Q. Have terminal station and substation inspection, repair (CM) and preventive maintenance (PM) practices changed since 2009? Are there any changes beginning in 2014? Please explain in detail any changes in terminal station/substation inspection and maintenance practices, including any changes beginning in 2014.

A. The following summarizes the significant changes since 2009 and the changes in 2014 in preventative maintenance (PM) practices in terminal stations. There have been no changes in corrective maintenance (CM) practices since 2009.

2010 to 2013
Compressor/Dryer/Air System Maintenance Inspection changed from bi-monthly to monthly.
Updated Annual Inspection for Battery Bank Maintenance Procedure to remove only if instructed and to include checks for cell-to-cell resistance, cell internal ohmic values and cell temperatures. Also added to remove rectifiers and clean internally for Cordex Rectifiers.
Update 120-day inspection form to include checking concrete base.
Updated auxiliary contact checks to six years - DCF/DCVF and DLF Air Blast Breaker Inspection to check and clean auxiliary contacts in each control block and in main control cabinet.
Developed and issued procedure for oil sampling for sealed power transformers.

Since 2013
Battery Bank Discharge Testing- Started working with FM global on a frequency for discharge testing critical battery banks. Completed two sites in 2013 and plan to complete another 12 sites in 2014. Currently have an agreed to discharge critical flooded cell banks every five years. Hydro is still working with FM Global on a testing frequency for valve regulated critical battery banks.
Doble Testing: Began required (as opposed to if instructed) doble testing on 138 kV or 69 kV Power transformers in 2013 and required doble testing on instrument transformers and Oil Circuit Breakers in 2014. This will be implemented and coordinated with the PM for the respective asset or over a six-year period.
Added procedure to maintenance manual for infrared thermography and specifically added a check to look for hot spots on bushings and instrument transformers.
Added a procedure to the maintenance manual for oil sampling of sealed power transformers and updated oil sampling frequency from six to three years.
Operate Circuit Breakers: Starting in 2014 Hydro plans to operate all 69 kV and above circuit breakers both locally from the station and remotely from the Energy Control Centre (ECC).
Operate Breaker from protection: Starting in August 2014, Hydro will operate 230 kV breakers from the protection during the scheduled six year PM on the circuit breaker.
Added requirement to complete timing test to six year PM on 69 kV and above circuit breakers regardless of type or function. This will begin in August 2014 for areas that currently have timing sets and will be scheduled in area that do not have timing sets starting in 2015. This will be with the six year PM for the breaker.
Air Blast Circuit Breaker PM frequency was changed from six years to four years.
For flooded cell batteries, procedure and checksheets revised to indicate distilled water to be used.
For four year PM s – 230 kV DLF and DCVF air blast breakers, added note on checksheets to measure dew point at breaker (if possible). In addition, added check receiver tanks on breaker for moisture by removing drain plugs. Any future re-lubrication of air blast breakers completed in the field will be performed in an enclosed areas protected from the elements.
Added inspections for all hardware for overhead bus work and skywire for 230 kV stations on a six-year frequency. The plan is to complete all 230 kV stations in 2014 prior to Nov 30, 2014.