Une unité du système VIC

Système VIC

Air-Injection Testing of Insulation on Low-Voltage Underground Cables

Hydro-Québec Distribution's underground grid has low-voltage (LV) cables pulled through conduits. The condition of the insulation on these cables is of prime importance for the safety of the installations, workers and the public. The Institut de recherche d'Hydro-Québec (IREQ) has therefore developed a system for testing the insulation on LV underground cables using air injection (VIC)..

Diagnostic method

The VIC system is based on an original method jointly developed and patented by Hydro-Québec and Dow Chemical. It consists in injecting compressed air into the cable core and then seeing how the pressure changes over time. A break in the insulation, i.e., a leak, is detected by a drop in air pressure inside the cable. Conductors in a multipole cable can be looped, which considerably reduces the testing time compared with testing each cable individually.

Portable and automated

The VIC system consists of an electropneumatic device for injecting compressed air into the cable core, an electronic controller (the brains of the system), and pneumatic hoses and fittings for connection to the cables. Special attention was paid to designing a cone fitting that would be easy to install on all sizes of LV cables in the Hydro-Québec system. Electric power is supplied by a rechargeable battery housed in the case. Compressed air must be supplied by an external source such as a compressor. Testing is entirely automatic with only a single result displayed: "leak/no leak" status.

A proven system

The VIC system has demonstrated its worth in a program of laboratory and field tests. It provides a way to test the electric insulation of a cable during manufacture, transport or installation in a conduit. Hydro-Québec plans to implement this technology in 2012.

Main advantages

- Able to detect a hole 1 mm in diameter on a cable over 200 m long.
- Rapid diagnostic, ranging from one to several minutes. The duration depends mainly on the diameter and length of the cable and is automatically adjusted for each cable tested.
- Not influenced by ambient temperature or humidity.
- The insulation's dielectric properties are not altered by the compressed air injected (about 75 psi).

For information

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