Q. **Asset Management**

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?

A. Hydro's Vegetation Management (VM) policy, program, and practices are described below.

a) Who is responsible for the program?

The person ultimately responsible for the VM program is the Transmission and Rural Operations (TRO) Services Manager. Reporting to the Services Manager is the Vegetation Control Specialist with three vegetation control inspectors reporting to the Specialist.

b) What are the duties of the vegetation specialist? Is he/she an arborist?

The Vegetation Control Specialist is responsible for the overall planning and implementation of the vegetation control program including allocation of approved budget funds into different portions of the program (transmission, distribution, facilities and roads) for all of TRO's assets in the province. The Specialist also provides advice, planning, and implementation of VM programs for Hydro Generation, Holyrood, Network Services, Exploits Generation, the Wood Pole Management Program, customer requests for tree trimming and brush clearing/tree removal for new hook ups, and various capital projects requiring VM work. The Specialist solicits work priorities from Hydro Generation, Holyrood, Network Services, Exploits Generation, and the Wood Pole Management Program to develop work plans and interact with contractors to develop work schedules. The Specialist oversees (supervises) field operations as needed, particularly during the busy summer season. The Specialist oversees the development and implementation of contracts through the tendering process as well as verifying and processing all progress billing. The Specialist interfaces with Hydro's Environmental Services Department as well as external agencies such as the provincial departments of Environment and Conservation, Natural Resources, and Federal Agencies such as Parks Canada and Environment Canada. The Specialist is responsible for overseeing task based risk assessments for all activities of the VM department and development of all work methods pertaining to VM work. The Specialist is

responsible for all data management and storage, mapping, and preparation of annual license applications for spray programs.

In addition, the Specialist also undertakes day-to-day supervisory tasks such as: conducting safety meetings, planned inspections, work method verifications, task assessments, SWOP review for the Specialist's staff, timesheets, ensuring employees have all appropriate training, verification of any purchases by staff, and any other day to day duties assigned.

The current Vegetation Control Specialist has a Bachelor of Science in Forest Management with a minor in Forest Science. An arborist is more of a field position. Currently two of the vegetation inspectors are trained arborists as well as tree trimmers employed by contractors.

c) Policies or practices for trimming, danger tree (and define danger tree) removal and brush control and descried issues related to removing danger trees?

A danger tree can be defined as any tree that has the potential to come in contact with an energized line through wind movement, falling onto the line, or the potential of becoming energized through an arc due to its close proximity to the energized conductor. Some danger trees, depending on their condition, location, are removed immediately as reported by the VM group or the line staff. Where it is determined that removal cannot be completed safely with the power on, the VM inspector or Specialist will arrange an outage and have the tree removed.

Tree trimming is typically done on distribution systems; however there are isolated instances where tree trimming is conducted on transmission lines. Tree trimming is typically carried out when a customer does not want the tree removed from their property; therefore to ensure safe clearance from the energized conductor, the tree

is trimmed. The second situation where tree trimming is required occurs when trees are too close to the conductor to allow for safe removal by ground cutting crews and must first be trimmed. The tree trimming crew will go through a line and trim the trees to provide clearance from the conductor and a ground cutting crew comes in afterwards and removes the rest of the tree. Tree trimming typically only provides short-term (two to three year) clearance requirements and the tree requires follow up trimming. This is not cost or time effective and the preferred method is tree removal.

Brush control makes up the largest portion of our program and is typically carried out with ten to 12 people per crew. These crews work primarily on transmission with a secondary focus on distribution. Transmission is the primary focus area due to the large number of customers that can be affected by a single event on a transmission line. Brush control on distribution is typically much slower and much more expensive.

On distribution systems, the top issue with removal of danger trees is resistance on behalf of the customer. Many people become extremely attached to trees on their property for various reasons: emotional (their kids planted the trees) or financial (mature trees may add value to their property). On transmission systems, the top hindrance to danger tree removal is accessibility. Quite often, the trees are in areas with little or no access. The best time to remove danger trees is in the winter. Access is relatively easy on snowmobile when compared with an ATV and is much cheaper than using a helicopter. Large sections of line can be patrolled in a single day. This past winter (2014), the VM department implemented a winter danger tree removal program where VM inspectors, accompanied by a contractor cutting staff, patrolled lines on snowmobile and removed approximately 1000 potential danger trees.

Cost of individual tree removal is also key in determining how much can actually be carried out. Removal of three large danger trees on a distribution system equates to cutting a hectare of brush on a transmission system.

d) Trim clearance requirements?

For distribution:

1) 90 cm around communication and secondary/neutral conductor.
2) 1.8 meters around primary conductor.

For transmission:

1) 69 KV – 10 ft. from lowest point of conductor
2) 138 KV – 13ft from lowest point of conductor
3) 230 KV – 15ft from lowest point of conductor

e) Whether VM work is based on trim cycles or is only for addressing hot spots?

The majority of the VM program is meant to put lines on a cycle. With a "cutting only" program on transmission we get a range of control from three to four years to as long as ten to 12 plus years. The lower the period of control corresponds to area with heavy hardwoods. In areas with mostly conifer we get longer periods of control. Our spray programs extend the period of control in our heavy hardwood areas to seven to ten years. On distribution, the cycles tend to be about the same on the low end but the upper end is typically less at five to six years due to the narrow rights-of-way and lower poles and equipment.

f) By whom and when are VM inspections conducted?

Inspections are conducted primarily by the VM Specialist and the Asset Specialist for TRO. The bulk of the inspections are through aerial inspection which is

completed annually. Additional VM ground inspections are conducted by VM inspectors during the winter. The primary areas of focus for these inspections tends to be areas for the upcoming field season. Information is also gathered by lines crews during the WPLM program or during climbing inspections, but this tends to be collected in much lesser detail as the collection of vegetation information is not the primary focus of those programs.

g) Who does the tree trimming, Hydro or a contractor and how many VM contractor crews are available to Hydro?

All VM work is carried out by contractors under Hydro supervision. Hydro does not have any crews of its own. Typically, there are two to four cutting crews available, a spray crew during the spray season, and an individual sprayer to carry out the weed control program on Hydro facilities (i.e., terminal stations, yards, etc.).

h) Whether the VM program applies to both the distribution and transmission systems?

The VM program applies to transmission and distribution systems and their access trail networks, facilities, yards, penstocks, dams, and approximately 300 km of forest access roads.

i) How much operations and maintenance (O & M) funds and capital were spent on Hydro's transmission VM program and for its distribution VM program in 2009, 2010, 2011, 2012, 2013, and how much is budgeted for 2014 and 2015?

Year	Operations*	Capital**	Total
2009	$ 1,261,926	$ 110,732	$ 1,372,658
2010	$ 1,383,292	$ 14,067	$ 1,397,359
2011	$ 1,492,962	$ 6,745	$ 1,499,707
2012	$ 1,817,567	$ 2,861	$ 1,820,428
2013	$ 2,032,270	$ 42,310	$ 2,074,580
2014	$ 2,575,445	$ 55,125	$ 2,630,570
2015***	$ 3,025,445		$ 3,025,445

* Include TRO, Hydro Gen, WPLM, Network Services

** Includes capital projects and line extensions

*** Includes Proposed TRO budget and 2014 budgets for other depts.