NEWFOUNDLAND AND LABRADOR
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES
120 Torbay Road, P.O. Box 21040, St. John's, Newfoundland and Labrador, Canada, A1A 5B2

E-mail: gyoung@nlh.nl.ca

2014-08-25

Mr. Geoffrey Young
Newfoundland and Labrador Hydro
P.O. Box 12400
St. John's, NL A1B 4K7

Dear Sir:

Re: Newfoundland and Labrador Hydro - the Board's Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System – Requests for Information PUB-NLH-301 to PUB-NLH-437

Enclosed are Information Requests PUB-NLH-301 to PUB-NLH-437 regarding the above-noted matter. Responses to these Requests for Information (RFIs) must be filed by Monday, September 15, 2014.

If Hydro determines that it cannot meet the response date for any of these RFIs, Hydro must advise the Board and provide an explanation as to why it cannot respond to each RFI for which it is requesting an extension to file a response. Hydro must request an extension of time to file responses, if it intends to do so, by Thursday, August 28, 2014.

If you have any questions, please do not hesitate to contact the Board's Legal Counsel, Ms. Jacqui Glynn, by email, jgylnn@pub.nl.ca or telephone, (709) 726-6781.

Yours truly,

B. Sheppard

Bobbi Sheppard
Assistant Board Secretary

Encl.

cc. **Newfoundland Power Inc.**
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IN THE MATTER OF
the *Electrical Power Control Act, 1994*,
SNL 1994, Chapter E-5.1 (the "*EPCA*")
and the *Public Utilities Act,* RSNL 1990,
Chapter P-47 (the "*Act*"), as amended; and

IN THE MATTER of the Board's Investigation
and Hearing into Supply Issues and Power Outages
on the Island Interconnected System.

PUBLIC UTILITIES BOARD
REQUESTS FOR INFORMATION

PUB-NLH-301 to PUB-NLH-437

Issued: August 25, 2014

PUB-NLH-301 Provide a spreadsheet detailing the customer service performance and the operational metrics listed in PUB-NLH-207. Include actual performance for each metric by month for 2012, 2013, and 2014 YTD.

PUB-NLH-302 Provide meeting minutes, notes, action items, and lessons learned from the Joint Utilities meeting that occurred in May 2013.

PUB-NLH-303 Provide meeting minutes, notes, action items, and lessons learned from the Executive Level Committee meetings that have been held monthly since May 2014. Specify the meeting schedule going forward.

PUB-NLH-304 Provide a copy of the Joint Utilities Communications Plan established with Newfoundland Power that outlines notification protocol during a system event.

PUB-NLH-305 Provide meeting minutes, notes, action items, and lessons learned from the Lessons Learned meeting that was held with Newfoundland Power Customer Service, Communications, and Energy Efficiency teams.

PUB-NLH-306 Provide a copy of the recently revised business continuity plans.

System Design

PUB-NLH-307 Provide a "*Hydro Provincial Generation and Transmission Grid*" system map with sufficient resolution to be read on a Word document. Also, provide a map showing Hydro's distribution territory.

PUB-NLH-308 Indicate the numbers of residential, commercial and industrial customers directly served by Hydro on the Island Interconnected System. How many are served by the transmission system?

PUB-NLH-309 Describe Hydro's 230kV, 138kV, and 69/66kV loops. Provide lists of transmission lines showing whether each circuit is radial or looped.

PUB-NLH-310 What percentage of Hydro's distribution substations is served by more than one source? How many distribution substations have more than one transformer?

PUB-NLH-311 Further to the response to PUB-NLH-176 confirm that Hydro does not have any spare 230/138kV or 230/69/66kV transformers, other than might result from the Hardwoods-Oxen Pond project.

PUB-NLH-312 What are the ranges of kVA sizes of the transformers in Hydro's distribution substations? How many of Hydro's substations have more than one transformer?

PUB-NLH-313 How many of the Hydro's distribution lines have ties to other lines so as to be able to pick up some loads between the distribution lines?

PUB-NLH-314 To what Canadian Electricity Association (CEA) standards do Hydro's current transmission pole line and distribution line pole strength criteria comply? How much of Hydro's transmission system, and how much of its distribution system, were constructed under older standards with lower strength requirements than indicated by the existing standard?

PUB-NLH-315 The response to PUB-NLH-176 indicates that Hydro's Energy Control Centre (ECC) maintains a transformer loading guideline for emergency conditions with acceptable overload levels. Provide a copy of these emergency loading guidelines and confirm whether or not Hydro allows temporary overloading (without exceeding maximum hot spot temperatures) of transformers, when necessary to conduct repairs or switching necessary to minimize Hydro or Newfoundland Power customer outages or whether Hydro only allows short-term overloading of distribution substation transformers as indicated by Hydro's response to PUB-NLH-188.

PUB-NLH-316 Further to the response to PUB-NLH-176 which indicates that Hydro does not employ "*emergency*" load limitations to its transmission and distribution line ratings, does this mean that Hydro or Newfoundland Power will need to shed load (if no local generation is available) when a transmission line becomes "*overloaded*" because a parallel line is out of service, even when conductor sag clearances are not exceeded?

PUB-NLH-317 What are Hydro's minimum allowed vertical and horizontal clearances for each transmission operating voltage?

PUB-NLH-318 Describe the Island Interconnected transmission system before the 230kV system was constructed in the 1960s. What was the time period when the original 230kV system was constructed? When were the ring and breaker and one-half buses installed?

PUB-NLH-319 Provide simple diagrams on a Word document demonstrating load bus, ring bus, breaker and one-half bus, and breaker and one-third bus; and provide a brief discussion of the advantages and disadvantages of each bus design.

T&D Planning

PUB-NLH-320 Provide a description of operating situations when Hydro's Transmission Planning group assists the Energy Control Centre (ECC).

PUB-NLH-321 How many circuit breakers have been replaced since 2004 because of fault-duty limitations? Which of Hydro's circuit breakers must be replaced because of the increased fault-duty after the integration of Muskrat Falls and the Labrador-Island Link?

PUB-NLH-322 Describe how Hydro forecasts peak demands for developing capital load growth projects in the medium and long term, for each feeder, for each substation, and for each transmission line. Indicate the levels (e.g. 95%, 100%, or 105% of ratings) of anticipated forecast peak loads on feeders, substations, or transmission lines that trigger load growth projects.

PUB-NLH-323 Provide the peak demand anticipated for each transformer for each of Hydro's terminal station and substation transformers for next winter with all systems in normal configurations. Confirm whether the average demand on each transformer doesn't exceed about 50% of the peak demand.

PUB-NLH-324 Provide a list of Hydro's transmission lines by voltage. Indicate ampacity ratings at 0 degrees Celsius and the peak demand anticipated for each line for next winter with all systems in normal configurations. Confirm that the average demand on each line doesn't exceed about 50% of the peak demand.

PUB-NLH-325 Provide a list of distribution lines, by voltage. Indicate ampacity ratings at 0 degrees Celsius and peak demand anticipated for each line for next winter with all systems in normal configurations. Confirm that the average demand on each distribution line doesn't exceed about 50% of the peak demand.

System Protection

PUB-NLH-326 Describe Hydro's programs and procedures for its 6-year protective relay testing program and state whether any changes will be necessary when Hydro's system is interconnected with the Muskrat Falls Project. In the response confirm that Hydro does not have any relays in its distribution substations.

PUB-NLH-327 Provide Hydro's relay protection design criteria before 2014 and after January 2014.

PUB-NLH-328 The response to PUB-NLH-100 indicates that Hydro expended $264,295 in 2009 and $172,173 in 2010 for relay replacements, with no expenditures for 2011, 2012, and 2013. Describe the relay replacement projects for 2009 and 2010 and explain why no relay replacement work was conducted in 2011 to 2013.

PUB-NLH-329 Explain how Hydro protects its transmission lines and its distribution lines from lightning and switching surges. Include in the response whether Hydro has a practice of installing metal oxide varistor (MOV) arresters on its pole-mounted distribution transformers.

PUB-NLH-330 Explain how Hydro protects its transmission and distribution systems from animals and raptors. In the response include whether Hydro has a practice of installing animal guards.

PUB-NLH-331 Explain how Hydro mitigates "*galloping conductor*" issues.

System Reliability

PUB-NLH-332 The response to PUB-NLH-105 referred to a "*System Planning Criteria*" document. Provide this document.

PUB-NLH-333 Further to the response to PUB-NLH-105 confirm that Hydro does not have transmission or distribution "*reliability*" engineers nor specific on-going annual reliability enhancement programs addressing worse performing feeders, multiple device operations, or any programs specifically addressing reliability indices, such as number of customer interruptions, and System Average Interruption Frequency Index (SAIFI) or System Average Interruption Duration Index (SAIDI), but that Hydro does include weighted scoring of project reliability improvements as part of its equipment upgrades, replacements, and additions projects.

PUB-NLH-334 Provide examples of Transmission and Rural Operations (TRO) projects, such as the Wood Pole Line Management (WPLM) program, that TRO has conducted over the last few years where improving service reliability for customers was the primary goal.

PUB-NLH-335 Has Hydro ever had a systematic program for addressing its worse performing feeders?

PUB-NLH-336 Hydro's capital planning prioritization method includes weighted scorings for the degree a project is needed to continue reliable customer service and the degree the project impacts customer service. Confirm that Hydro does not calculate "*cost per avoided customer interruption*" in its analysis for scoring a project which impacts customers.

PUB-NLH-337 Does Hydro address multiple operations of the same protective devices for its distribution system? If so, how are these addressed by Operation and Maintenance (O&M) work or by capital projects?

PUB-NLH-338 Provide tables indicating the causes of customer interruptions by year, including total numbers of Customer Interruptions (CIs) and numbers of

Customer Minutes of Interruptions (CMIs), without and with major events, each year, the number of CIs for each cause each year, and the percentage each cause contributed to the total CIs for each year from 2009 through 2013. For the "*equipment malfunction*" cause, provide a table for each year indicating the equipment type which failed including, but not limited to, substation transformers, relays, cutouts, poles, insulators, wires, underground cables, aerial cables, splices, etc. State what is assumed to be causes under "*other*". Are trees generally the cause of wind and weather caused outages?

PUB-NLH-339 Provide, in tabular form, Hydro's System Average Interruption Frequency Index (SAIFI) and its System Average Interruption Duration Index (SAIDI) indices (including and excluding major events) for the transmission system and the distribution systems, by region, for each year 2009, 2010, 2111, 2012, and 2013. In the response include the criteria used to determine a "*major event*", how Hydro's reliability indices compare with Canadian Electricity Association (CEA) average indices and explain if Hydro has reliability goals and any programs for attaining those goals.

PUB-NLH-340 Does Hydro plan, in the future, to install distribution automation (DA) equipment and installing AMI (Advanced Metering Infrastructure) metering which can communicate with the Outage Management System?

PUB-NLH-341 Which group reviews the causes of outages and how are the outage causes generally used to improve reliability?

Asset Management

PUB-NLH-342 Provide an electronic copy of Hydro's overall asset management philosophy and strategy document.

PUB-NLH-343 Provide the appropriate organization charts which show the positions, and who they report to, for the "*Manager, Office of Asset Management*", the "*Manager, Project Execution – Regulated Hydro*" and the "*TRO General Manager*" in the Nalcor and Hydro organizations.

PUB-NLH-344 Define the acronym "PETS", explain the function of the PETS engineering group, with examples, and provide the organization chart for the PETS engineering group.

PUB-NLH-345 Does Hydro consider the need for increased skilled Full-Time Employees (FTE) workers, or additional contractor workers, as part of identifying total resource needs to accomplish anticipated Transmission and Rural Operations (TRO) operations and maintenance (O&M) work, capital project work, and emergency work? Explain how Hydro is planning to

provide the resources needed for the accelerated TRO O&M and capital work over the next few years.

PUB-NLH-346 Describe the Company's Line Worker, Substation Electrical Worker, and Millwright apprenticeship programs. Describe any specific training for these workers other than the apprenticeship programs.

PUB-NLH-347 Describe the duties and responsibilities of Hydro's Protection and Control (P&C) engineers and P&C technologists.

PUB-NLH-348 According to the Report to the Board Related to Terminal and Protection and Control Resource Requirements dated June 16, 2014, Hydro is considering adding to the base Protection and Control (P&C) work plan in 2015 and in future years. Describe the base P&C work plan in general terms, and explain the additions to the work plan planned for 2015 and future years. Include in the response how many technologists will be hired to accomplish the planned work.

PUB-NLH-349 The response to PUB-NLH-172 indicates that Hydro bases its Wood Pole Line Management (WPLM) program on a Reliability Centered Maintenance (RCM) principle. Provide a discussion of Hydro's definition of RCM and Hydro's use of RCM principles for its various Transmission and Rural Operations (TRO) asset management operations and maintenance (O&M) and capital programs. Include the formal goals of Hydro's Asset Management activities.

PUB-NLH-350 Further to the response to PUB-NLH-174 provide a copy of a typical Regional Manager's Preventive Maintenance (PM) status report and recovery plans submitted to the General Manager. Explain if this report includes tracking corrective maintenance (CM) tasks and how Regional Managers are held accountable for not completing Transmission and Rural Operations (TRO) asset management work according to the weekly and annual plans.

PUB-NLH-351 Describe Hydro's Geographic Information System (GIS), including the software program used, how and by whom equipment data and location are entered and updated. In the response include to what degree (80%, 90%, 100%) is Hydro's GIS transmission data and its distribution data accurate and what Hydro is doing to improve its GIS data.

PUB-NLH-352 Further to the responses to PUB-NLH-085 and PUB-NLH-172 what are Hydro's priority categories for replacing reject poles under the Wood Pole Line Management (WPLM) program? Does Hydro use the 4 levels of priorities indicated by the response to PUB-NLH-083 (repair priorities)? Are poles identified as urgent replaced immediately? Are all pole replacements charged as capital projects?

PUB-NLH-353 Provide, in tabular form, Hydro's Operations and Maintenance (O&M) and its Capital expenditures for annual and semiannual transmission line inspections, for the Wood Pole Line Management (WPLM) program, and for transmission pole replacements for each year 2009, 2010, 2011, 2012, and 2013.

PUB-NLH-354 Provide, in tabular form, Hydro's Operations and Maintenance (O&M) and Capital expenditures for distribution line inspections, by region, and for distribution pole replacements for each year 2009, 2010, 2011, 2012, and 2013.

PUB-NLH-355 Provide, in tabular form, the number of transmission lines and transmission poles on Hydro's system by age groups (0-10, 11-20, 21-30, 31-40, and greater than 40 years). Provide estimates of actual ages are not known.

PUB-NLH-356 Provide, in tabular form, the numbers of distribution substation transformers on Hydro's system by age groups (0-10, 11-20, 21-30, 31-40 and greater than 40 years). Provide estimates of actual ages are not known.

PUB-NLH-357 Provide, in tabular form, the number of distribution lines and distribution poles on Hydro's system by age groups (0-10, 11-20, 21-30, 31-40, and greater than 40 years). Provide estimates if actual ages are not known.

PUB-NLH-358 Does Hydro have any plans to provide its Transmission and Rural Operations (TRO) crews with mobile computers which can communicate with Hydro's Computerized Maintenance Management Software (CMMS) system and with its Outage Management Systems (OMS) (if any) so that paper work orders and paper inspection sheets can be replaced with electronic work orders and inspection? Is Hydro considering using handheld computers for terminal station and substation inspections?

PUB-NLH-359 Describe Hydro's Vegetation Management (VM) policy, program, and practices, including:

a. Who are responsible for the program?
b. What are the duties of the vegetation specialist? Is he/she an arborist?
c. Policies or practices for trimming, danger tree (and define danger tree) removal and brush control and describe issues related to removing danger trees.
d. Trim clearance requirements.
e. Whether VM work is based on trim cycles or is only for addressing hot spots.
f. By whom and when are VM inspections conducted.
g. Who does the trimming, Hydro or a contractor and how many VM contractor crews are available to Hydro?

h. Whether the VM program applies to both the distribution and transmission systems.
i. How much Operations and Maintenance (O&M) funds and capital were spent on Hydro's transmission VM program and for its distribution VM programs in 2009, 2010, 2011, 2012, and 2013 and how much is budgeted for 2014 and 2015?

PUB-NLH-360 Does Hydro have any underground/submarine transmission lines? If yes, state how many and where they are located and who maintains and replaces them.

PUB-NLH-361 Does Hydro have any mainline underground distribution feeders and/or Underground Rural Distribution (URD) lateral feeders? If yes state how many, where they are located, whether Hydro has a URD replacement program and who repairs them.

PUB-NLH-362 Does Hydro use line contractors either for the normal course of work or in emergencies and if so, how are they used? Include the use of Newfoundland Power's lineworkers, if any, in this response.

PUB-NLH-363 Does Hydro conduct periodic electrical quality testing on distribution substation transformers? If so, describe the preventive maintenance and testing conducted.

PUB-NLH-364 Provide the titles of the Hydro personnel who inspect terminal stations. Provide a copy of a typical completed 120-day termination station inspection checklist.

PUB-NLH-365 Explain Hydro's reasons and justifications for deferring the 6-year maintenance for some Air Blast Circuit Breakers (ABCBs) and some large power transformers between 2010 and 2014. Did Hydro select which breakers and transformers it deferred based on low criticality or on condition assessments, or both?

PUB-NLH-366 Further to the response to PUB-NLH-155 confirm that the deferred Transmission and Rural Operations (TRO) Preventive Maintenance (PM) work orders for large transformers and for Air Blast Circuit Breakers (ABCBs) were not included in the 2010-2014 annual TRO work plans. Is it correct that the % PM work compliance could be 100% even when some PM work (the deferred work) was not scheduled, although the work was specified by Hydro's maintenance program?

PUB-NLH-367 Further to the response to PUB-NLH-155 on page 7 of the response Hydro stated that "*TRO (Transmission and Rural Operations) reviewed the status of all PMs (preventive maintenance work orders) in 2010 to ensure completeness and consistency across similar assets and improvements were subsequently made. In light of the January 2014 events, TRO is*

implementing the following initiatives". What initiatives did TRO implement between 2010 and 2014 to improve annual PM work completion percentages, other than deferring some work in the annual plan and has Hydro implemented the seven PM work completion initiatives indicated on pages 7 and 8 of the response?

PUB-NLH-368 Describe how equipment condition assessments are conducted for transmission, terminal station, substation and distribution line equipment. Include in the response who participates in the assessments, examples of types of inspections and tests, and reliability data, used for the assessments and whether these assessments form the basis for both Operations and Maintenance (O&M) maintenance work and capital improvement projects.

PUB-NLH-369 Further to the response to PUB-NLH-037 which states that "*In 2012, Hydro commenced an internal review of the methodology for determining critical spare thresholds*", describe Hydro's process for determining Transmission and Rural Operations (TRO) critical spare thresholds and the status of this review. Include in the response the extent Hydro currently stocks spare conductors, insulators, and other parts for critical transmission lines, and spare parts for critical terminal stations.

PUB-NLH-370 Provide a list of the generators operated and maintained by Hydro's Transmission and Rural Operations (TRO) group. Describe generators locations, sizes, fuel, and general maintenance practices.

PUB-NLH-371 Describe the duties and membership of Hydro's Transmission and Rural Operations (TRO) Root Cause and Repeat Failure Analysis Council. Include in the response what triggers it to meet and whether it is involved with distribution issues as well as transmission issues.

PUB-NLH-372 Do Transmission and Rural Operations (TRO) personnel investigate unexplained relay operations? If yes, who does the investigations?

PUB-NLH-373 Further to the response to PUB-NLH-087 provide the number of transmission line inspections and the number of Wood Pole Line Management (WPLM) inspections scheduled, and the numbers completed, each year 2011 through 2013.

PUB-NLH-374 Further to the response to PUB-NLH-095 which indicates that Hydro replaced about 2,850 distribution poles in the last 5 years. What usually triggered these pole replacements? Was it from distribution line assessments resulting from distribution inspections, or something else?

PUB-NLH-375 Further to the responses to PUB-NLH-088 and PUB-NLH-095 does Hydro agree with the following statements:

"Hydro replaced about 1.14 percent of its transmission poles (265 out of 23,350), and 6.09 percent of its distribution poles (2,850 out of 46,790), over the last five years. On average, the Company has been replacing transmission poles at about 0.23 percent per year and distribution poles at about 1.2 percent per year. At these current annual replacement rates, each transmission pole is being replaced, on average, about every 435 years (although Hydro treats its transmission poles to extend pole life) and each distribution pole is being replaced, on average, about every 83 years."

PUB-NLH-376 Further to PUB-NLH-375 is the Wood Pole Line Management (WPLM) program basically deferring large numbers of transmission pole replacements 20-40 years?

PUB-NLH-377 Provide the numbers of distribution line inspections scheduled each year 2011 through 2013. Provide the numbers of distribution line inspections conducted each year 2011 through 2013.

PUB-NLH-378 Further to the response to PUB-NLH-084 provide, in tabular form, the number of terminal station equipment corrective maintenance (CM) work orders scheduled for completion during each year, the number of CM work orders completed during each year and the number of CM work orders scheduled to be completed during each year, but not completed by year's end (overdue/backlogged) for year's end 2011, 2012, and 2013. Do not include relays.

PUB-NLH-379 Further to the response to PUB-NLH-084 (terminal station backlogs). This response reported the terminal station equipment inspections, preventive maintenance (PM), and corrective maintenance (CM) work order backlogs, and the terminal station relay maintenance work order backlogs together and not separately. Provide, in tabular form, the number of terminal station equipment preventive maintenance (PM) work orders scheduled for completion during each year, the number of PM work orders completed during each year, and the number of PM work orders scheduled to be completed during each year, but not completed by year's end (overdue/backlogged) for year's end 2011, 2012, and 2013. Do not include relay preventive maintenance work or terminal station inspections.

PUB-NLH-380 The response to PUB-NLH-084 reported the terminal station equipment inspections, preventive maintenance (PM), and corrective maintenance (CM) work order backlogs, and the terminal station relay maintenance work order backlogs together and not separately. Provide, in tabular form, the number of terminal station Protective Relay Testing/Maintenance work orders scheduled for completion during each year, the number of relay work orders completed during each year, and the number of relay work

orders scheduled to be completed during each year, but not completed by year's end (overdue/backlogged) for year's end 2011, 2012, and 2013.

PUB-NLH-381 This is in reference to Hydro's 2015 Capital Budget Application, Appendix A; "*Capital Project Overview.*" Explain how Hydro applies "*Probability and Confidence Factors*" into the scores and which scores when considering capital projects and explain what groups conduct the evaluations and scoring, and who leads the process.

PUB-NLH-382 This is in reference to Hydro's 2015 Capital Budget Application; Appendix A; "*Capital Projects Overview*". Explain how corporate financial and resources limit each year's capital budget and limit each year's 5-year plan projects up to a specific ranking, (in the 2014 budget, the project rankings were limited to Rank 46 and in the 2015 capital budget, the projects were limited to Rank 50).

PUB-NLH-383 Further to the response to PUB-NLH-100 using the 2009 to 2013 table provided as a baseline, state the anticipated expenditures for relay replacements, recloser control panels, and 230kV breaker controls for each year 2014, 2015, 2016, 2017, 2018, and 2019.

PUB-NLH-384 Describe how (what software) and who schedules and tracks protective relay periodic testing. Include in the response who is directly responsible and who is ultimately responsible for completing relay testing consistent with schedules, whether relay maintenance data records are recorded in a computer program and whether relay test sheets are hand written or via a computer program.

PUB-NLH-385 Do inspectors record distribution pole Global Positioning System (GPS) locations when conducting distribution feeder inspections? Do transmission pole inspectors record Geographic Information System (GIS) data when inspecting transmission poles?

Emergency Management

PUB-NLH-386 Provide electronic copies of all Storm Restoration Reports submitted to the Public Utilities Board related to major storm outage events (especially Hurricane Igor in 2010) since 2004. These reports should include topics such as how each storm affected different areas of the Company, equipment damaged, numbers of customer interruptions (CIs) and customer minutes of interruption (CMIs) for each storm, time required to restore 95% (if possible) and 100% of customers, numbers of employees involved including Line Workers, local contractor personnel, and tree trimmers, conditions or resource limitations extending restoration times, and if any, Newfoundland Power and other contractor crews were utilized.

PUB-NLH-387 Further to the response to PUB-NLH-027 provide an update on the status of the review cited in this response. If completed, provide an electronic copy of the report. If still in progress, provide the scheduled due date for completion.

PUB-NLH-388 Further to the response to PUB-NLH-031 provide an update on the status of the review cited in this response. If completed, provide an electronic copy of the report. If still in progress, provide the scheduled due date for completion.

PUB-NLH-389 Further to the response to PUB-NLH-041 provide an update on the status of the Lessons Learned studies cited in subsection (e). If these studies have been completed, provide electronic copies. If still in progress, provide the expected completion date of these studies.

PUB-NLH-390 Further to the response to PUB-NLH-043 expand upon any and all changes identified from the December 2013/January 2014 incidents as they specifically relate to: (i) System Operations, (ii) emergency preparedness, and (iii) coordination with Newfoundland Power.

PUB-NLH-391 Further to the response to PUB-NLH-067 provide an electronic copy of the additional operational protocol(s) referenced in this response.

PUB-NLH-392 Nalcor's Corporate Emergency Response Plan provided as the attachment to RFI PUB-NLH-069 and the sheet of revisions from 2008 to the date submitted shows only updates to telephone numbers or rosters. State if there have been any content changes reflective of the incidents of December 2013/January 2014.

PUB-NLH-393 The date on the cover sheet of Nalcor's Corporate Emergency Response Plan provided in the response to PUB-NLH-069 is November 2013 and the last date on the Amendment sheet was April, 2013. Detail those changes between the April and November versions. What was the original date of issue of the Plan?

PUB-NLH-394 Further to the response to PUB-NLH-077 provide the status of the emergency response and restoration investigation(s). If these studies are complete, provide electronic copies of the reports.

PUB-NLH-395 Provide the status of the Hydro document *"Severe Weather Preparedness"*. If this document has been finalized, provide an electronic copy.

PUB-NLH-396 Does Hydro plan to conduct any drills or other training in advance of the 2014/15 winter season?

PUB-NLH-397 Provide summaries of all communications and coordination activities to-date with Newfoundland Power to prepare for the 2014/15 winter season.

PUB-NLH-398 Is the Nalcor Emergency Operations Center in close proximity to Hydro's Energy Control Centre? Describe the communication paths that exist between these two facilities.

Outage Management

PUB-NLH-399 Further to the response to PUB-NLH-127 do Hydro's interruptible agreements with its customers allow for economic interruptions, as well as for reliability? If so, has Hydro exercised this ability within the past two years? Provide a table of dates, number of economic interruptions and durations.

PUB-NLH-400 Further to the response PUB-NLH-183 and PUB-NLH-184 explain why the positions of Driver Groundsperson and Utility Worker are seasonal positions, state the months they are employed and state whether the people hired for these positions are typically the same persons in subsequent years.

PUB-NLH-401 Further to the response to PUB-NLH-185 explain how the Reliability Reporting System interfaces with Hydro's Energy Management System. If it is a manual process, describe the process including those positions that are responsible for maintaining the Reliability Reporting System.

PUB-NLH-402 Further to the response to PUB-NLH-185 Attachment 1 explain how the numbers of customers interrupted during an outage are determined.

PUB-NLH-403 Further to the response to PUB-NLH-195 explain the typical response times for transmission facility outages from initial determination to having a crew on site and the typical response times for distribution facility outages using the same criterion.

PUB-NLH-404 Has Hydro ever considered the acquisition of an Outage Management System? If so, what were the criteria used to evaluate such system(s) and what were the determining reasons not to acquire one? If Hydro has not considered such an acquisition, what are the reasons this decision was made?

Transmission Operations

PUB-NLH-405 The response to PUB-NLH-102 indicated that 15 of Hydro's terminal stations do not have Supervisory Control and Data Acquisition (SCADA)

remote control and 14 do not have SCADA monitoring. Identify these terminal stations (and the voltages). Explain how the Energy Control Centre (ECC) indirectly monitors and controls these (or at least those that it owns) terminal stations without the benefit SCADA.

PUB-NLH-406 Further to the response to PUB-NLH-101 how many of the 56 transmission circuits are under SCADA or other monitoring or control? If any of these circuits are not under SCADA, or some other form of monitoring, explain why.

PUB-NLH-407 Describe Hydro's Supervisory Control and Data Acquisition (SCADA) system and how it interfaces with Hydro's Energy Management System (EMS).

PUB-NLH-408 Provide the following information on Hydro's Emergency Management System (EMS).

a) Whether the same system is used for both Generation and Transmission management. If different, respond to the following for both systems.
b) The name of the Vendor, original installation date, version currently used and the date of the most current version.
c) Hydro's budget for maintaining the EMS including annual license and/or maintenance fees, IT support, and training.
d) The capabilities of the EMS regarding monitoring and control of the facilities. Include discussion on human/machine interfaces.
e) Hydro facilities that are *not* under the control of the EMS.

PUB-NLH-409 The response to PUB-NLH-153 states that Hydro develops three forecasts based on geography, one of which is for the Avalon Peninsula. Is this forecast for the entire load on the peninsula, including Newfoundland Power, or just Hydro's load? If it includes Newfoundland Power's load, how is this forecast integrated with any forecasts generated internally by Newfoundland Power?

PUB-NLH-410 Provide a detailed explanation of communication and coordination that occurs between Hydro's and Newfoundland Power's respective Energy Control Centres regarding transmission line status, including loadings and terminal station breaker status.

PUB-NLH-411 Further to the response to PUB-NLH-153 other than the times immediately preceding the January 2014 events, have there been other occasions where Transmission Operators or engineers felt that the short-term forecasts created by the *Nostradamus* program were not to be accepted, and had to be manually revised?

Governance

PUB-NLH-412 Provide Hydro's most recent corporate one and five year plans for the period 2010 to 2014 inclusive.

PUB-NLH-413 Provide a calendar showing the key steps and linkages in the planning and budgeting cycle.

PUB-NLH-414 Provide the guidelines issued to guide capital and expense budget preparation for the budget years 2011-2015.

PUB-NLH-415 Provide all 5- and 20-year capital plans, starting with the one for which the first year addressed was 2011.

PUB-NLH-416 Identify for the Hydro and Nalcor leadership teams the members and their titles.

PUB-NLH-417 Provide a copy of the enterprise risk management framework and the tools package used to support it.

PUB-NLH-418 Provide the governing documents and procedures of the Enterprise Risk Management Committee.

PUB-NLH-419 Identify the members and position titles of the Enterprise Risk Management Committee.

PUB-NLH-420 Provide the current Hydro risk register.

PUB-NLH-421 Provide the documents that routinely report on the status of measures to address the items in the Hydro risk register.

Staffing

PUB-NLH-422 Hydro has referred to "*net ins and outs by function*", provide them.

PUB-NLH-423 Provide the basis on which charges from other Nalcor entities are made to Lower Churchill Management Corporation (LCMC) and by which LCMC makes charges to others.

PUB-NLH-424 Provide a copy of the June 18, 2014 Presentation on Governance.

PUB-NLH-425 Further to PUB-NLH-424 for each of the 12 service areas shown on the left column of slide 12 of the Governance Presentation show where these service areas are located on the February 7 organization charts prepared for Liberty.

PUB-NLH-426 Further to PUB-NLH-425 provide for each year end from 2011 to 2013 inclusive and year-to-date for 2014 for each Position Identifier (PID) within the organization corresponding to each service area shown on slide 12, the position title corresponding to the PID, the home base organization of each PID and the percentage of time charged to Hydro for each PID.

PUB-NLH-427 Further to PUB-NLH-424 for those organization charts that are shown on pages 5 through 7 of the Governance Presentation confirm that the charts show all personnel within the organization depicted on each chart (i.e., each PIN corresponds to an individual employee) and if not identify any additional personnel not depicted.

PUB-NLH-428 Further to PUB-NLH-427 identify all personnel not assigned to Hydro as home base and for each person provide for the years 2012 and 2013 the total time charged, time charged to Hydro and time charged to non Hydro entities using time-based measurement but where that is not possible use salary costs.

PUB-NLH-429 Further to PUB-NLH-424 for those organization charts that are shown on page 5 through 7 of the Governance Presentation that reference another "*Chart*" provide these charts and for these charts provide the same information as requested in PUB-NLH-427 and PUB-NLH-428.

PUB-NLH-430 Provide copies of the current Hydro Regional and Department Plans and those for the preceding two years that align with the corporate plan.

PUB-NLH-431 For each Hydro employee and each Project Execution and Technical Services manager whose work groups support the planning, design, construction, and operation of Hydro's generation and transmission facilities, identify and quantify the objectives and metrics used to measure the incentive portion of compensation.

Conservation and DSM

PUB-NLH-432 Provide the results of the recent KEMA CDM (conservation and demand management) review.

PUB-NLH-433 Describe the expected scope, schedule, and results of the conservation and demand management study expected to be performed jointly with Newfoundland Power in the near future.

PUB-NLH-434 Further to the response to IC-NLH-004 and PUB-NLH-021 provide the marginal costs and supporting analysis currently used to value conservation and demand management programs and expenditures.

1	**PUB-NLH-435**	Further to the response to PUB-NLH-434 describe when, how, and under what assumptions (i.e., material changes from key assumptions in the current one) you expect next to re-examine the marginal costs used to value conservation and demand management programs and expenditures.
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6	**PUB-NLH-436**	Provide the conservation and demand management (CDM) reports for the past 3 years.
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9	**PUB-NLH-437**	Provide the 2012-2016 conservation and demand management plan and the five-year plan preceding it.
10		

DATED at St. John's, Newfoundland this 25th day of August 2014.

BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

Per Bobbi Sheppard
Bobbi Sheppard
Assistant Board Secretary