

1 Q. **System Reliability**

2 Which group reviews the causes of outages and how are the outage causes
3 generally used to improve reliability?

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6 A. The causes of outages are reviewed by technical specialists with assigned
7 accountability for particular asset groups:

8 a. Transmission related outages are reviewed by the Senior System

9 Operations Engineer – Reliability;

10 b. Distribution related outages are reviewed by the TRO Asset Specialist –
11 Distribution; and

12 c. Generation related outages are reviewed by the Long Term Asset
13 Planning group for the facility involved.

14
15 Nalcor's Project Execution and Technical Services Division provides root cause
16 investigation support to the specialists indicated above on an as-required basis.

17
18 The Long Term Asset Planning (LTAP) group has assigned responsibility to identify
19 and monitor asset reliability and service level requirements, complete root cause
20 and repeat failure analysis and oversee remedial action plans for improved
21 reliability. Assigned Asset Owners have overall accountability for operations and
22 maintenance of generation, transmission and distribution assets, and to ensure that
23 supporting functions like Long Term Asset Planning are fulfilling their role.

24
25 Typically remedial actions can involve changes to PM programs, packaging of
26 related corrective maintenance activities, and/or updating of Long Term Asset

1 Management Plans for asset replacement or refurbishment, as well as adjustments
2 to critical spares. For example:

- 3 • If a transmission or distribution system is having an increased number of
4 trips during high winds, investigation may determine that additional
5 poles need to be added in the line or dampers are required to be
6 installed on the conductor. This would improve the reliability for that
7 transmission or distribution line.
- 8 • If an outage at a generating plant is traced back to a lubrication system,
9 the defect would be corrected and the PM program updated to address
10 the issue before a failure occurs in the future.

11
12 Hydro also has a Performance and Reliability Committee which reviews and makes
13 recommendations to the assigned Asset Owners on the performance of the bulk
14 electrical system and the reliability to all Hydro's customers. The terms of reference
15 for this committee are attached as PUB-NLH-341 Attachment 1.

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17 The LTAP group reviews forced outages to identify root causes to prevent future
18 outages. In addition, outages are trended over five years to identify repeat failures
19 and patterns to identify further remedial actions to improve future reliability. There
20 is an on-going as well as an annual review component to this process. PUB-NLH-
21 341 Attachment 2 summarizes the role and responsibilities of LTAP. PUB-NLH-341
22 Attachment 3 overviews the process for long term asset management plans with
23 O&M experience and outages as an identified input.

Performance & Reliability Committee Terms of Reference

1. SCOPE

The terms of reference for the Performance & Reliability Committee (hereafter called The Committee) includes objectives, membership, meetings and mandate. The primary focus of the Committee will be to make recommendations to Asset Owners for action related to the performance of Hydro's Bulk Electrical System (BES) and its service reliability to all Hydro's customers. This will include generation, transmission and terminals.

2. MEMBERSHIP

Committee

The Committee shall be an oversight group with membership from the Managers in System Operations, Office of Asset Management, System Planning, Transmission and Rural Operations (TRO), Plants and Engineering who will set policy. The committee will also govern working groups who will set procedures and guidelines and work with performance data.

Working Groups

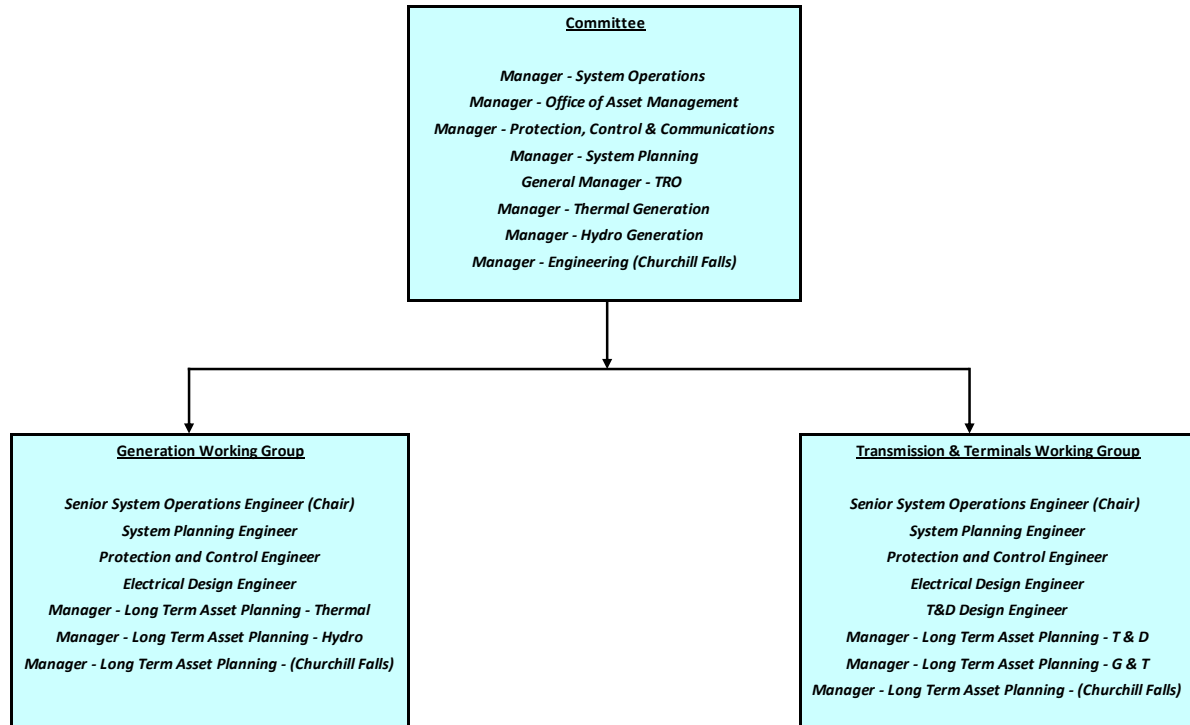
There will be two working groups who report to the overall Committee – Generation and Transmission & Terminals. The membership of the working groups will generally consist of the Long Term Asset Planning Managers responsible for the assets and representatives from System Operations, System Planning and the respective Project Execution Engineering disciplines. Members of these working groups may not be required to attend every meeting. Other people will be designated as required.

It is expected that Working Group members from the Project Execution Engineering disciplines will serve three year terms. The Long Term Asset Planning Managers and Chair from System Operations will require permanent appointment.

An organizational chart follows:

Performance & Reliability Committee Terms of Reference

PERFORMANCE AND RELIABILITY COMMITTEE & WORKING GROUPS



April 15, 2013

3. OBJECTIVES

The objectives of this structured approach are:

- To continuously monitor performance metrics, complete analysis of substandard performance and recommend immediate action on major system issues when required;
- to review Hydro's systems reliability performance metrics and to recommend generation, delivery point and service continuity reliability standards and targets to be used in justifying capital and operating expenditures;
- to standardize the review and approval of reliability aspects of project proposals and to establish a minimum standard of the quality of reliability project proposals;

Performance & Reliability Committee Terms of Reference

- to assess performance improvement reliability project proposals and make recommendations in prioritizing reliability-related activities; and
- To review all root cause analysis reports and follow-up action report status while setting priorities for follow-up actions and time lines for completion.

4. MEETINGS

The Committee will hold no less than one meeting each quarter. Working Groups will hold monthly meetings..

5. MANDATE

The Structure is accountable to the Vice President, Newfoundland & Labrador Hydro and will:

- provide for consistent, accurate, timely collection and reporting;
- assess the effectiveness and recommend updates as required to any databases used for the compilation and reporting of reliability data;
- work towards consistency and standardization of reliability performance-related issues throughout Hydro. Areas of activity will include but not be limited to standardizing field reports for the purposes of collecting reliability information and standardizing the way in which reliability statistics are presented for performance-related proposals;
- ensure that reliability performance problems are identified and acted upon;
- review equipment failures, and potential equipment failures identified for their impact (actual or potential) on system reliability performance;
- ensure system performance indices are reviewed and areas for improvement are identified and prioritized, using internal and external benchmarks, as follows:

Performance & Reliability Committee

Terms of Reference

T-SAIDI/T-SAIFI	System Average Interruption Duration/Frequency Indices
SAIDI/SAIFI	Average Duration/Frequency of Customer Outages
Unsupplied Energy	Unsupplied Energy for forced delivery point interruptions, planned delivery point interruptions and underfrequency events. Measured in MW-Mins.
UFLS	Underfrequency Load Shedding Schedule
DAFOR	Generating Unit Derating Adjusted Forced Outage Rate
ICbF	Generating Unit Incapability Factor
Contingency Reserve	Measure of system generation reserve against loss of single largest unit in ensuring that overall System load would be met. Performance is reported monthly for the entire year.
➤	maintain a “Hot List” (<i>a work list of priority items sorted by their impact on the bulk electric system</i>) of issues and report regularly on their status;
➤	review and prioritize reliability performance improvement proposals;
➤	align with our Asset Maintenance Strategy in identifying performance issues that may require changes to maintenance activities or standards;
➤	communicate critical information to the Leadership Team, Regional and Plant Managers and Engineering Managers;
➤	assign team members to collect data in each plant/region and standardize collection methods;
➤	prepare a monthly report of System issues indicating events requiring detailed root cause analysis;
➤	review root cause analysis, Surge & Trouble Reports and detailed failure analysis reports; and
➤	generate minutes within ten (10) working days of each meeting and report to the Vice President, Newfoundland & Labrador Hydro.

Roles and Responsibilities

MANAGER, LONG-TERM ASSET PLANNING

Summary of Job Function

Leads LT asset planning and critical spares management activities. Accountable for developing and refreshing the 20+ year asset plan addressing asset rehabilitation/overhaul, renewal and replacement. Drives development of annual asset work plan and provides oversight and input into effectiveness of asset maintenance activities including preventative & predictive maintenance.

Principal Activities, Duties and Responsibilities

- Develop and continually refresh 20+ year asset plan that reflects: asset rehabilitation/overhauls to major assets; asset renewal requirements – what needs to be replaced, when and with what.
- Create/maintain accurate & complete asset listing/ hierarchies with supporting detail, location, history, financial information.
- Translate 20 year asset plan into detailed 5-year and annual asset work plans; update as required.
- Recognizing the dynamic nature of long and short-term asset work plans and the expertise of others, obtain input from work execution and operations functions when developing/refreshing long-term, 5-year and annual asset work plans.
- Participate in technical councils and use councils to test long-term plans, promote their role in operational trouble-shooting.
- Develop high-level implementation strategy including financial leveling, resource planning for each year of the LT asset plan.
- Drive development 20 year capital plan inputs for assets.
- Check/ensure alignment with corporate long-term asset planning practices led by the office of asset management.
- Ensure project scope, estimates and quality are acceptable.
- Identify and monitor asset reliability/service level requirements.
- Develop and monitor asset performance metrics and develop/ execute actions to address performance issues.
- Complete root cause failure analysis and remedial action plans.
- Complete risk assessment and reliability monitoring.

Roles and Responsibilities

MANAGER, LONG-TERM ASSET PLANNING (*cont'd*)

Principal Activities, Duties and Responsibilities

- ***Develop, monitor and continuously improve preventative and predictive maintenance programs.***
- Develop and implement condition assessment tools and monitoring techniques, incorporate results into planning activities.
- Monitor and incorporate industry and technology trends impacting long-term asset plan.
- Use critical spares framework established by the Office of Asset management to identify critical equipment/tools spares based on criteria including: acceptable downtime/service levels; impact to reliability; delivery time; failure history; and repair duration.
- Determine quantity, lead times, and optimum inventory levels.
- Initiate the procurement of critical spares and ensures correct equipment is specified, ordered and received.
- Develop necessary inspection/review/maintenance/ location requirements on critical equipment/tools spares to ensure readiness including monitoring OEM supplier support and equipment/tools availability.

Development of the Long-Term Asset Management Plan

