

1 Q. **References: Tab 6; Volume II: Terminal Station Asset Management Overview –**
2 **Version 3**

3 Page 26, lines 13-17 of the report entitled Terminal Station Asset Management
4 Overview states

5 *“The service life of flooded cell batteries is 18 to 20 years while valve*
6 *regulated lead acid (VRLA) batteries have a service life of 7 to 10*
7 *years. Hydro regularly carries out testing on its battery banks to*
8 *determine bank capacity and will replace banks and chargers with*
9 *insufficient capacity under this program.”*

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11 Has Hydro undertaken an analysis to determine the cost savings that may be
12 realized by extending the service life of flooded cell and VRLA batteries in its
13 system? If so, please provide the analysis. If not, please provide the rationale for
14 not doing so.

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17 A. Hydro has not undertaken an analysis to determine cost savings that may be
18 realized by extending the service life of flooded cell and VRLA batteries used in
19 Terminal Station application due to the critical nature of the battery banks and the
20 increased risk of failure by increasing the service life. Battery banks in terminal
21 stations provide the necessary direct current (“DC”) power for protection, control,
22 and communication circuits, and also for power circuits for equipment such as high
23 voltage breakers and motorized disconnect switches that are required to isolate
24 equipment for a line or terminal station fault. If the DC power is not available, high
25 voltage equipment will not be protected nor would DC powered isolating
26 equipment work thus affecting the reliability of the electrical system.

1 At least two other utilities in Canada use a similar approach as Hydro for their
2 flooded cell terminal station battery bank replacements, while another replaces
3 their VRLA banks after five years and some use capacity discharge testing to
4 determine the condition and replacement year for flooded cell banks.

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6 Hydro ranks the criticality of its battery banks from A to D, with A being most critical
7 and D being least critical. Since 2013, Hydro has been performing discharge testing
8 on its A and B banks (for flooded cell, 10 years after the in-service year and then
9 every five years thereafter, and every two years for VRLA). Hydro replaces battery
10 banks that fail during this scheduled testing or other in-service failure events. Hydro
11 has only one VRLA bank that is in the A and B criticality grouping. This 2011 bank
12 was tested in late 2017 and failed the discharge test at six years of age. It is
13 currently being replaced as an in-service failure. The nine flooded cell terminal
14 station battery banks tested since 2013, the oldest of which is 15 years old, have all
15 passed and remain in service. One of the larger Canadian utilities reported that
16 their discharge testing data has shown their flooded cells need replacement
17 between 18 and 22 years.

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19 Hydro's believes its criteria governing flooded cell and VRLA battery bank
20 replacement is a reasonable balance between reliability and costs.