

1 Q. Has Hydro determined the cause of the excessive moisture levels found in T5? Is
2 there a method to prevent same from occurring in other transformers?

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5 A. Hydro is in the process of determining whether there is excessive moisture in
6 Transformer T5 and is using oil samples to do so. To date, oil samples have been
7 collected in April, June, and July of 2014. The April sample suggests that the
8 transformer has excessive moisture while the June and July samples indicate that it
9 does not. Hydro has consulted with Doble Engineering on this issue and Doble
10 Engineering has advised that the results obtained to date are inconclusive and that
11 the transformer needs to be at thermal equilibrium at an oil temperature higher
12 than 50°C in order to obtain conclusive oil sample results. It is not uncommon for
13 in-service transformers to operate at oil temperatures higher than 50°C (due to
14 heat produced inside the transformer due to losses) but an out of service
15 transformer's oil is at or near ambient temperature which is less than 50°C.
16 Comparison of both the June and July results to Doble Engineering's criteria indicate
17 that the transformer can be put in service at low initial loading. Based on Doble
18 Engineering's advice and the June and July results, Hydro plans to place the
19 transformer in service at controlled loading for the purpose of achieving a thermal
20 equilibrium at an oil temperature higher than 50°C and to then take the oil samples
21 required to determine the transformer's moisture level. Hydro estimates that it will
22 know the moisture level of Transformer T5 by early September.

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24 There are methods to reduce the risk of moisture from reaching unacceptable levels
25 in a power transformer including methods that are incorporated into the
26 transformer design. Most of Hydro's transformers are free-breathing units and the
27 design of free breathing transformers (including those used by Hydro) typically use

- 1 a sealed tank combined with a silica gel breather. In sealed units such as Wabush
- 2 T5, the risk of moisture is reduced by the use of a sealed tank combined with a
- 3 sealed gas blanket.