

BC Hydro Planning Coordinator Qualified Change Definition and Determination Process

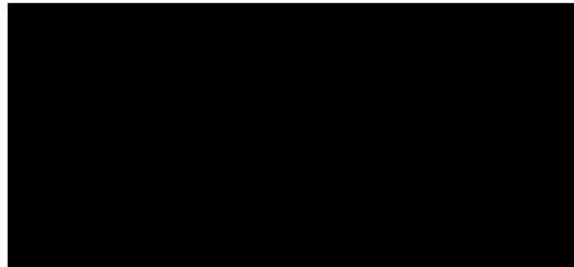
FAC-002-4 Facility Interconnection Studies, Requirement R6

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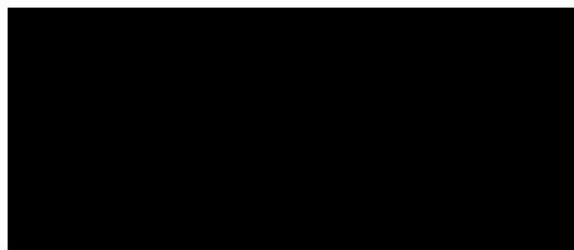
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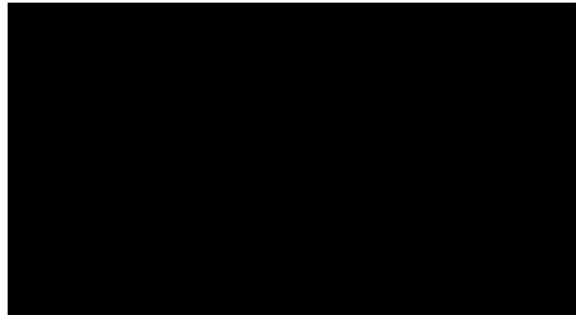
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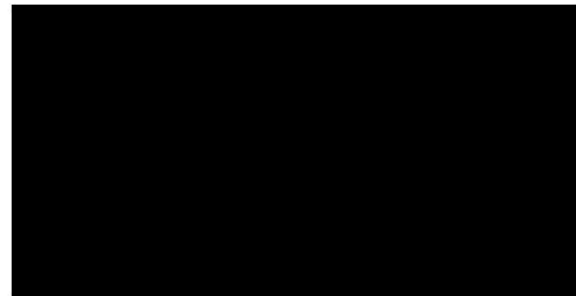
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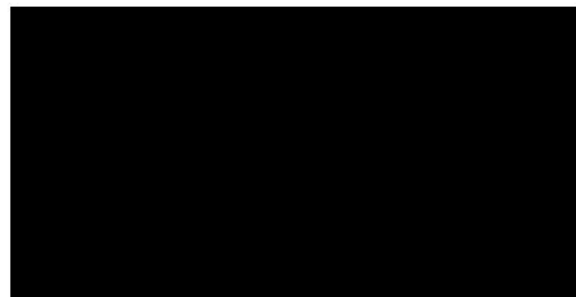
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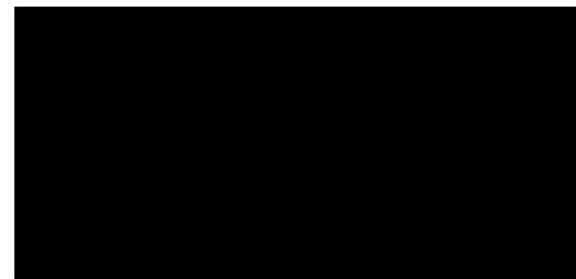
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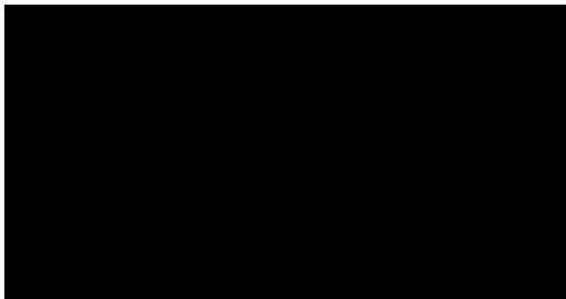
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1 Purpose

This document defines the potential “Qualified Change¹” in the Bulk Electric System within the BC Hydro Planning Coordinator area and provides a process to determine qualified change. The BC Hydro is registered as a Planning Coordinator (PC) and therefore is required to publicly post the definition in accordance with NERC Reliability Standard FAC-002-4, Requirement R6. This document is applicable to all facilities located within the BC Hydro Planning Coordinator area that may potentially impact the interconnected Bulk Electric System.

2 Definitions

A “Qualified Change” is any modification to an existing interconnection of generation, transmission, or end-user facility that may adversely impact the reliability of the Bulk Electric System. This includes changes that alter network topology, facility ratings, short circuit capacity, power flow patterns, dynamic response characteristics, power system stability, or protection coordination. Exclusions apply for identical replacements and changes within contractual limits. Examples of Qualified Change and exclusions are provided in Section 6.

Entities proposing such changes must coordinate with the applicable Transmission Planner (TP) and Planning Coordinator (PC) to assess reliability impacts prior to implementation. Entities need to contact through BC Hydro Interconnections Group for this purpose.

3 Scope

This document establishes the criteria used by BC Hydro, as the Planning Coordinator, to identify Qualified Changes to existing interconnected facilities that may impact the reliability of the Bulk Electric System within the BC Hydro Planning Coordinator Area for the purposes of FAC-002-4 Requirement R6.

4 Applicable Entities

This document applies to BCUC-registered Mandatory Reliability Standards (MRS) Entities, including Transmission Planners (TPs), Transmission Owners (TOs), Generator Owners (GOs),

¹ The term Qualified Change replaces the definition of ‘materially modified’ used in previous versions of the FAC-002 standard.

Applicable Generator Owner, and Distribution Providers (DPs) within the BC Hydro Planning Coordinator area. It is developed in alignment with NERC Reliability Standard FAC-002-4, Requirement R6, and the BC Mandatory Reliability Standards Program to ensure consistent application of reliability impact assessments for Qualified Changes.

5 Effective Date and Document Version Control

This document is effective on October 1, 2026, and will remain effective until superseded or retired. This document will be available from the following publicly accessible locations:

1. British Columbia Coordinate Planning Group website:

<https://www.bccpg.com/home.html>

2. BC Hydro Transmission Voltage Customer Interconnection Information website:

<https://app.bchydro.com/accounts-billing/electrical-connections/load/transmission.html>

3. BC Hydro Transmission Generation Interconnection Information website:

<https://app.bchydro.com/accounts-billing/electrical-connections/transmission-generator-interconnections.html>

6 List of Potential Qualified Change by Facility Type

6.1 Generating Facilities

A Qualified Change for a generating facility (i.e. generation customer facility) must be evaluated to ensure continued system reliability and compliance with applicable planning standards. Qualified Changes include, but are not limited to, changes to generator output capability or power factor, modifications to the Generator Step-up Transformer (GSU), updates to control models or parameters, protection and control system changes, Inverter-Based Resource (IBR) control or model changes, and sustained deviations or changes in governor or exciter performance.

Representative examples of Generating Facility Qualified Changes are provided in **Table 1** below.

For third-party Generator Owner entities within the BC Hydro Planning Coordinator (PC) area, please submit all qualified change requests for existing generation to transmission.generators@bchydro.com. For internal BC Hydro generation facilities, existing processes and procedures should be followed for any potential qualifying change requests.

Table 1: Qualified Changes for Generation Facilities

Category	Examples of potential qualified changes
Generator: Change in Generator Output	- Real and reactive maximum capability change: ≥10% of the nominal unit rating for generators with ratings ≥50 MVA; ≥ 5MVA of the nominal unit rating for generators with ratings < 50 MVA. - Energy purchase agreement (EPA) update resulting to capacity limit change for example ≥10% of nominal limit - Rated power factor change - Add/remove reactive compensation, black start or sync condenser function
Generator: Change in Generator Characteristics	- Machine refurbishment/replacements that modifies generator steady state and dynamic performance characteristics - MOD-025/026/027 driven response changes - Model/equipment parameter changes and correction of generator, governor, exciter, power system stabilizer (PSS), IBR's inverter controls
GSU / Interconnection	- Generator step-up (GSU) transformer modifications including change in MVA, voltage, winding configuration, or positive sequence impedance - Point Of Interconnection (POI) change - High voltage side of network topology changes/electrical connection changes - Temporary or unplanned changes to station equipment or configuration lasting longer than 6 months

Governor or governor settings	• Refurbish or replace governor system • Any temporary, permanent or unplanned changes causing frequency response change lasting > 6 months
Exciter or Excitation system	• Refurbish or replace excitation system • Any temporary, permanent or unplanned changes causing voltage response change lasting > 6 months
Change in power system stabilizer	▪ Add/remove PSS • PSS setting changes
Change in Protection System of the generator facilities or generator interconnection facilities	• PRC-024 qualifying frequency and voltage relay setting changes • Other protection system changes that may alter how generator operates or disconnects from the BES
Inverter Based Resource (IBR) Only: Change in Inverter or inverter settings	• Hardware, software, firmware, control mode, setting changes that alter the dynamic or static response characteristics of the IBR unit(s) or facility • Control methodology changes or update including but not limited to inertia, fast frequency response, virtual inertia etc. • Electromagnetic Transient (EMT) model change
Exclusions	▪ One-for-one or like-for-like equipment replacements with a documented technical evaluation which demonstrate identical ratings and static or dynamic response characteristics. ▪ Generation output demand changes within the existing contractual limits (EPA). ▪ Civil work with no electrical impact (e.g., foundation, painting).

6.2 Electricity End-User Facilities

A Qualified Change for an electricity end-user facility² refers to any modification to demand, configuration, equipment, protection and control systems, Facility topology or operating characteristics that could affect the reliable operation of the interconnected BES. Such changes may require a system impact assessment, including technical studies and the development of mitigation measures, in accordance with BC Hydro's interconnection and planning processes.

These changes may influence active or reactive power flows, dynamic performance, or power quality (e.g., harmonic performance) at the point of interconnection, and must be evaluated to ensure continued system reliability and compliance with applicable planning standards. Qualified Changes include, but are not limited to, significant increases in demand (real power or reactive power), installation or removal of major equipment, modifications to protection and control schemes, changes in load characteristics, and topology changes that affect system interaction with the BES.

Representative examples of End-User Facility Qualified Changes are provided in **Table 2** below.

For third-party End-User entities within the BC Hydro Planning Coordinator (PC) area, please submit all qualified change requests for existing loads to:

large.industrial.connections@bchydro.com

Table 2: Qualified Changes for End-User Facilities

Category	Examples of potential qualified changes
All Facilities: Increase in Load Demand and Load Characteristics	▪ Annual capacity demand increase > 10% ▪ Electricity Supply Agreement (ESA) limit change of any amount ▪ Point Of Interconnection (POI) change ▪ Station configuration changes.

² Electricity end-user facilities include load-serving/customer facilities that consumes electricity (active or reactive power) rather than generating or transmitting it, such as large industrial plants, data centers, refineries, manufacturing facilities, commercial loads, other customer-owned facilities interconnected to the transmission system or otherwise significant enough to warrant interconnection studies.

	▪ Equipment add/remove affecting composite load model ▪ Load type or characteristics change affecting harmonics or transients ▪ Addition/removal of reactive power compensation (e.g., capacitors, reactors, STATCOMs, SVCs). ▪ Temporary or unplanned reactive support device changes lasting > 6 months
All Facilities: End-User Facility Topology Changes	▪ Changes affecting BES power flows ▪ Interruptible load behavior changes during peak periods ▪ Addition of behind-the-meter generation > 0.5 MW for load displacement
All Facilities: Harmonic Level Changes	▪ Add/remove steel casting, smelter, and electronic (variable frequency drives, computational data center) loads
All Facilities: Protection or control scheme/settings Changes	▪ Protection or control scheme/setting changes that impact system performance (e.g., UVLS settings, coordination, tripping behavior, ATS, VSI blocking schemes)
Industrial Facilities: Addition or change of equipment that would significantly impact composite Load Model Impact	▪ Installing motor ≥ 1000 hp (0.73 MW) ▪ Adding motor larger than all others in existing facility with ≥ 500 hp (0.36MW) motors ▪ Changing motors ≥ 1000 hp (0.73 MW) to different operating scheme e.g. from direct-on-line to variable frequency drive and vice versa.
Computational Load Facilities (AI, Conventional Data Centers, HPF, Crypto)	
Load Demand Changes	▪ Any addition or modification resulting in $\geq 10\%$ of active or reactive power demand change relative to the previously studied values
Load Characteristics & Dynamic Performance	▪ Changes in control schemes, protection, or operational characteristics ▪ Active or reactive power ramp rates, load factor, reactive power change ratio etc.

	- Modifications to ride-through, uninterruptible power supply (UPS)/inverter, Battery Energy Storage System (BESS), or reconnection settings affecting: - Dynamic system performance - Voltage/frequency response - Common-mode tripping behavior Fault ride through characteristics
Model Validity & Operational Changes	- Observed events, disturbances, or commissioning results indicating model inaccuracies - Model validation findings showing mismatch with actual performance - Repurposing³ of facility to significantly different computational application than originally studied
All Facilities: Exclusions	- One-for-one or like-for-like end user equipment replacements with a documented technical evaluation which demonstrate identical ratings and static/dynamic characteristics. - Civil work with no electrical impact (e.g., foundation, painting).

6.3 Transmissions Facilities

Qualified changes to a transmission facility include modifications to the electrical characteristics, protection and control systems, or network configuration of transmission elements that could affect the reliable operation of the interconnected BES. Such changes may require a system impact assessment, including technical studies and the development of mitigation measures, in accordance with BC Hydro's interconnection and planning processes.

These changes may impact parameters such as thermal rating, impedance, frequency or voltage stability margins, voltage levels, protection coordination, and system topology, and must be

³ For example, altering the computational load facility from a data warehouse or crypto mining facility to an Artificial Intelligence (AI) training facility.

evaluated to ensure continued reliable operation and compliance with applicable planning standards. Qualified Changes include, but are not limited to, significant increases or decreases in thermal ratings, changes to impedance, modifications to voltage class, alterations to protection coordination or fault-clearing performance, and topology changes that affect BES power flows. Representative examples of Transmission Facility Qualified Changes are provided in Table 3 below.

For third-party Transmission Owners within the BC Hydro Planning Coordinator (PC) area, please submit all qualified change requests for existing transmission facilities to large.industrial.connections@bchydro.com and PlanningCoordinator@bchydro.com.

Table 3: Qualified Changes for Transmission Facilities

Category	Examples of potential qualified changes
Change in Rating	- Thermal rating change > 5% - Impedance change > 5% - Nominal voltage class change
Change in Protective Device Coordination	- Protection scheme or setting changes affecting switching - Protective device modification or replacement resulting in fault clearing duty or speed changes
Change in topology	Network topology change affecting BES active or reactive power flows
Exclusions	- One-for-one or like-for-like equipment replacements with a documented technical evaluation which demonstrate identical ratings and static/dynamic characteristics. - Civil work with no electrical impact (e.g., foundation, painting).

7 Qualified Change Determination Process

Note: Requirement R6 does not obligate the Planning Coordinator to establish or provide a structured process or governance framework. Rather, it expects facility owners⁴ to coordinate and cooperate with the applicable Transmission Planner and Planning Coordinator in a structured manner when seeking to comply with Requirements R2 through R5. To promote consistency and efficiency, this section provides a recommended high-level process for identifying potentially Qualified Changes and coordinating with the applicable Transmission Planner and Planning Coordinator as per requirement R2 to R5. Facility owners that already have established internal processes may continue to use those processes. Facility owners that do not have an established process are encouraged to consider the high-level process described in this section when determining the potential Qualified Change.

The purpose of the Qualified Change determination process is to identify proposed modifications to the existing facilities that could impact system reliability of the BES while ensuring that only those modifications meeting the Qualified Change criteria are subjected to the planning assessment requirement of FAC-002-4 R1.

Prior to implementing any modification to an existing generation, transmission and distribution facilities, the facility owner shall evaluate the proposed change against the Qualified Change criteria identified in **Section 6** of this procedure. The evaluation shall be performed upon accumulative changes to the generating facility, and the result shall be documented and retained in accordance with the organization's evidence retention requirements.

The facility owner is responsible for making the initial determination of whether a proposed modification is a potential Qualified Change. Where uncertainty or technical ambiguity exists, the facility owner should consult the mapped Transmission Planner (TP) for technical guidance before implementation.

If the proposed modification is determined to be a potential Qualified Change, the facility owner shall notify the applicable Transmission Planner and provide sufficient technical information to support the planning assessment. The Transmission Planner after completion of its assessment, shall conclude its agreement or disagreement with those suggested by the facility owner.

⁴ Facility owner term used in this document refers to the Generator Owners, Transmission Owners, Distribution Providers and Applicable Generator Owners

If the facility owner concludes that a proposed modification is not a Qualified Change, but the modification could reasonably be interpreted as meeting one or more criteria identified in **Section 6**, the facility owner should document the technical basis for its determination and seek technical support from the Transmission Planner when necessary. The Transmission Planner may request additional information to perform its own technical review before confirming a qualified change.

The following process shall be followed to determine Qualified Change:

1. Internal Screening

- The facility owner shall review each proposed facility modification upon an accumulative basis with the appropriate internal subject matter experts.
- The proposed modification shall be evaluated against the Qualified Change criteria in **Section 6** of this document.

2. Potential Qualified Change

- If the proposed modification meets, or may meet, the Qualified Change criteria, the facility owner shall notify the applicable Transmission Planner and provide the necessary technical information.
- The Transmission Planner shall conclude its agreement or disagreement with those suggested by the facility owner .

3. Not a Qualified Change

- If the facility owner determines that the proposed modification is not a Qualified Change, the basis for the determination shall be documented.

4. Uncertain Determinations

- Where the facility owner is unable to determine whether a proposed modification constitutes a Qualified Change, the matter shall be referred to the applicable Transmission Planner for technical guidance before implementation.

5. Transmission Planner Review

- The Transmission Planner is responsible for studying the reliability impact for an applicable facility, a new interconnection, or a Qualified Change to an existing interconnection, as required under FAC-002-4 Requirement R1.

- The Transmission Planner may request that the facility owner submit a consolidated review of planned changes when multiple changes are occurring within the same plant.
- If the TP determines the modification is a Qualified Change, the facility owner shall initiate an interconnection study as per BC Hydro's interconnection processes.

8 Periodic Review

This document shall be reviewed when either one of the following occurs:

1. Changes to the requirements when the standard is updated.
2. There is input from the stakeholders that require revision of this document.
3. Changes to the BC Hydro Planning Coordinator's roles and responsibilities.
4. Changes to the BC Hydro business need that requires revision of this document.
5. Any changes identified in the document during the course of PC Function

9 Contact Information

If you have any questions, please contact BC Hydro Planning Coordinator at planningcoordinator@bchydro.com

10 Appendix – List of Relevant Documents

1. **FAC-002-4 – Facility Interconnection Studies:**
<https://www.nerc.com/globalassets/standards/reliability-standards/fac/fac-002-4.pdf>
2. **NERC Implementation Guidance for FAC-002-4, R6 Qualified Changes**
<https://www.nerc.com/globalassets/programs/compliance/compliance-guidance/implementation/fac-002-4-r6-definition-of-qualified-change-2020-05-sdt.pdf>