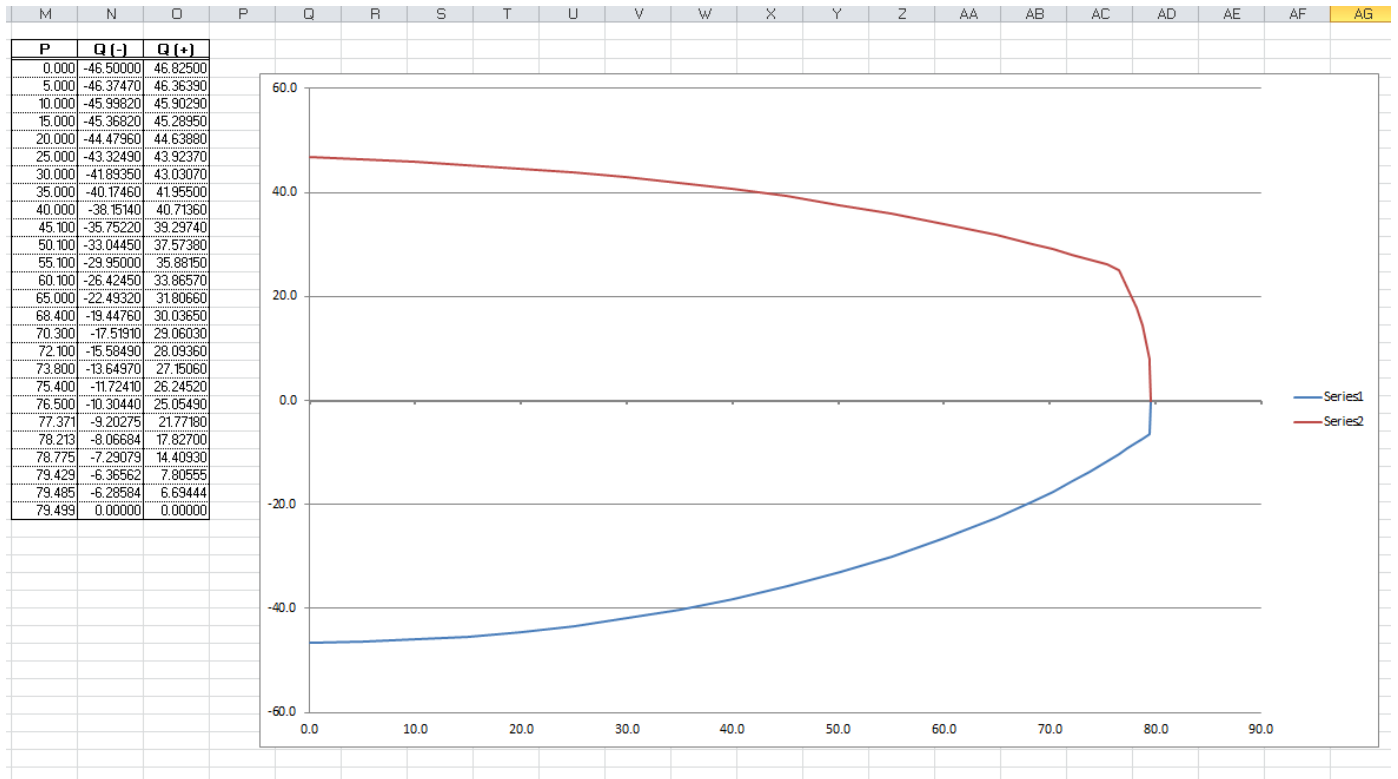


Figure 1. P-Q Curve Data Example

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Reference

[WECC Approved Dynamic Model Library](#)

Version History

Version	Issue Date	Action/Changes	Approved	Date
Rev. 0	5/1/19	Initial process creation	L. Cardoza	5/1/19
Rev. 1	9/3/21	Updated WECC links	L. Jones	9/3/21

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Version Summary of Changes

This summary provides a high level view of the changes made throughout Section 2 – Generator Owners

Version	Action	Date
Rev. 0	Creation	March 2019
Rev. 1	Changes were made to the following sections, see each version control block for details. <i>Note, this table does not include errata changes that correct grammar or help define a process. Please see redlines for these updates.</i> <ul style="list-style-type: none">• Planning Assessment Data Coordination Matrix• MOD-025-2• Appendix 1	September 2021
Rev. 2	Changes were made to the following sections, see each version control block for details. <i>Note, this table does not include errata changes that correct grammar or help define a process. Please see redlines for these updates.</i> <ul style="list-style-type: none">• TPL-001-5	December 2022