

November 21, 2014

The Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, Newfoundland & Labrador
A1A 5B2

Attention: Ms. Cheryl Blundon
Director Corporate Services & Board Secretary

Dear Ms. Blundon:

**Re: The Board's Investigation and Hearing into Supply Issues and Power Outages
on the Island Interconnection System**

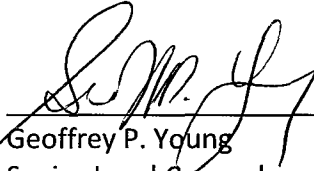
In accordance with the Board's Interim Report dated May 15, 2014 with respect to the above noted matter, please find enclosed the original plus 12 copies of Hydro's:

- Updated Integrated Action Plan as at the end of October 2014.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO



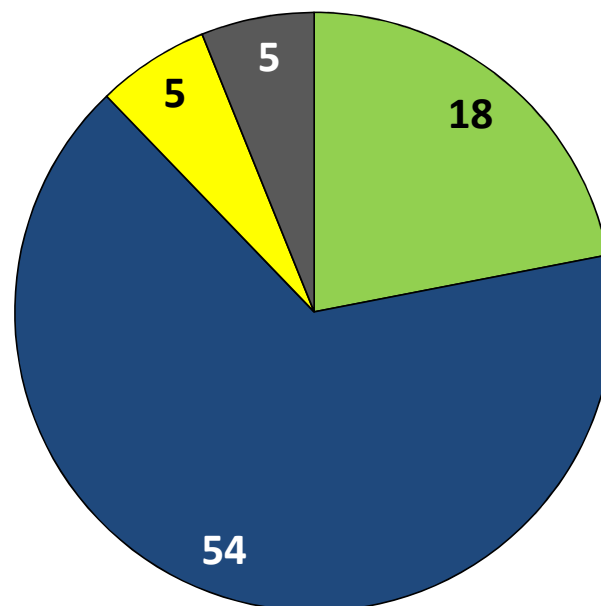
Geoffrey P. Young
Senior Legal Counsel

GPY/jc

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey Stirling Scales
Sheryl Nisenbaum – Praxair Canada Inc.
ecc: Roberta Frampton Benefiel – Grand Riverkeeper Labrador

Thomas Johnson – Consumer Advocate
Thomas O' Reilly – Cox & Palmer
Danny Dumaresque

NL Hydro's Integrated Action Plan - Status Report - November 21, 2014



Data Table

Number of Actions per Status Group

Status				
In Progress and On Track	Complete	Caution Recovery Plan in Place	Not Yet Started 2015 Activity	Total
18	54	5	5	82

NL HYDRO INTEGRATED ACTION PLAN - 2014 SUPPLY DISRUPTIONS AND POWER OUTAGES



Ref	Action/Activity	IAP Reference(s)	Interim Report Ref(s)	Accountable Title	Due Date	Status	Notes / Comments
LOAD FORECASTING							
1	Implement enhancements to the short term 7 day forecasting model to ensure a better correlation in extreme cold weather conditions.	P2LF1, LF2, Liberty 1		VP System Operations and Planning	15-Nov-2014		In progress. Ventyx working on database and backup issues. Hydro - Avalon / Island utility load models have been developed. Avalon and Island utility load values being derived for model training purposes. Database and software additions to improve forecast accuracy have been identified and changes are being implemented. Ventyx was in St. John's in June to lead Nostradamus Training Workshop. At that time they installed a new version of Nostradamus, reviewed Hydro's models, and suggested changes to improve the accuracy of the model. Issues with the main database input/output have been resolved but there are areas that still require troubleshooting. Next steps: All outstanding issues will be resolved prior to moving to the main platform and operations staff will gain experience with new version before the upcoming winter. On track for Nov 28 completion. Progress report was provided on Oct 31. New Island load definition was created. Outstanding: Model training and verification is on-going. Move to production thereafter no later than Nov 28.
2	Refine the equations used for estimating major end-use of electric heat on the system through continued surveying of the customer base in terms of average energy use and saturation of electric heating	LF3		VP System Operations and Planning	15-Nov-2014		Complete. Improvements in statistical properties have been made to NLH's models for forecasting electric heat saturation on the system. NLH will review residential end use survey being completed by NP in Fall 2014 and incorporate all relevant findings in next planning load forecast. 2015 budget funds identified for completing end use customer survey.
GENERATION AND RESERVE PLANNING							
3	Incorporate any significant load changes, from system losses or otherwise, resulting from different system configurations in the short term load forecasting process.	Liberty 2	PUB 1	VP System Operations and Planning	15-Nov-2014		In progress. Analysis of winter 2013/14 losses based upon generation dispatch is underway. Outcome to be included in the peak load forecast to be generated in mid-November. Due date has been advanced from December 1. In reporting load forecast, the loss impact of varying unit commitment will be incorporated. Currently developing the relationship between unit commitment and losses. Update provided in the Oct 31 progress report. On-target to finish on Nov 28.

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4	Include sensitivity analysis for extreme weather, unit Equivalent Forced Outage Rate (EFOR) ranges, alternate scenarios and other factors in load forecasting processes.	P1GP1, LF1, GRP3, GRP5, Liberty 3 and 4	PUB 2	VP System Operations and Planning	1-Sep-2014		Complete. Completed weather sensitivity for input to CT proposal. Weather sensitivity analysis to be included in the Hydro 2014 Planning Load Forecast (PLF) and 2014 Generation Expansion Plan analysis. Hydro's PLF process will include sensitivity analysis with respect to weather and consider other key load variables. Completed review of historical weather data. Outline for inclusion in mid-Nov forecast has been completed.
5	Continue with the generation planning criterion of 2.8 LOLH, refine the forecasting model as necessary with increased sensitivity assumptions related to extreme cold weather and forced outage rates.	GRP1, Liberty 8		VP System Operations and Planning	30-May-2014		Complete. Hydro is expanding its analysis to include additional sensitivities to address concerns raised in the Liberty review.
6	Revisit the generation reserve planing criterion and the manner in which external markets are modeled after interconnection in 2017.	GRP2		VP System Operations and Planning	15-Nov-2015		Not yet started. To be initiated in 2015.
7	Complete a break-even EFOR for each class of Hydro's generation to determine the point at which a generator's EFOR results in the system exceeding the LOLH criterion of 2.8 hours/year.	GRP4		VP System Operations and Planning	1-Dec-2014		Complete. The break-even EFOR statistic for each class of Hydro's generation will not add value to our winter preparedness. This action is marked as complete at this stage in favour of concentrating our efforts on priority actions that are critical for winter readiness. The EFOR issue will be reviewed again in September, 2015.
8	Complete an evaluation of the instances where actual peak load exceeded the forecasted peak during the winter of 2014 and determine what common factors, if any, were responsible, and any implications for the forecasting process.	Liberty 5		VP System Operations and Planning	15-Nov-2014		Complete. NL Power monthly winter peak assessed. Completed detailed review of 2013/14 winter weather. Data collection is complete, and data analysis is underway including a review of utility and industrial customers loads for winter monthly peaks. Critical work completed, expect to meet due date. Filed with Oct 31 progress report.
9	Determine any opportunities for re-constructing the peak load when peaks have been significantly affected by artificial means such as those employed by the generation shortage protocol, and consider any improvements in the review of 2014 peak deviations.	Liberty 6		VP System Operations and Planning	1-Sep-2014		Complete. A transmission load-loss assessment has been completed, as has an assessment of using NLH-NP peak demand weather adjustment model for re-constructing NP load. Customer and system peak loads have been reconstructed for actual and historic normalised weather.

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10	Use the Island Interconnected System as the reference point in future analyses of system reliability rather than just the Hydro interconnected system.	Liberty 7		VP System Operations and Planning	30-Nov-2014		In Progress. Progress being made on the addition of Deer Lake Power and Newfoundland Power generation to Hydro's automatic generation control applications. Winter peak model is being calibrated for total island load. Have identified all changes required in AGC and reporting tools. Progressing through necessary changes for implementation. Transmission Planning base case load flows updated to include customer generation. Completion expected by December 1, 2014. AGC changes made on EMS development system to incorporate all Island resources. On-target for Dec 01.
11	Evaluate a new supply reliability criterion for the longer term, with a logically associated level of reserves, based on stakeholder input.	Liberty 9		VP System Operations and Planning	2014/2015		Not Yet Started. To be initiated in 2015, subject to any review/discussion of this issue during the Province's overall review of the provincial electricity system.
GENERATION AVAILABILITY							
12	Implement a 2014 winter preparation and availability improvement program for all generating assets and a related maintenance program for the HTGS.	Liberty 10, 11, 12 and 13; AM5; GA2	PUB 3 PUB 4 PUB-8 ² PUB 11	Chief Operating Officer, General Manager, GT and Diesel	30-Nov-2014		In progress. The availability improvement actions outlined in the June 16 Generation Availability Report to the Board relative to the Holyrood, Hardwoods/Stephenville CTs, and hydro generation assets are being executed as planned and are being tracked through the Annual Work Plan and other mechanisms. A self-assessment of winter readiness processes was completed in July and a process improvement action plan for winter readiness self-assessment, which will be implemented by no later than November 30, was presented to the Board on October 1. Hydro's severe weather preparedness protocol has been finalized and was provided to the Board on October 1. An update to Hydro's master generation winter availability plan was also supplied to the Board on October 1.

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12a	- Availability improvement: Hardwoods and Stephenville	P1GA2(a), (b), (c), (d), and (e); GA1, GA3, GA4, GA5, GA6, GA7		General Manager, GT and Diesel	30-Nov-2014		Complete. Review of GT maintenance practices is complete and required changes are being finalized. Assessing the effects of test starts prior to severe weather is ongoing to optimize the number of starts with GT availability. Recommended solutions have been implemented for all identified repeat failures with good success to date. The identification of additional plant and equipment refurbishment not already completed is being finalized. Fuel storage process and procedures have been reviewed, and a fuel management procedure has been prepared.
12b	- Availability improvement: Holyrood Start-Up Time	GA8		Chief Operating Officer	7-Nov-2014		In Progress: Balancing calculations have been completed and planned actions will be implemented at the end of Holyrood Unit 1's annual maintenance outage scheduled for Nov 7, 2014. Maintenance programs have been executed. The Unit is in start-up and balancing phase, and has been loaded to 50 MW. New balance calculations have been made and will be implemented once the Unit has cooled down. Balancing iterations are expected to continue with completion by Nov 30.
12c	- Availability improvement: Hydro Generation / Granite Canal Availability	GA11		Chief Operating Officer	28-Nov-2014		In Progress: An investigation of the Granite Canal turbine vibration issue was completed during the annual unit inspection in August 4-15. Follow-up actions recommended by Project Execution and Technical Services will require a short outage which will be completed in November given the current requirement for 24 hour continuous operation of the plant in order to meet fish compensation obligations. We have confirmed that the vibration condition has only occurred twice since the plant was commissioned, both in potential icing periods. The inspection and test plan, Phase 1 in August, confirmed proper independent operation of check valves on the air admission chamber via bench tests. Phase 2 is due to complete by Nov 30. Successful completion of these activities will rule out all possible failure modes other than environmental icing conditions.

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Ref	Action/Activity	IAP Reference(s)	Interim Report Ref(s)	Accountable Title	Due Date	Status	Notes / Comments
13	Develop a critical spares plan for HTGS, the Hardwoods and Stephenville gas turbines, Hydro Generation and TRO	Liberty 14, P1AM4, AM3, GA2, GA9	PUB 5 PUB-9 ²	Chief Operating Officer, General Manager, GT and Diesel	30-Nov-2014		<p>Complete. The Consultant presented the finalized report of critical spares to be stocked at Holyrood on October 1. The listing is being further analyzed by Hydro to ensure accuracy and completeness. The preparation of cost estimates in relation to the last milestone continues to progress and is on target. Overall, Holyrood remains on track to complete its review of critical spares within the planned schedule. Hydro has completed an assessment of its requirements for spare 4kV motors. Three options were evaluated and it has been determined that the most reliable and cost effective solution is to purchase the four most critical motors and spare parts for the others. A purchase order has been issued to a supplier. The GTs Critical Spares Review is progressing on schedule. An asset criticality workshop has been completed as well as consultant site visits. A preliminary spares list is being reviewed. The final report has been received and recommended critical spares identified. Procurement of spares is ongoing with orders being placed as parts are sourced. A separate update on critical spares for all generation assets was provided to the Board on October 15.</p>
14	Secure economically available interruptible loads.	Liberty 16	PUB 6 PUB-10 ²	VP NL Hydro	30-Nov-2014		<p>In Progress: Hydro has been providing regular updates to the Board regarding its progress with respect to securing economically available capacity assistance; the most recent update was filed as part of the Generation Availability Report on November 14, 2014. Based on discussions with its Island Industrial Customers (IICs), Hydro determined that Corner Brook Pulp and Paper (CBPP) and Vale are the only IICs capable of providing a material quantity of winter capacity assistance. An application for approval of an agreement between Hydro and CBPP for 60 MW of winter capacity assistance was filed with the Board on October 28, 2014. Hydro made its final submission to the Board on this matter on Thursday, November 20, 2014 and is currently awaiting Board approval of the agreement. Hydro is also in the process of finalizing an agreement with Vale for additional capacity assistance.</p>

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15	Install and commission a new Combustion Turbine at Holyrood.	Liberty 15	PUB 7	VP Project Execution and Technical Services	7-Dec-2014		Caution: Project progressing on schedule in accordance with the PETS Incremental Work Project Plan (IWPP). Separate bi-weekly progress reports are being submitted to the PUB. Some delays experienced due to weather and equipment deliveries, additional resources applied to try and pull back schedule, necessary equipment for power generation is now on site. Dec 7 was the planned EPCM handover to Hydro forces, with Hydro's activities following into December. Hydro is still working to accelerate schedule with net changes showing power generation still available within December.
16	Create a senior position reporting to the VP with accountability for CTs and diesels	P1GA2		VP NL Hydro	14-Apr-2014		Complete: General Manager Gas Turbines and Diesels established and filled.
17	Document the Exploits Generation operational response to the severe frazil ice build-up for future reference as a best practice.	GA12		Chief Operating Officer	30-May-2014		Complete: Exploits Generation has developed a written procedure for dealing with frazil ice production and movement for the Grand Falls and Bishop's Falls generating facilities.
TRANSMISSION AVAILABILITY							
Transformers and Terminal Stations							
18	Execute a 2014 plan for testing transformers with questionable levels of combustible gases.	Liberty 17	PUB 13 PUB 15 PUB-16 ¹	General Manager, TRO	31-Aug-2014		Complete: Transformer gas testing has been completed consistent with the plan submitted to the PUB on June 2.
19	Execute a 2014 plan for completing overdue testing and maintenance on critical transformers.	Liberty 18	PUB 12 PUB 14 PUB-17 ¹	General Manager, TRO	30-Nov-2014		Complete: Testing and maintenance on critical transformers is progressing as planned. Six of eight critical transformers have been completed to date.
20	Develop a plan for completing overdue testing and maintenance on remaining transformers.	Liberty 18	PUB-18 ¹	General Manager, TRO	15-Jun-2014		Complete: Plan submitted to the PUB on June 2, 2014.
21	Complete system studies in relation to the <u>relocation</u> of the repaired T5 transformer from Western Avalon to Sunnyside, including a plan to address potential further failures.	Liberty 19	PUB-19 ²	VP System Operations and Planning	15-Jun-2014		Complete: System study completed on June 13th. See IAP 24 and June 16th Report to the PUB.
22	Complete a study in relation to the availability and necessity of a <u>replacement</u> transformer for T5 at Western Avalon, addressing schedule, estimated costs, the resources required, and how these requirements will be met.	Liberty 19	PUB-20 ²	VP System Operations and Planning	15-Jun-2014		Complete: System study completed on June 13th. See IAP 25 and June 16th Report to the PUB.

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23	Complete a study to determine if abnormal system disturbances may have caused the T5 failure at Western Avalon.	Liberty 29, RC5	PUB-21 ²	VP System Operations and Planning	15-Sep-2104		Caution. Trans Grid Solutions has completed an analysis/simulation of the January 4 event to determine if harmonics or system resonance may have been a contributing factor to either SSD T1 failure or WAV T5 OLTC failure. Draft report received from TransGrid Solutions and reviewed. Additional work required on the WAV T5 analysis. Final report expected by Nov 28.
24	Install a replacement for T1 transformer at Sunnyside.	Liberty 19		VP Project Execution and Technical Services	21-Nov-2014		Caution: A second Factory Acceptance Test performed on October 11 did not pass all requirements. Hydro has activated its contingency plan to ensure required transformer capacity at Sunnyside, as outlined in its letter to the Board on Oct 15. New expected date is Dec. 4.
25	Complete refurbishment of T5 transformer at Western Avalon.	Liberty 30		VP Project Execution and Technical Services	5-Oct-2014		Complete: Egerization of the T5 transformer was on Oct. 23 - Project is progressing on schedule in accordance with the PETS IWPP. Separate bi-weekly progress reports are being submitted to the PUB, most recently on October 24.
26	Review the system disruptions in January, 2014 in terms of the performance of facilities, equipment and resources; document unexpected outcomes and lessons learned; implement changes to improve future performance; and communicate these changes to the entire Hydro organization.	TA2, TA7		Chief Operating Officer	1-Dec-2014		In progress: Review has been completed and documented in Hydro's Integrated Action Plan. Key lessons and priority actions will be implemented and communicated by Dec 1, 2014. Events and lessons learned were shared and discussed by all asset owners in the Assets Owners Council meeting on Oct 29, 2014. This item is substantially complete with a final close out review meeting by the Assets Owners Council scheduled for Nov 26.
27	Complete a risk/reward review of the option of installing on-line continuous gas monitors on all GSU transformers not currently equipped with this equipment.	RC1		Chief Operating Officer	30-May-2014		Complete: An overall plan has been developed to install on-line continuous gas monitors on all 22 GSU transformers. Seven transformers will receive this upgrade in 2015, and the remaining GSUs as well as other 230 kV critical units will be upgraded in subsequent years. This has been added to the 2015 Capital Budget Proposal.
28	Complete a risk/reward review of the option of requiring that all 230 kV terminal station transformers are equipped with their own 230 kV breakers.	RC7		VP System Operations and Planning	14-Nov-2015		Not Yet Started: The risk/reward review will begin in 2015. However, the Sunnyside replacement transformer will be installed with the enhanced 230 kv breaker configuration.

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29	Complete a formal life assessment of Hydro's power transformers and revise the long term plan for transformer upgrades and replacements as appropriate.	RC14		Chief Operating Officer	31-Oct-2014		Caution: ABB engaged to assist with this review. Condition information was provided for 30 of Hydro's most critical transformers and ABB site inspections have since been completed. ABB's draft report was received in September and their final report is expected shortly. The resources assigned to documenting the long term plan have been temporarily re-assigned to address unexpected repairs in Cornerbrook T2 and BDE T3. The completion date has been deferred to Nov 28 as a result. Resources reassigned to this activity in October. The draft report has subsequently been through two development iterations to clarify the details. It has also been reviewed within the Transformer and Swithyard Equipment Technical Council. Another meeting was held with ABB on Nov 7 and the final report was received Nov 21. Long term plan is expected to be revised by Nov 30, 2014.
30	Complete a risk/reward review of the option of requiring additional station service redundancy at all 230 kV terminal stations, and to install back-up service supply in locations recommended by Hydro's Internal Review.	RC25, ERR4	PUB 49	Chief Operating Officer	30-Mar-2015		Not Yet Started: Asset Specialist assigned to work on this for Q4 2014 with an expected completion date of the review by March 30, 2015. Back up station service supplies will be identified for future year capital budget proposals if required.
31	Specify in a Terminals Engineering Standard that the location of the station service transfer switch shall be the control building in stations that have a control building remote to the transformers.	RC29	PUB 49	Chief Operating Officer	30-May-2014		Complete: Standard added.
32	Review the current location of the station service transfer switches at terminal stations that do not have a control building to ensure their locations are optimal.	RC30	PUB 49	Chief Operating Officer	Q4 2015		Not Yet Started: To be initiated in 2015 as a joint task with PETS and TRO Operations.
Air Blast Breakers							
33	Execute the annual 2014 plan for exercising air blast (AB) circuit breakers.	Liberty 20	PUB 22 PUB 23 PUB-24 1	General Manager, TRO	30-Nov-2014		In Progress: Breaker exercise program progressing in accordance with the plan submitted to the PUB on June 2. Forty-two (42) of 63 AB circuit breakers have been exercised to date.
34	Execute a 2014 plan for completing overdue testing and maintenance on critical AB circuit breakers.	Liberty 21, RC15	PUB 23 PUB 25 PUB-26 ¹	General Manager, TRO	30-Nov-2014		In Progress: Testing and maintenance on critical AB circuit breakers is progressing in line with the plan submitted to the PUB on June 2. Eight (8) of the 9 critical recovery AB circuit breakers have been completed to date.
35	Develop a plan for completing overdue testing and maintenance on remaining AB circuit breakers.		PUB 23 PUB-27 ¹	General Manager, TRO	15-Jun-2014		Complete: Plan submitted to the PUB on June 2, 2014.
36	Develop a plan for periodically operating AB circuit breakers from protective relays.	Liberty 23	PUB-28 ¹	General Manager, TRO	30-Nov-2014		Complete: A procedure was developed and placed into the Minatenance Manual effective August 1, 2014.

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37	Complete an analysis of the DC system for B1L03 to determine the existence of any high impedance paths that may affect its operation.	RC2	PUB-29 ¹	General Manager, TRO	30-Sep-2014		Complete: A complete checkout for the DC circuit for breaker B1L03 at Sunnyside was completed on August 20. No requirements for follow-up work were identified.
38	Complete a review of the annual air system leak check PM to ensure adequacy.	RC20	PUB-30 ¹	General Manager, TRO	30-Sep-2014		Complete: Updated maintenance manual with updated procedure.
39	Complete a review of the current approach to AB circuit breaker re-lubrication, which addresses why the DOW 55 grease was not removed during the 2007 re-lubrication.	RC22, RC23	PUB-31 ¹	General Manager, TRO	30-Sep-2014		Complete: Future lubrications will not be completed outside in the elements and practices and procedures will be updated following oversight by an air blast circuit breaker expert during an overhaul scheduled for October 2014. An overall summary report was also prepared outlining other items such as lubrications recommended and other utility maintenance practices.
40	Develop a plan for implementing an accelerated/shortened PM cycle for AB circuit breakers.	Liberty 22, P1TA3(b)	PUB-32 ³	Manager LT Asset Planning	15-Jun-2014		Complete: Breaker PMs will be updated at the end of 2014 to reflect a reduction of the PM cycle to four years. With the accelerated replacement plan currently contemplated, only 21 of the 63 breakers will require their frequency changed from 6 to 4 years. See Hydro's August 1 report to the PUB.
41	Develop a program for the accelerated replacement of AB circuit breakers, with a priority on identifying the activities and areas to be completed during the 2014 maintenance season.	P1TA3(a), TA1, AM1, RC24	PUB-33 ³	Manager LT Asset Planning	1-Aug-2014		Complete: An external consultant completed a report outlining a plan for the accelerated replacement of air blast circuit breakers starting in 2015. This plan was submitted to the Board in the August 1 Air Blast Circuit Breakers Report.
42	Review and implement changes to internal procedures related to: a) the application of protective coatings to circuit breakers; b) ensuring that false indications of the open/close state cannot occur in any failure mode; and c) establishing a specific pass/fail criterion related to circuit breaker timing tests.	Liberty 33; P1TA3(c), RC10, 11, 13, and 21.	PUB-34 ³	General Manager, TRO	31-Oct-2014		Complete: Reviews of these internal procedures have been completed and the the necessary changes to internal procedures have been made. See the August 1 update report to the PUB.
Alarms and Recording Devices							
43	Develop a plan for updating event and data recording devices, systems and procedures to identify the key set of priority alarms, to provide for the monitoring of alarms, and to address staff training and equipment repair.	Liberty 27, 28, TA3, TA4, TA5, TA6	PUB-43 ³	General Manager, TRO	30-Nov-2014		Complete: Plans related to a review of DFR devices, identifying key priority alarms, monitoring of alarms, and related staff training have been developed and were indicated in a report to the PUB on August 1. All required activities will be completed by November 30, 2014.

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44	Complete an analysis of the implementation of a program to install modern digital relays for all major equipment such as 230 kV transformers.		PUB-44 ³	General Manager, TRO	17-Oct-2014		Caution: The plan for completing this analysis has been developed and was indicated in a report to the PUB on August 1. Implementation will follow in future years from this analysis. Expected completion is Nov. 28.
ASSET MANAGEMENT & MAINTENANCE							
45	Implement process improvements related to the planning, scheduling and execution of work.	P2AM3, AM2, RC12		Chief Operating Officer, General Manager, GT and Diesel	30-Nov-2014		Complete: A committee with representation from PETS and the STWPS Council has established a standardized approach to planning, scheduling and executing the annual work plans, and the metrics used to track performance. A process to integrate resources into the completion of the plan is in place. Active management of execution is in place. Fully integrated resource plan has been developed and supporting resources have been procured, and this had been done as a combined effort involving PETS and Hydro operations.
PROTECTION AND CONTROL SYSTEMS							
46	Execute a 2014 plan to eliminate slow trip coils.	Liberty 32; P&C 1	PUB 35 PUB-39 ²	Manager Eng, P&C and Communications	30-Nov-2014		Complete: All breakers with slow trip coils have been addressed.
47	Develop a plan to: a) redesign existing breaker failure relay protection schemes to provide that breaker failure will be activated with either a 138kV or 230 kV breaker malfunction after a transformer failure; and b) install breaker failure relay protection for transformers in terminal stations where breaker failure relay protection is not in place.	Liberty 24 and 25; RC3, RC6, RC8; P&C 6	PUB-36 ² , PUB-37 ²	Manager Eng, P&C and Communications	30-Nov-2014		In Progress: Work is progressing on schedule in line with the plan reported to the PUB on June 16.
48	Develop a plan to include experienced P&C Technologists with response teams, where appropriate, starting in 2014.	Liberty 31, RC4, RC 19, P&C5	PUB-38 ²	General Manager, TRO	30-Sep-2014		Complete: The interim plan circulated for internal review in September has been finalized.

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49	Implement all other P&C and related Root Cause Analysis recommendations identified in Hydro's Integrated Action Plan.	Liberty 27; P2P&C4; P&C 2, 3, 4, and 7; TA8; RC9, 27 and 28.	PUB-36, 37, 42 ²	Manager Eng, P&C and Communications	15-Dec-2014		In Progress: Internal P&C resources assigned to coordinate the implementation of these 60 recommendations. Of these, 26 are complete, and another 27 (total 53) will be completed by Dec 15, 2014. The remaining 7 recommendations will be completed by Dec 15, 2015. TA8 and RC28 have been re-assigned to General Manager, TRO and Manager, Operations and Work Execution (G&T), TRO-C respectively.
50	Execute a 2014 plan to repair and update terminal station relay cards.	RC16, RC17, RC18	PUB-40 2	Manager LT Asset Planning	30-Nov-2014		In Progress: Work is progressing on schedule and in line with the plan reported to the PUB on June 16. Fifty percent of all terminal station relay cards have been audited, and the remaining are being scheduled for auditing.
51	Document a protection philosophy and P&C engineering standard in 2014.	RC26; P&C 8	PUB-41 ²	Manager Eng, P&C and Communications	15-Dec-2014		In Progress: Work is progressing in line with the plan reported to the PUB on June 16, addressing the following elements: (a) establish the process for creating, reviewing, approving and managing the standards across time; (b) develop a prioritized list of protection philosophy standards to be developed; (c) two standards to be prepared by November 30, 2014 - breaker fail and transformer protection; and (d) develop a plan by December 15 for completing all other standards at a later time.
52	Develop a plan for meeting the Company's substation and protection and control system resource requirements beginning in 2014.	Liberty 34, 35	PUB-48 2	General Manager, TRO	31-Jul-2014		Complete: A longer-term P&C resourcing plan to ensure base needs are met has been developed and included as part of the 2015 operating budget submission. Resource requirements for 2016 and beyond will be driven by the annual work planning process. The approach for meeting 2014 resource requirements was outlined in a report to the PUB on June 16.
53	Implement all outstanding recommendations from the 2010/11 P&C studies.	P&C3	PUB-27 1	General Manager, TRO	15-Dec-2014		In progress: Work is progressing in line with the plan reported to the PUB on June 16.
54	Implement all outstanding P&C recommendations from the 2013 winter events study.	P&C3	PUB-27 1	General Manager, TRO	31-Dec-2014		In progress: Work is progressing in line with the plan reported to the PUB on June 16.

TECHNOLOGY & COMMUNICATIONS INFRASTRUCTURE

NL HYDRO INTEGRATED ACTION PLAN - 2014 SUPPLY DISRUPTIONS AND POWER OUTAGES



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55	Complete all outstanding work in relation to the Hydro Place emergency generation system, and report to the PUB outlining availability risks and revised maintenance procedures.	Liberty 26, P2TCI6, TCI1, TCI2, TCI3, TCI4, TCI5	PUB 45 PUB-46 ²	General Manager Finance (NLH)	31-Aug-2014		Complete: NL Power now has Hydro Place on priority feed not to be dropped, and if interrupted, HP is considered a priority for reconnection. All Hydro Place emergency generation system components are fully operational. Replacement of the louver control system is complete, including design redundancy. Review of PM program for Diesel Generation System is complete. A second contractor has been added to specialize in the generator section, and engine maintenance checks have been adjusted from once to twice per year, regardless of hours. A critical spares list for all components has been developed. The PM program, including critical spares, has been reviewed by PETS.
56	Execute a 2014 plan for ensuring there is adequate emergency lighting in Hydro Place.	TCI6	PUB 45 PUB-47 ²	General Manager Finance (NLH)	30-Jun-2014		Complete: Emergency lighting has been installed May 26 in Hydro Place stairwells, as well as improvements implemented to the Hydro Place generator room emergency lighting.
57	Ensure that documents related to system restoration, including cold start procedures, are readily available in the IS office and in the Hydro Place ECC in hard copy format.	TCI7		General Manager Finance (NLH)	15-Apr-2014		Complete: Work completed by IS personnel in April, 2014.
58	Implement a process for the monitoring of critical alarms from the Hydro Place UPS on a real-time 24/7 basis.	TCI8		General Manager Finance (NLH)	30-Jun-2014		Complete: Critical alarms are now monitored, and appropriate personnel notified.
COORDINATION & COMMUNICATION WITH CUSTOMERS							
59	Implement a formal protocol for notifying customers, users and the general public in relation to pending supply issues and conservation requests.	P2CC5, CCC9, Liberty 42	PUB 50	VP Corporate Relations	30-Sep-2014		Complete: Hydro and NF Power have developed a terms of reference and action plan for the development of a process for advanced notification.
60	Review the process used in January, 2014 for planning and coordinating rotating outages, both internally and with Newfoundland Power, and implement any changes necessary to improve and streamline this joint process.	CCC1	PUB 50 PUB 51	VP System Operations and Planning	14-Sep-2014		Complete: A meeting with NL Power to conduct a lessons-learned exercise was held. The draft procedure was advanced, and a list of feeders with associated customer service priority has been integrated into the procedure. The protocol was finalized and shared internally and with NLP in late September.
61	Review the protocol for Hydro's use of NLP's hydroelectric and standby generation resources; and address NLP's request for real-time data related to the status of the island interconnected system.	CCC2 (a) and (b)	PUB 50 PUB 51	VP System Operations and Planning	30-Sep-2014		Complete: Protocol has been discussed and agreed between the two utilities. A procedure was drafted and later finalized in the last week of September. The real-time data list is finalized, and EMS datapoints requested over the ICCP data link have been implemented.

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62	Revise Hydro's Outage Communication Protocol to add a Daily Communications Summary coordinated with NLP, and to ensure the mutual sharing of notices and advisories prior to public release.	CCC3	PUB 50 PUB 51	VP Corporate Relations	30-Sep-2014		Complete: A revised outage protocol process flow has been finalized. The full process, including the addition of a daily comms summary, has been added to the revised outage protocol overview document. Monthly monitoring of compliance with the revised outage communication protocol is occurring with TRO, ECC, Customer Service Centre and Corporate Relations.
63	Develop templates that will be available in advance of potential supply/outage events to enable the preparation of public advisories and to ensure rapid response to public inquiries.	CCC4	PUB 50	VP Corporate Relations	30-Apr-2014		Complete: Advisory templates completed April 1 for conservation requests, outage advisories, and storm advisories.
64	Document and streamline the internal processes used for sharing and distributing information between System Operations and Corporate Relations in a potential supply disruption/outage situation.	CCC5	PUB 50	VP Corporate Relations	30-Sep-2014		Complete: System Operations Manager participated in an Issues Analysis exercise with internal stakeholders to develop a streamlined process associated with communications during outages. TRO, CCC and ECC staff trained on new protocol. Completed in May.
65	Develop a list of key customers and power outage stakeholders.	CCC6	PUB 50	VP Corporate Relations	15-May-2014		Complete: Key customer/feeder lists received from the regions were formatted for consistency and completed and sorted as of July 24.
66	Investigate alternatives for managing customer calls in a supply disruption/outage situation, including overflow call options and IVR programming at high volume levels, and implement changes to ensure customer calls are answered in a more timely manner.	CCC7	PUB 50	VP Corporate Relations	15-Dec-2014		In progress: An alternative has been identified with a plan to be in-service in advance of the coming winter season. Necessary changes will be implemented by December 15th.
67	Update Hydro's list of priority feeders in its service territory, determine which feeders cover sensitive customers, and develop a feeder rotation list.	CCC8	PUB 50	Chief Operating Officer	30-May-2014		Complete: Priority feeders and sensitive customers are identified and single point of accountability assigned in TRO to work with Customer Services and System Operations to develop the feeder rotation standard.
68	Develop protocol for advising internal and external stakeholders when Hydro's system reserves are within the threshold of the loss of the largest generating unit, and when an energy conservation call is required	CCC9	PUB 50	VP Corporate Relations	30-Apr-2014		Complete: Instruction developed by System Operations and revised with NL Power. It is being implemented starting on the first week of June, 2014.
69	Develop with NLP a joint Outage Communications Strategy to guide near and longer-term improvements to customer contact technologies and telephony, including multi-channel communication options such as SMS text messaging or other broadcasting options.	Liberty 37 and 41	PUB 50 PUB 51	VP Corporate Relations	15-Jun-2014		Complete: Terms of reference, activities and action plan have been defined. NL Power and Hydro are collaborating to identify synergies and plan near and longer term strategies for customer contact and outage technologies. Hydro and NL Power will be assessing technical details in September.
70	Complete joint customer research with NLP to better understand customer outage-related informational needs and expectations, including requests for conservation.	Liberty 38	PUB 50 PUB 51	VP Corporate Relations	31-Aug-2014		Complete: Joint research was carried out with NLP and concluded with a better understanding of customers' informational expectations, including requests for energy conservation.

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71	Ensure that pre-winter season stress testing of any enhancements to customer-facing outage support systems is incorporated into the implementation process.	Liberty 39		VP Corporate Relations	30-Sep-2014		Complete: It was expected that significant enhancements to customer-facing outage support systems in 2014 would be minimal or not required given NL Hydro's intention to replace these systems within 12-24 months. A review of stress-testing requirements completed in Q3 confirmed that is not possible for NL Hydro to enhance the customer-facing outage support systems, therefore stress-testing of enhancements is not applicable.
72	With respect to the Hydro Place building and its facilities, review Hydro's business continuity plans and contingencies and update as necessary to ensure continued operations and the availability of critical outage response support systems in the event of a supply disruption to the Hydro Place building.	Liberty 40		General Manager Finance (NLH)	30-Nov-2014		Complete: Several actions have been completed to ensure continued operations and the availability of critical outage response support systems in the event of a supply disruption. See IAP 55, 56, 57 and 58 (complete) for details. NL Hydro has also engaged a consultant who will be issuing a report on the Hydro Place Disaster Recovery Plan. The consultant has begun work, and we are in receipt of the first draft version of the current status findings of the report. To date there are no recommendations. Once the final report is issued, any necessary recommendations will be implemented. Hydro anticipates a final report in Q4 2014.
73	Develop a coordinated and robust Storm/Outage Communication Plan with NLP which documents protocols, plans and templates to guide communications during major events.	Liberty 44	PUB 50 PUB 51	VP Corporate Relations	15-Jun-2014		Complete: Hydro and NL Power have completed the terms of reference and action plan. A draft joint storm and outage communications plan is now complete.
74	Complete a joint "lessons learned" exercise with NLP.	Liberty 45	PUB 50 PUB 51	VP Corporate Relations	15-Jun-2014		Complete: Joint lessons learned conducted on May 20th.
75	Commit to a formal effort, sponsored by the senior executives of both Hydro and NL Power, to work together jointly in formulating goals, protocols, programs, and other activities that will improve operational and customer information and communications coordination, leading to the development of identified membership on joint teams, operating under senior executive direction and according to clear objectives, plans, and schedules.	Liberty 46	PUB 50 PUB 51	VP NL Hydro	15-Jun-2014		Complete: NL Power and Hydro executives have met in May, June and July 2014 and will be meeting monthly to oversee the actions and improvements being undertaken by both utilities to enhance customer service and inter-utility coordination.
EMERGENCY RESPONSE AND RESTORATION							
76	Update Hydro's Severe Weather Preparedness Protocol and checklist to incorporate lessons learned from the 2013 and 2014 outages as well as best practices from other utilities.	ERR1		Chief Operating Officer	15-May-2014		Complete: Hydro has implemented a Severe Weather Protocol Preparedness Protocol, incorporating best practices from other utilities. A copy was provided to the Board as part of Hydro's generation winter readiness update on October 1.

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77	Update the TRO emergency response plans to reflect lessons learned from the January, 2014 transformer failures, including specified methods for dealing with transformer fires.	ERR2		Chief Operating Officer	30-Sep-2014		Complete: Section 4.19 of the emergency response plan for fires in terminal stations has been revised.
78	Ensure that records indicating the PCB contents of all oil-filled transformers and equipment are available in hard copy both locally and at an alternate location.	ERR3	PUB 49	Chief Operating Officer	1-Dec-2014		In progress: Fifty percent of the PCB records have been placed in the transformer cabinets.
79	Complete a lighting improvement plan at the Holyrood plant in 2014.	ERR5		Chief Operating Officer	1-Sep-2014		Complete: Lighting improvement plan has been developed. All DC emergency lighting has been verified. New black start diesels installed to provide station service power.

NOTE:

- 1 Color-Shaded References refer to Key Priority Actions in the PUB Interim Report dated May 15, 2014, page 57.

FOOTNOTES:

- 1 Plan outlined in a Report to the PUB on June 2nd
- 2 Plan outlined in a Report to the PUB on June 16th
- 3 Plan outlined in a Report to the PUB on August 1st