A.2.2.

120 kV cable installation at Beauharnois power station

CHOQUETTE M., Hydro-Québec, Canada
CANAAN A., Pirelli, Canada

Abstract: Hydro-Québec has installed 56 circuits of 120 kV XLPE insulated cables at Beauharnois power generating station. This hydroelectric power house plays a strategic role with its installed capacity of 1673 MW and its proximity to load centers and exportation markets.

Thirty six (36) cable circuits are used to connect turbine-generator unit transformers to new SF6 switching substations. Twenty (20) more cable circuits enable the overhead transmission circuits to collect the energy from the substations.

The system design, cable route, installation techniques, testing and monitoring of these new circuits are described. Major challenges were met by maintaining the power house operational during the majority of construction, installation and testing phases.

Keywords: High Voltage XLPE Cable, finite-element ampacity calculations, dry-type SF6 termination, real time temperature monitoring, acoustical resonance tests, non-flammable conduit.

Résumé: Hydro-Québec a installé un total de 56 circuits de câbles isolé au polyéthylène réticulé à 120 kV à la centrale de Beauharnois. Cette centrale hydroélectrique joue un rôle clé étant donné sa capacité installée de 1673 MW et sa proximité des centres de charge et des marchés d'exportation.

Trente-six (36) circuits de câbles servent à raccorder les transformateurs des groupes turbine-alternateurs aux nouveaux postes blindés de sectionnement. Vingt (20) autres circuits souterrains permettent de transiter l'énergie vers autant de circuits aériens.

La conception du système, le parcours, les travaux d'installation, les essais réalisés et la surveillance de ces nouveaux circuits de câbles seront décrits. Des défis importants ont été rencontrés afin de maintenir cette centrale opérationnelle pendant la majorité des travaux.

Mots clés: Câble PRC à haute tension, calcul de courant admissible par éléments finis, extrémités SF6 de type sec, suivi thermique en temps réel, essais de résonance acoustique, conduits ininflammables

1. Introduction

The Beauharnois hydroelectric power generating station was constructed in three phases between 1929 and 1961. The refurbishment of this station required the construction of two new SF6 substations and 56 - 120 kV XLPE insulated cable circuits to transport the generated power of 1673 MVA.

This cable project involved the installation of more than 42 km of 120 kV XLPE insulated cables as well as 168 outdoor and 168 SF6 terminations.

The XLPE cables were manufactured both in Canada and France while the terminations were manufactured in Italy by the same cable supplier. Newly designed (1997) dry type SF6 terminations were used, thus reducing the need for periodic inspection and preventive maintenance.

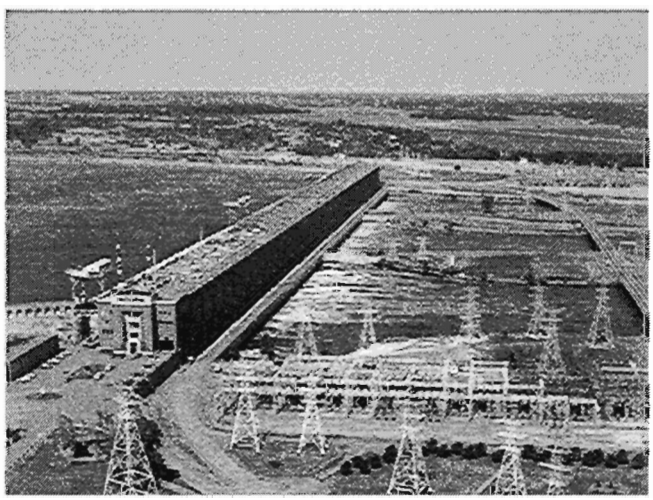

Figure 1: Aerial view of Beauharnois power generating station (before refurbishment).