TSP Data Management Procedures

Report No. SPA2008-53

Transmission and Station Planning (TSP)

BC Hydro - Asset & Investment Management

Revision 6

REVISION HISTORY

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Revision 6 20-July-2017	Tito Inga-Rojas	Format changes and minor clean-ups

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I. TSP Data Management Procedures

A. Introduction

This document outlines BC Hydro's Transmission and Station Planning (TSP) data management procedures in order to:

- Support BC Hydro's transmission planning business processes (growth capital planning, station planning, interconnection planning and performance planning),
- Address WECC steady-state and dynamic data model requests, and
- Comply with NERC MRS Standards that deal with data modelling for transmission planning and reliability assessment. These are:

    1. NERC Standard MOD-010 requires to establish consistent data requirements, reporting procedures, and system models of Steady-State data for modelling and simulation of the interconnected transmission system

    2. NERC Standard MOD-012 requires to establish consistent data requirements, reporting procedures, and system models of Dynamic data for modelling and simulation of the interconnected transmission system

    3. NERC Standard MOD-026-1 requires 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 behaviour when assessing Bulk Electric System (BES) reliability.

    4. NERC Standard MOD-027-1 requires to verify that the turbine/governor and load control or active/frequency control model and the model parameters used in dynamic simulations that assess BES reliability, accurately represent the generator unit real power response to system frequency variations.

    5. NERC Standard MOD-031-1 requires to ensure that various forms of historical and forecasted demand and energy data and information is collected to support reliability studies and assessments.

Where applicable, NERC Reliability Standards Requirements, for which compliance is monitored, are referenced. This procedure document has been prepared by TSP's Power System Modelling Group, which has certain responsibilities as described in this document. Other TSP process groups, Growth Capital Planning, Station Planning, Interconnections Planning, and Performance Planning also have responsibilities as described in this document.

Section II of this report addresses Steady-State data requirements for modelling and simulation of the interconnected transmission system. Section III addresses Dynamic data requirements for modelling and simulation of the interconnected transmission system. Section IV addresses WECC stead-state and dynamic data request. Section V addresses verification of dynamic data for generating units. Section VI addresses WECC requirements for data reporting for load and generation resources. Sections VII and VIII address NERC/WECC/CEA requirements for data reporting for reliability assessment.

Bold text indicates a process, procedure, or documentation that is specifically required for compliance with NERC Reliability Standards. The specific Standard and Requirement is identified.

B. Roles and Responsibilities

- The Power System Modelling Group is responsible for compiling the data and making the base cases available to support all the transmission planning processes of BC Hydro and the analysis and reliability assessment of BC Hydro's transmission system.

- The Power System Modelling Group is responsible for ensuring that load and resource forecast data provided by LSE (Load Serving Entities) and Resource Planners, such as BC Hydro and Fortis BC, are accurately represented in the base cases. In case of data inconsistencies and/or inaccuracies, the Power System Modelling Group will work with the LSE and Resource Planners to resolve the data issues.

- Transmission planners from the growth capital planning, station planning, interconnection planning and performance planning groups are responsible for providing to the Power System Modelling Group complete and timely model data updates for new or planned facilities.

- Transmission planners are responsible for reporting to the Power System Modelling Group of any data errors discovered during the normal course of doing studies. These errors will be corrected by the Power System Modelling Group and implemented in the next release of base cases.

- The Power System Modelling Group is responsible for enhancing the data models and performing data clean-ups on an on-going basis. Consultation with the transmission planners will be done as required.

- The Power System Modelling Group is responsible for delivering customized study base cases to the transmission planners as per specifications in their Study Data Service Request. The Power System Modelling Group will work with the

transmission planner to clarify the specifications and deliverables as per the scope of the work.

II. Steady-State Data for Modeling and Simulation

A. Introduction

In order to support BC Hydro's transmission planning business processes (growth capital planning, station planning, interconnection planning and performance planning), address WECC data model requests and comply with NERC MRS standards related to data modelling, there is a need for developing a comprehensive steady-state data requirements and reporting procedures to model and analyze the steady-state conditions of BC Hydro's transmission system.

B. BC Hydro Power Flow Base Cases

TSP's Power System Modelling Group uses a base case management infrastructure with repository and versioning control capabilities to maintain steady-state and dynamic data models. Using this infrastructure a power flow base case is created for a particular representation of the BC Hydro system. The attributes of a power flow base case are:

a. Load Level Groups –
   i. Bulk
   ii. Division
   iii. Region
   iv. Area
   v. Zone
   vi. Station

b. Application –
   i. Bulk Planning Studies – Bulk (b) cases based on system coincident load.
   ii. Division and Inter-Region Planning Studies – Division (d) cases based on coincident division load groups.
   iii. Region and Inter-Area Planning Studies – Region (r) cases based on coincident region load groups.
   iv. Area and Region Planning Studies – Area (a) cases based on coincident area load groups.
   v. Sub-area and Area Planning Studies – Zone (z) cases based on coincident zone load groups.
   vi. Station and Localized Radial Supply Planning Studies – Station (s) cases based on station peak (non-coincident) loads.

c. Season –
    i. Heavy Winter
    ii. Light Winter
    iii. Heavy Summer
    iv. Light Summer

d. Resolution –
    i. Each year for the next 10 years.

e. Reference forecasts –
    i. 1-in-2 probability forecast (Mid-Forecast or P50) for bulk studies only
    ii. 1-in-10 probability forecast (High-Forecast or P90) for all studies except bulk

f. Demand Side Management (DSM) impact –
    i. With DSM
    ii. No DSM

g. Load Scaling Methodology –
    i. Using Load Coincident Factors

h. Transmission and Station Equipment Power Flow Data Models –
    i. Bus (substation, load): name, voltage, active and reactive power demand (MW, MVAr), etc.,
    ii. Generating units: bus location, minimum and maximum ratings (net MW and MVAr values), status, regulating bus, voltage setpoint, etc.,
    iii. AC Transmission circuit (overhead and underground): voltage, impedance, line charging, normal and emergency ratings, status, metering locations, etc.,
    iv. Transformer (voltage and phase-shifting): voltage of windings, impedance, tap ratios (voltage and/or phase angle or tap step size), regulated bus and voltage setpoint, normal and emergency ratings, status, etc.,
    v. Reactive compensation (shunt and series capacitors and reactors): voltage, nominal ratings, impedance, percentage compensation, connection point (bus), controller device, etc.

i. Transmission and Station Equipment Sequence Data Models –
    i. Generating units: positive, negative and zero sequence impedances, grounding impedance,
    ii. AC Transmission circuit (overhead and underground): zero sequence impedance,
    iii. Transformer (voltage and phase-shifting): zero sequence impedance, winding connection code and grounding impedance,
    iv. Mutual line impedance for transmission lines (230kV and 500 kV).

j. Interchange Schedules –
    i. BC-US: existing long-term contracts (230 MW)
    ii. US-BC: existing long-term contracts (1892 MW)
    iii. BC-AB: existing long-term contracts (480 MW)
    iv. AB-BC: existing long-term contracts (249 MW)

The power flow base cases are created in PSS/E *sav* and *raw* formats.

Sub-Sections C – J provide additional description of the data included in the power flow base cases.

C. Station Non-Coincident Load Forecasts

Station (Distribution and Transmission Voltage Customers) non-coincident peak load forecasts (with DSM and no DSM) will be obtained from Load Serving Entities (LSE) within BC Hydro's transmission planning area. The entities with LSE responsibility, BC Hydro's Distribution Planning group (for distribution loads), BC Hydro's Market Forecast group (for transmission voltage customer loads) and Fortis BC will distribute this data to the Power System Modelling Group. The Power System Modelling Group will work with the entities with LSE responsibility to incorporate the load forecasts in the data models used to support all the transmission planning processes in BC Hydro.

D. System Coincident Load Forecast

System coincident peak load forecasts (with DSM and no DSM) will be obtained from Load Serving Entities within BC Hydro's transmission planning area. The entities with LSE responsibility (BC Hydro's Market Forecast group and Fortis BC) will distribute this data to the Power System Modelling Group. The Power System Modelling Group will work with the entities with LSE responsibility to incorporate the load forecasts in the data models used to support all the transmission planning processes in BC Hydro.

E. Load Coincident Factors

The Power System Modelling Group is responsible for maintaining and keeping up to date historical hourly load curves for each load (distribution station load and transmission voltage customer load) in the BC Hydro transmission system. Using these load curves, Load Coincident Factors (LCF) are generated on a seasonal basis (Heavy Winter, Light Winter, Heavy Summer and Light Summer) for each load group (Bulk, Division, Region, Area, Zone and Station). These LCF are applied to the load forecasts in order to allocate the corresponding value to each bus load while creating a power flow base case. The LCF may need to be adjusted to match the total coincidental load forecasts provided by the LSE. For future loads, appropriate proxies LCF are used.

F. Interconnection Queue

Planners from the Interconnections Planning group are responsible for providing the data model for generation (IPPs) added in the interconnection queue once the system impact study is completed. The Power System Modelling Group will add this data and any transmission upgrade that is required in the base cases used for interconnection studies based on the queue.

Planners from the Growth Capital Planning group are responsible for providing the data model for Transmission Voltage Customers (TVC) added in the interconnection queue once the system impact study is completed. The Power System Modelling Group will add this data and any transmission upgrade that is required in the base cases used for interconnection studies based on the queue.

The Power System Modelling Group will request the Interconnection Customer (IPP or TVC) either directly or through the interconnection/project manager for plant record (as-built) data of their facilities during the commissioning stage or as soon as they enter in commercial operations in order to update the base cases.

G. Base Resource Plan

Base Resource Plan (Generation forecasts) will be obtained from the Resource Planners. The entities with Resource Planning responsibility (BC Hydro's Energy Planning group and Fortis BC) will distribute this data to the Power System Modelling Group. The Power System Modelling Group will work with the Resource Planners to incorporate the Base Resource Plan in the data models used to support all the transmission planning processes in BC Hydro.

H. Capital and Sustain Projects

Capital and Sustain Projects (Area reinforcements, Bulk system reinforcements, Station expansion & modification, Generating plant upgrades, unplanned reinforcements and replacements) identified in the annual capital plan and sustain program will be obtained from the Capital Infrastructure Project Delivery group that keeps up-to-date the portfolio delivery plan in the SAP system.

The Power System Modelling Group in coordination with the Program/Project Managers and the Transmission Planners will incorporate the capital plan and sustain projects in the base cases used to support all the transmission planning processes in BC Hydro. The Power System Modelling Group will also request the Program/Project Managers for as-built data of capital and sustain projects during the commissioning stage or as soon as they are put in service in order to update the base cases.

I. US and AB Model Representation

External systems (U.S. and Alberta) will be represented in BC Hydro base cases by an equivalent system developed by the Power System Modelling Group. This equivalent will normally be based on a selected and approved WECC base case that includes all the major transmission expansion projects of relevance in other jurisdictions.

A single external system model will be used for all BC Hydro base cases. Therefore, the Power System Modelling group will ensure that this external model behaves properly for all likely scenarios to be studied in terms of generation dispatch, load levels and inter-tie transfer flows.

Should a planner identify a need for a better representation of an external system, the Power System Modelling Group will work with the Transmission Planner to develop this from the most appropriate approved WECC base case or from the most up-to-date model requested to a neighbouring utility. The Power System Modelling Group will also coordinate this work with the neighbouring utilities (BPA in the U.S. and AESO in the province of Alberta) as appropriate.

J. Fortis BC Model Representation

The Fortis BC system is fully integrated to the BC Hydro transmission system. As such, the Power System Modelling group works very close with the Transmission Planner from Fortis BC in order to keep the steady-state model representation as accurate as possible.

III. Dynamic Data for Modeling and Simulation

A. Introduction

In order to support BC Hydro's Transmission Planning business processes (Growth Capital Planning, Interconnection Planning, Station Planning and Performance Planning), address WECC data model requests and comply with NERC MRS standards related to data modelling, there is a need for developing a comprehensive dynamic data requirements and reporting procedures needed to model and analyze the dynamic behaviour or response performance of BC Hydro's transmission system.

B. BC Hydro Dynamic Base Cases

The Power System Modelling Group uses a base case management infrastructure with repository and versioning control functions to maintain steady-state and dynamic data models. Using this infrastructure power flow and dynamic base cases are created sequentially and they both correspond to a particular representation of the BC Hydro system.

The attributes of a dynamic base case are the same as for the power flow data described in Section II.B. However, additional data dynamic models (WECC certified, typical, WECC generic, or manufacturer's data) included in the dynamic base case are as follows:

a. Generating units – Conventional plants
   i. Generator model: inertia constant, damping coefficient, saturation parameters, direct and quadrature axes reactance and time constants
   ii. Exciter model: type, parameters and time constants
   iii. PSS model: type, parameters and time constants
   iv. Governor model: type, parameters and time constants
   v. Turbine model: type, parameters and time constants

b. Generating units – Wind Turbine Generators (WTG)
   i. Excitation/Converter Control Generic Model for Type 3 and Type 4 WTG
   ii. Aerodynamic Generic Model for Type 3 WTG
   iii. Pitch Controller Generic Model for Type 3 WTG
   iv. Torque Controller Generic Model for Type 3 WTG
   v. Plant Controller Generic Model

c. Composite Load Model –
   i. Load: Station (bus load), id, climate zone (MWC – Northwest Coast), feeder type and percentage (residential, commercial, industrial)

d. Under Frequency Load Shedding (UFLS) –
   i. Load: Station (bus load), amount of MW shed, frequency and time cycle for each load step.

The dynamic base cases will be provided in PSS/E *dyr* format (for the conventional and generic models) and in *obj* format for user defined models.

Sub-Sections C – F provide additional description of the dynamic data included in the base cases.

C. Interconnection Queue

Same as for base case power flow data. In addition, typical dynamic data will be assigned to future generating resources included in the interconnection queue.

D. Base Resource Plan

Same as for base case power flow data. In addition, typical dynamic data will be assigned to future generating resources and bundles included in the base resource plan.

E. Capital and Sustain Plan

Same as for base case power flow data. In addition, typical dynamic data will be assigned to future generating resources or generator upgrade projects included in the capital and sustain plans.

F. US and AB Model Representation

The dynamic model for the external system (U.S. and Alberta) will correspond to the selected and approved WECC base case. The Power System Modelling group will ensure that this model successfully initializes under no-fault tests.

G. Fortis BC Model Representation

The Fortis BC system is fully integrated to the BC Hydro transmission system. As such, the Power System Modelling group works very close with the Transmission Planner from Fortis BC in order to keep the dynamic model representation as accurate as possible.

IV. WECC Base Case Data Submission

WECC normally prepares 10+ base cases annually for use by WECC members. The cases are prepared to represent conditions in WECC, as specified and published in the WECC Annual Study Program.

A. WECC Load Flow Base Case Submission

Upon a data request sent by WECC, the Power System Modelling group will work and coordinate with the neighbouring utilities (BPA in the U.S. and AESO in the province of Alberta) to set the appropriate interchange schedules to be modelled in the base case.

The Power System Modelling group will also work and coordinate with the Transmission Planner from Fortis BC in order to merge the Fortis BC transmission model into the BC Hydro model in order to meet the requirements of the base case.

Once the base case is assembled and tested, the Power System Modelling group will work in coordination with the System Planner (Performance Planning group) to verify

and sign-off the base case for submission to WECC **(Ref: MOD-010)** according to the schedule published by WECC and currently in effect. Records of submissions to WECC will be maintained by the Manager, Power System Modelling Group as evidence for compliance and audit purposes.

All power flow base cases provided to WECC will be in GE-PSLF data format.

B. WECC Dynamic Data Submission

Same as for base case power flow data.

The Power System Modelling group will prepare incremental updates on the dynamic data for the generating units added/replaced/modified as provided by the Generator Owners (BC Hydro and IPPs) and by the Transmission Planner from Fortis BC. The Power System Modelling Group will ensure that the dynamic data is consistent with the base case power flow provided.

Once the base case is assembled and tested, the Power System Modelling group will work in coordination with the System Planner (Performance Planning group) to verify and sign-off the base case for submission to WECC **(Ref: MOD-012)** according to the schedule published by WECC and currently in effect. Records of submissions to WECC will be maintained by the Manager, Power System Modelling Group, as evidence for compliance and audit purposes.
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The dynamic data provided to WECC will be in GE-PSLF data format.

V. Verification of Dynamic Models

The Power System Modelling Group will verify the dynamic models for all the generating units connected in the BC Hydro's transmission system in response of the following:

- Generator owner updates (replacement, refurbishment or parameter adjustment) model for an existing generating unit that re-starts commercial operations.
- Generator owner's new generating unit starts commercial operations
- Generator owner reviews/tunes dynamic model data.

A. Model Verification Process

When a Generator Owner provides a test report with the dynamic data models for a generating unit, the Power System Modelling Group will go through the model verification process which consists of the following steps:

- Sanity checks ensuring that the dynamic models in the test report are WECC approved models and their parameters are complete and within the recommended values and threshold limits.
- Ensure all field tests are consistent with WECC's baseline test requirements
- Perform no-fault simulation tests for a period of 10-20sec and ensure flat response.
- Perform disturbance simulation (3-phase fault) at generator terminals or nearest transmission lines cleared after 4 cycles and ensure stable response.
- Perform simulation tests with/without PSS (Power System Stabilizer) applying a voltage reference step change (3-5%) to ensure positive damping response.
- Perform governor response tests to ensure positive damping response.
- Perform ring-down simulation test in accordance with validation tests performed by WECC staff for unit certification and ensure stable response.

B. WECC Generating Unit Model Validation Policy

In order to meet the WECC Generating Unit Model Validation Policy the Power System Modelling Group will follow the model verification process described above once the test report for a generating unit is submitted by the Generator Owner.

Any issues identified during the verification process will be reported and resolved in coordination with the Generator Owner until all results of the simulations show satisfactory dynamic performance.

The Power System Modelling Group will write the verification report and send to the Transmission Planner (Performance Planning Group) for final review and sign-off. The Power System Modelling group will sent to WECC the verification report with the dynamic models in GE-PSLF and PSS/E data formats for certification. The Generator Owner will be notified once WECC certifies the unit.

C. NERC MOD-026-1 and MOD-027-1 Standards

For compliance of NERC requirements in **MOD-026-1 (R1)** and **MOD-027-1 (R1)** standards the Power System Modelling Group (acting with the role of Transmission Planner) will provide to the Generator Owner upon request the following information:

- List of all WECC approved models for excitation control systems or plant volt/var control functions (**MOD-026-1**) and turbine/governor and load control or active

power/frequency control systems (**MOD-027-1**) that are acceptable to the Transmission Planner for use in dynamic simulations.

- Documentation (user manual of the GE-PSLF software tool) with instructions on how to obtain the model library block diagrams and/or data sheets for excitation control systems or plant volt/var control functions (**MOD-026-1**) and turbine/governor and load control or active power/frequency control systems (**MOD-027-1**) that are acceptable to the Transmission Planner for use in dynamic simulations.
- WECC's MDF (Master Dynamic File) with the current (in-use) models for any of the Generator Owner's existing applicable unit specific excitation control systems or plant volt/var control functions (**MOD-026-1**) and turbine/governor and load control or active power/frequency control systems (**MOD-027-1**) including generator MVA base.

For compliance of NERC requirements in **MOD-026-1 (R6)** and **MOD-027-1 (R5)** standards, the data models provided by the Generator Owner will be verified by the Transmission Planner following the verification process described above.

The criteria in **MOD-026-1 (R6)** to determine whether the model is usable or not is as follows:

- The excitation control system or plant volt/var control function model initializes to compute modeling data without error,
- A no-disturbance simulation results in negligible transients, and
- For an otherwise stable simulation, a disturbance simulation results in the excitation control and plant volt/var control function model exhibiting positive damping.

The criteria in **MOD-027-1 (R5)** to determine whether the model is usable or not is as follows:

- The turbine/governor and load control or active power/frequency control function model initializes to compute modeling data without error,
- A no-disturbance simulation results in negligible transients, and
- For an otherwise stable simulation, a disturbance simulation results in the turbine/governor and load control or active power/frequency control function model exhibiting positive damping.

After the verification process is completed in accordance with **MOD-026-1 (R6)** and **MOD-027-1 (R5)**, the Power System Modelling Group (acting with the role of Transmission Planner) will provide a technical description (Verification Report) to the Generator Owner notifying that the model is usable or is not usable. For the latter, a description indicating why the model is not usable will be included in the verification report.

VI. Data Reporting for Load and Resource Information

A. Introduction

This section describes BC Hydro's documentation of data reporting requirements for actual and forecast demands, net energy for load, and controllable demand side management as required by NERC Standard **MOD-031-1** and based on WECC's approved reporting process for the annual collection of existing and planned generation data, and loads and resources data.

B. WECC Data Submittals

The Power System Modelling Group will provide all Load and Resource (L&R) information requested by WECC. In doing so, the Power System Modelling group will coordinate the data collection process pertaining to the request with the LSEs, Resource Planners, Transmission Operator and other registered entities within the Balancing Authority area. BC Hydro will not prepare data that is the responsibility of other registered entities but may prepare data on a reasonable efforts basis for portions of the BC Hydro Transmission Planning area that are not covered by a registered entity.

The Power System Modelling Group will coordinate with the staff in BC Hydro and Fortis BC who have the role and responsibilities of LSE, Resource Planners, and Transmission Operator and ensure that they satisfy the data reporting requirements in the **NERC standard MOD-031-1 R1** and in the annual data request for Load & Resource information.

After the data collection is completed, the Power System Modelling Group will provide the L&R information to WECC according to the WECC schedule and data reporting instructions and in the spreadsheets/formats requested by WECC and upload this information in the SharePoint site provided by WECC.

VII. Data Reporting for Reliability Assessment

A. Introduction

This section describes BC Hydro's documentation of data reporting requirements for WECC's annual reliability assessment in compliance with NERC Standards **TPL-005** and **TPL-006** respectively.

B. WECC Annual Summer Assessment Data Submittal

BC Hydro will provide seasonal update of load and resource data to WECC in order to perform reliability and adequacy assessment of the WECC interconnected system in response to WECC's request for data and narrative response.

The Power System Modelling Group will coordinate the data collection pertaining to the request with the LSE (BC Hydro and Fortis BC) within the BC Hydro Transmission Planning Area. All requested data will be assembled and sent back to WECC within the corresponding due date.

The narrative response is currently prepared by the Northwest Power Pool (NWPP) on behalf of its members including BC Hydro. NWPP assumes this role on a year by year or season by season basis. At the time the NWPP relinquish his role in the reporting process, BC Hydro will prepare and provide the narrative response in order to meet WECC's requirements for this request.

C. WECC Annual Winter Assessment Data Submittal

Same as for the summer assessment.

D. NERC Long Term Reliability Assessment

BC Hydro will provide narrative responses to the NERC Long Term Reliability Assessment questions.

The Power System Modelling Group will coordinate the collection of responses pertaining to the request with the LSE (BC Hydro and Fortis BC) within the BC Hydro Transmission Planning Area and BC Hydro's system planning and system operation staff. All requested data will be assembled and sent back to WECC within the corresponding due date.

E. WECC Progress Report for Planning Coordination

BC Hydro will provide annual report on new facility additions to the system and associated system operation in response to WECC's Progress Report Procedure and in compliance with NERC Standards and WECC System Performance Criteria.

The Power System Modelling Group will coordinate the collection of responses pertaining to the request within BC Hydro's system planning and system operation staff. All requested data will be assembled and sent back to WECC within the corresponding due date.

VIII. Data Reporting for Transmission Outage Assessment

A. Introduction

This section describes BC Hydro's documentation of outage data reporting to WECC/NERC and CEA annually for reliability assessment.

B. WECC/NERC Annual Outage Data Submittal

BC Hydro provides previous year's forced outage data of 200 kV and above transmission lines, cables and transformers with 200 kV and above secondary windings to WECC Transmission Reliability Data System (TRDS) and NERC Transmission Availability Data System (TADS) in response to WECC/NERC data requirements.

BC Hydro will collect and process data reporting for station and transmission circuit planned outage and provide to NERC TADS at the time when this type of information becomes part of the data requirements from NERC.

The Reliability & Performance Assessment Group is responsible for collecting and processing all outage information for the circuits and equipment described above. This information is submitted in a combined report to WECC within the corresponding due date. WECC will subtract the data for NERC from the report and upload the data to NERC's WebTADS system.

C. CEA Annual Outage Data Submittal

BC Hydro provides previous year's delivery point outage data report to the Canadian Electrical Association (CEA) in response to the requirements based on CEA's Electric Power System Reliability Assessment data collection programs.

BC Hydro also provides to CEA previous year's forced outage data report to the CEA for major station and transmission equipment with voltage level above 60 kV in response to the requirements based on CEA's Equipment Reliability Information System data collection program.

The Reliability & Performance Assessment Group is responsible for collecting and processing delivery point outage report and forced outage report for major station and transmission equipment. These reports are sent to CEA within their respective due dates.