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December 10, 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: Newfoundland and Labrador Hydro - the Board's Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System – Update to Hydro's Integrated Action Plan (IAP) as of December 10, 2014**

As requested recently by the Board, please find enclosed a status update on Hydro's Integrated Action Plan. This update reflects the status of all action items to a current date.

We trust the foregoing is satisfactory. If you have any questions or comments, please contact the undersigned.

Yours truly,

**NEWFOUNDLAND AND LABRADOR HYDRO**

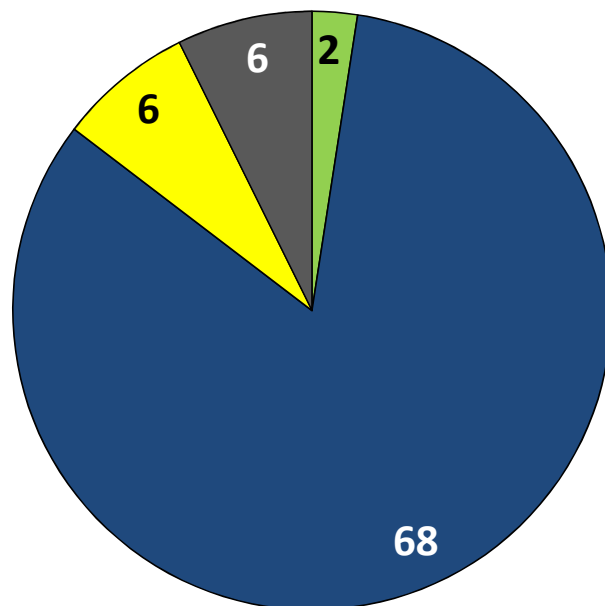
Tracey Pennell  
Legal Counsel

TLP/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 - December 10, 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
2	68	6	6	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
<b>LOAD FORECASTING</b>							
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		<b>Complete.</b> Database and software additions to improve forecast accuracy have been identified and changes have been implemented. Ventyx was in St. John's in June to lead a Nostradamus Training Workshop and to review Hydro's models, and suggested changes to improve the accuracy of the model. A new Island load definition has been created, model training and verification has been completed, and the application has been moved into production.
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		<b>Complete.</b> 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.
<b>GENERATION AND RESERVE PLANNING</b>							
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		<b>Complete.</b> Analysis of winter 2013/14 losses based on generation dispatch has been completed. A 2014/2015 incremental transmission system losses table is now in use by ECC as part of the forecasting program.
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		<b>Complete.</b> 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		<b>Complete.</b> Hydro is expanding its analysis to include additional sensitivities to address concerns raised in the Liberty review.
6	Revisit the generation reserve planning criterion and the manner in which external markets are modeled after interconnection in 2017.	GRP2		VP System Operations and Planning	15-Nov-2015		<b>Not yet started.</b> 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-2015		<b>Not Yet Started.</b> The break-even EFOR statistic for each class of Hydro's generation will not add value to our 2014/15 winter preparedness. The EFOR issue will be reviewed again in September, 2015 and a new completion date of December 1, 2015 has been assigned.
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		<b>Complete.</b> 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		<b>Complete.</b> 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.
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		<b>Complete.</b> Winter peak model is being calibrated for total island load. Have identified all changes required in AGC and reporting tools. Transmission Planning base case load flows has been updated to include customer generation. AGC changes have been made on EMS development system to incorporate all Island resources.
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		<b>Not Yet Started.</b> To be initiated in 2015, subject to any review/discussion of this issue during the Province's overall review of the provincial electricity system.
<b>GENERATION AVAILABILITY</b>							

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Ref	Action/Activity	IAP Reference(s)	Interim Report Ref(s)	Accountable Title	Due Date	Status	Notes / Comments
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; AMS; GA2	PUB 3 PUB 4 PUB-8 <sup>2</sup> PUB 11	Chief Operating Officer, General Manager, GT and Diesel	30-Nov-2014		<b>Complete.</b> Winter readiness process self-assessment targets were completed by Nov 30. A new Severe Weather Preparedness Protocol has been in use throughout the Fall. Most operations and maintenance activities and generation related capital projects indicated in Hydro's Generation Master Plan for Winter Preparation were complete as of December 1, and all remaining activities and projects involving planned scope for 2014 have either been completed or will be completed by December 19. As of December 10, all generating units are available.
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		<b>Complete.</b> Review of GT maintenance practices is complete and required changes have been documented. A protocol for test starts has been developed. Recommended solutions have been implemented for all identified repeat failures. Additional plant and equipment refurbishment has been identified. A fuel management procedure has been prepared.
12b	- Availability improvement: Holyrood Start-Up Time	GA8		Chief Operating Officer	7-Nov-2014		<b>Complete:</b> The 2014 maintenance programs have been executed, and Unit balancing is complete and within standard. Cycle times for unit start-up have been streamlined and practiced within balancing iterations with positive results.
12c	- Availability improvement: Hydro Generation / Granite Canal Availability	GA11		Chief Operating Officer	28-Nov-2014		<b>Complete:</b> An investigation of the Granite Canal turbine vibration issue was completed during the annual unit inspection in the August 4-15 time period. Follow-up actions recommended by Project Execution and Technical Services required a short outage and were completed in November. While its been confirmed that the vibration condition has only occurred twice since the plant was commissioned, both in potential icing periods, Hydro's investigation was not able to isolate icing or any other factors beyond icing as having caused the unit vibration issues in December, 2013. This will continue to be monitored and instrumentation has been installed to assist with the tracking of any future occurrences.
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 <sup>2</sup>	Chief Operating Officer, General Manager, GT and Diesel	30-Nov-2014		<b>Complete.</b> Comprehensive critical spares reviews have been completed in each area of generation operations -- hydraulic; Holyrood; and the gas turbines in Hardwoods and Stephenville. Many required spares have been confirmed as already being in stock, and most spares not in stock which have been identified as being a priority for 2014/2015 winter readiness/generation availability are on order with expected delivery dates in December or January, 2015. A very small number of spares have order lead times which will not make procurement possible for the coming winter season, however the reliability risks in these areas have been assessed as low given the condition of the assets involved and Hydro's preparedness to make repairs in the unlikely event of a breakdown. Hydro's supplementary critical spares update to the PUB on December 9, 2014 provides further details.
14	Secure economically available interruptible loads.	Liberty 16	PUB 6 PUB-10 <sup>2</sup>	VP NL Hydro	30-Nov-2014		<b>In Progress:</b> Through its review, Hydro determined that Corner Brook Pulp and Paper (CBPP) and Vale are the only Island Industrial Customers capable of providing a material quantity of winter capacity assistance. An agreement reached with CBPP for 60 MW of winter capacity assistance was approved by the Board on November 28 (Board Order No. P.U. 49 (2014)). An agreement has since been reached with Vale, subject to a technical verification of the amount of capacity assistance that Vale is able to provide if required. Hydro expects to conclude an agreement with Vale by December 18.
15	Install and commission a new Combustion Turbine at Holyrood.	Liberty 15	PUB 7	VP Project Execution and Technical Services	7-Dec-2014		<b>Caution:</b> Some delays have been encountered due to weather and equipment deliveries, and additional resources are being applied to try and recover schedule. However, it is still expected that function testing and initial commissioning of the CT unit will be completed in December.
16	Create a senior position reporting to the VP with accountability for CTs and diesels	P1GA2		VP NL Hydro	14-Apr-2014		<b>Complete:</b> 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		<b>Complete:</b> 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.
<b>TRANSMISSION AVAILABILITY</b>							
<b>Transformers and Terminal Stations</b>							
18	Execute a 2014 plan for testing transformers with questionable levels of combustible gases.	Liberty 17	PUB 13 PUB 15 PUB-16 <sup>1</sup>	General Manager, TRO	31-Aug-2014		<b>Complete:</b> Transformer gas testing has been completed consistent with the plan submitted to the PUB on June2.
19	Execute a 2014 plan for completing overdue testing and maintenance on critical transformers.	Liberty 18	PUB 12 PUB 14 PUB-17 <sup>1</sup>	General Manager, TRO	30-Nov-2014		<b>Complete:</b> Testing and maintenance on critical transformers is progressing as planned. Six of eight critical transformers have been completed to date.

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Ref	Action/Activity	IAP Reference(s)	Interim Report Ref(s)	Accountable Title	Due Date	Status	Notes / Comments
20	Develop a plan for completing overdue testing and maintenance on remaining transformers.	Liberty 18	PUB-18 <sup>1</sup>	General Manager, TRO	15-Jun-2014		<b>Complete:</b> 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 <sup>2</sup>	VP System Operations and Planning	15-Jun-2014		<b>Complete:</b> 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 <sup>2</sup>	VP System Operations and Planning	15-Jun-2014		<b>Complete:</b> System study completed on June 13th. See IAP 25 and June 16th Report to the PUB.
23	Complete a study to determine if abnormal system disturbances may have caused the T5 failure at Western Avalon.	Liberty 29, RC5	PUB-21 <sup>2</sup>	VP System Operations and Planning	15-Sep-2104		<b>Complete</b> Trans Grid Solutions 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. Their two reports focused on the PSCAD studies associated with the failure of SSD T1 (fire) and the WAV T5 failure. Both reports are now final and ready for submission to the PUB. The reports' key finding was that there was no evidence of harmonic occurrence during the Western Avalon T5 energization that would have resulted in failure of the T5 tap changer. The reports recommended that if additional information become available then the study findings should be reviewed.
24	Install a replacement for T1 transformer at Sunnyside.	Liberty 19		VP Project Execution and Technical Services	21-Nov-2014		<b>Complete:</b> 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. T1 transformer at Sunnyside has been replaced with a redundant transformer we removed from Holyrood (T8). It is in place and powered up at Sunnyside. NOTE: There is a new transformer received and placed in the Holyrood T8 location (this is the now certified new transformer originally intended for Sunnyside T1 location). We are beginning the process of connecting and commissioning the new transformer at Holyrood T8
25	Complete refurbishment of T5 transformer at Western Avalon.	Liberty 30		VP Project Execution and Technical Services	5-Oct-2014		<b>Complete:</b> Energization of the T5 transformer occurred on October and it has been handed over to Operations. Hydro's update report to the Board on November 10, 2014 provides further details.
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		<b>Complete:</b> Review has been completed and documented in Hydro's Integrated Action Plan and Key lessons and priority actions have been implemented by Dec 1, 2014. Events and lessons learned were also shared and discussed by all asset owners in the Assets Owners Council meeting on Oct 29, 2014. The asset owners will share the results of lessons learned and winter preparedness actions with leaders in their plants/regions by December 15 to finalize this action item. Lessons learned and work overview shared across the organization in the first week of December.
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		<b>Complete:</b> 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		<b>Not Yet Started:</b> The risk/reward review will begin in 2015. However, the Sunnyside replacement transformer will be installed with the enhanced 230 kv breaker configuration.
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		<b>Complete</b> ABB was engaged to assist with this review. Condition information was provided for 30 of Hydro's most critical transformers and ABB site inspections were completed. ABB's draft report has been through two development iterations to clarify the details. It was also reviewed within the Company's Transformer and Swithyard Equipment Technical Council. Another meeting was held with ABB on November 7 and the final report was received November 21. Long term plan has been revised.
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		<b>Not Yet Started:</b> 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.

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Ref	Action/Activity	IAP Reference(s)	Interim Report Ref(s)	Accountable Title	Due Date	Status	Notes / Comments
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		<b>Complete:</b> 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		<b>Not Yet Started:</b> To be initiated in 2015 as a joint task with PETS and TRO Operations.
<b>Air Blast Breakers</b>							
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		<b>Complete:</b> Of the 63 breakers covered by the 2014 breaker exercise program 57 have been exercised, five have been replaced, and one remaining breaker will be exercised during the week of December 8.
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		<b>Complete:</b> The 2014 plan for testing and maintenance on critical AB circuit breakers has been completed in line with the plan submitted to the PUB on June 2, including the catch-up work identified on nine critical recovery AB circuit breakers.
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		<b>Complete:</b> 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		<b>Complete:</b> A procedure was developed and placed into the Minatenance Manual effective August 1, 2014.
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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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.
<b>Alarms and Recording Devices</b>							
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		<b>Complete:</b> 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.
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		<b>Complete:</b> The analysis of the implementation of a program to install modern digital relays for all major equipment, such as 230 kV transformers, has been completed. Implementation will follow in future years from this analysis.

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<b>ASSET MANAGEMENT &amp; MAINTENANCE</b>							
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		<b>Complete:</b> 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.
<b>PROTECTION AND CONTROL SYSTEMS</b>							
46	Execute a 2014 plan to eliminate slow trip coils.	Liberty 32; P&C 1	PUB 35 PUB-39 <sup>2</sup>	Manager Eng, P&C and Communications	30-Nov-2014		<b>Complete:</b> 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 <sup>2</sup> , PUB-37 <sup>2</sup>	Manager Eng, P&C and Communications	30-Nov-2014		<b>Caution:</b> Other operational and winter readiness priorities have resulted in some slippage in the completion of this action. However, a recovery plan has been implemented and its expected this work will be completed by December 19.
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 <sup>2</sup>	General Manager, TRO	30-Sep-2014		<b>Complete:</b> The interim plan circulated for internal review in September has been finalized.
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 <sup>2</sup>	Manager Eng, P&C and Communications	15-Dec-2014		<b>In Progress:</b> Internal P&C resources have been assigned through the year to coordinate the implementation of these 60 recommendations, 54 of which were planned for completion in 2014. Of this total, 46 are complete. Other operational and winter readiness priorities have delayed the completion of the remaining eight recommendations from the 2014 scope, however these will be completed by no later than the end of January, 2015.
50	Execute a 2014 plan to repair and update terminal station relay cards.	RC16, RC17, RC18	PUB-40 <sup>2</sup>	Manager LT Asset Planning	30-Nov-2014		<b>Caution:</b> Work is progressing and in line with the plan reported to the PUB on June 16. Relay cards are ordered for all critical 230 kv stations and will in place by December 31, 2014."
51	Document a protection philosophy and P&C engineering standard in 2014.	RC26; P&C 8	PUB-41 <sup>2</sup>	Manager Eng, P&C and Communications	15-Dec-2014		<b>Complete:</b> Work has progressed in line with the plan reported to the PUB on June 16. A process for creating, reviewing, approving and managing the standards across time was created; a prioritized list of protection philosophy standards to be developed was developed; and two standards have been prepared (breaker fail and transformer protection). A plan for completing all other standards in 2015 and beyond has also been developed.
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 <sup>2</sup>	General Manager, TRO	31-Jul-2014		<b>Complete:</b> 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 <sup>1</sup>	General Manager, TRO	15-Dec-2014		<b>In progress:</b> Thirteen of the 17 recommendations planned for 2014 are complete. The four remaining recommendations involve two actions for retrieving unfiltered data from Schweitzer relays, an assessment of pneumatic timers and performance of CVTs at SSD. Other operational and winter readiness priorities have resulted in some delay in the completion of these items, however they will be completed by the end of January, 2015 at the latest.
54	Implement all outstanding P&C recommendations from the 2013 winter events study.	P&C3	PUB-27 <sup>1</sup>	General Manager, TRO	31-Dec-2014		<b>In progress:</b> Work is progressing in line with the plan reported to the PUB on June 16. HRD Lockouts have been tied into breaker failure at terminal station. Other recommendations being implemented by the end of December. Four recommendations are scheduled for completion by end of 2014 including evaluating reclosing on 100L at SSD ; frequency monitoring assessment in terminal stations; u/f relaying at HLK assessment and installation of timers in CBC capacitor banks.

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<b>TECHNOLOGY &amp; COMMUNICATIONS INFRASTRUCTURE</b>							
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 <sup>2</sup>	General Manager Finance (NLH)	31-Aug-2014		<b>Complete:</b> 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 <sup>2</sup>	General Manager Finance (NLH)	30-Jun-2014		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> Critical alarms are now monitored, and appropriate personnel notified.
<b>COORDINATION &amp; COMMUNICATION WITH CUSTOMERS</b>							
59	Implement a formal protocol for notifying customers, users and the general public in relation to pending supply issues and conservation requests.	P2CCS, CCC9, Liberty 42	PUB 50	VP Corporate Relations	30-Sep-2014		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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.
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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> Key customer/feeder lists received from the regions were formatted for consistency and completed and sorted as of July 24.



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
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		<b>Caution:</b> An alternative has been identified and will be implemented by January 31, 2015.
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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> Joint research was carried out with NLP and concluded with a better understanding of customers' informational expectations, including requests for energy conservation.
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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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		<b>Complete:</b> 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.

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
<b>EMERGENCY RESPONSE AND RESTORATION</b>							
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		<b>Complete:</b> 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.
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		<b>Complete:</b> 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		<b>Complete:</b> The PCB contents of all oil filled power transformers have been made available electronically from all offices and terminal stations. Hard copies are also available in regional offices in Bishop's Falls, Happy Valley and Port Saunders, and in terminal stations inside transformer cabinets. The location information and access instructions have been communicated to all appropriate employees. Additionally, PCB labels have been sent to applicable supervisors, and work orders for the installation of labels on, and "Notices of PCB Concentrations" in, power transformer cabinets have been generated.
79	Complete a lighting improvement plan at the Holyrood plant in 2014.	ERR5		Chief Operating Officer	1-Sep-2014		<b>Complete:</b> Lighting improvement plan has been developed. All DC emergency lighting has been verified. New black start diesels installed to provide station service power.
<p><b>NOTE:</b></p> <p>1 Color-Shaded References refer to Key Priority Actions in the PUB Interim Report dated May 15, 2014, page 57.</p> <p><b>FOOTNOTES:</b></p> <p>1 Plan outlined in a Report to the PUB on June 2nd</p> <p>2 Plan outlined in a Report to the PUB on June 16th</p> <p>3 Plan outlined in a Report to the PUB on August 1st</p>							