Q. 2013 Wood Pole Line Management (WPLM). In Order P.U. 2 (2012), the Board stated "*However, given that the program has been in place for six years, the Board is of the view that there should be sufficient data and experience to provide a more comprehensive report on the benefits of the program to ratepayers*." The Board identified, for example, that Hydro's report should provide evidence of the results of non-destructive testing undertaken to date.

(a) At page B5, Appendix B, Hydro acknowledges that the Board expected evidence of the results of non-destructive testing undertaken to date to be provided by the Appendix B report, but on the same page this expectation is not referred to as one of the specific areas addressed by the report. Why has this Board expectation not been addressed?

(b) At page 9 of Appendix A (Tab 17, Volume II, 2013 Capital Budget Application), Hydro states that "*a general assessment of the large pole numbers at the field that are inspected annually with some non-destructive (NDE) evaluation technique is needed*". Has not this need been recognized by Hydro since 2005? When will this need be met?

(c) With reference to page 9 of Appendix A, please describe the current equipment used for NDE, how long it has been in use in the WPLM program, and to what it extent is has been used (i.e, has the current NDE equipment been used for each pole inspected since the 2005 program inception, and if not, how has its extent and frequency of use been planned and implemented)? For how long has it been known that current equipment used for NDE "does not produce consistent results"? How has it been determined that the results of current NDE have not

been consistent – compared to what? Why has the current equipment not produced consistent results?

(d) Does the lack of NDE equipment producing consistent results mean that the NDE data that would have been otherwise gained by the NDE inspection of lines since 2005 has been lost?

(e) Has Hydro undertaken any inquiries of the NDE techniques and equipment used by other utilities across North America?

A. (a) Hydro's NDE data collected under Stage 1 is reported in Figure 8 of Appendix B filed in relation to the WPLM project. NDE testing is done in two stages. In the first stage poles are inspected by sounding, by boring for shell rot, and visually. Core samples are extracted for condition assessment. In the second stage, in-service pole strength data (quantitative) is collected using NDE equipment. However, if there is external shell separation, this NDE equipment is unable to provide the strength value.

(b) The need for a better quantitative prediction of in-service pole strength data was identified at the early stage of the WPLM program when Hydro initiated full scale testing of in-service poles at MUN. It was noted that NDE data did not correlate well with the full scale test data. In fact, the correlation with the full scale test data is very weak. In many instances, the NDE equipment significantly overestimates the strength of poles which have deteriorated over time. Therefore, the data collected in general has not been used in assessing pole condition. Hydro is currently working with MUN to develop an alternate NDE

technology that can be used in the field as a second level screening before a pole is replaced. Details related to this work are presented in (c) below.

(c) The equipment currently being used for NDE testing is POLETEST developed by EDM International Inc., Fort Collins, US. This equipment has been used in the WPLM program since its inception in 2005.

As stated above, the weak correlation with the full scale test data necessitated that Hydro find an alternate way to detect in-service pole strength. A modal hammer technique is currently being developed through a collaborative project with MUN. The work is in progress and shows promise. Some limited full scale tests in the field were undertaken last year. At present, POLETEST equipment has been used to collect strength data for each pole provided the pole does not have a significant external shell separation problem. Although the data correlation is weak with respect to full scale testing, it is planned to use the equipment during the second ten year cycle of inspection starting in 2014. By measuring the strength value at the same pole location it is expected that differential strength value will provide an indication of pole degradation in a relatively quantitative manner, rather than an absolute value. Also, Hydro is considering alternate NDE to screen the pole before it is ready for replacement. One approach would be to use Modal Hammer but it will be at least five years before it is ready for use in the field.

(d) Data is not being lost, as Hydro has stored the results of NDE testing in its data base. The future use of this data is possible in a relative sense and described under the answer provided in (c) above.

(e) Hydro did not inquire as to what equipment is being used by other utilities. Hydro's pole assessment using NDE under Stage 1 is in line with other utilities' practices. However, Hydro did an internal review and noted that poor correlation of NDE POLETEST data were also reported by other researchers.