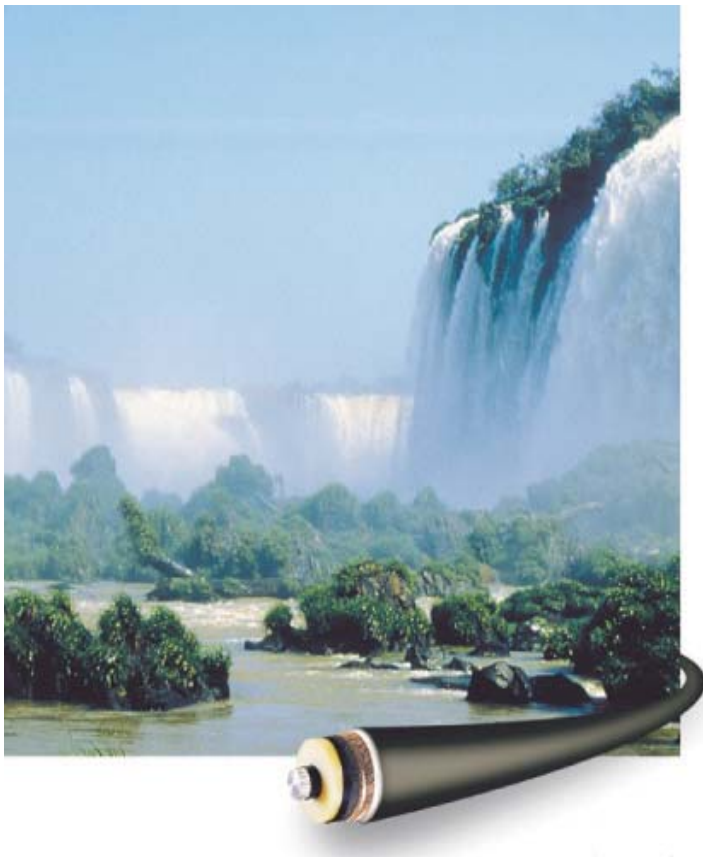


## Vertical shaft installation

# Refurbishment of Långå Hydro Power Plant, Sweden



### Cable data

Voltage	245kV AC
Length	1650 m
Conductor	1200 mm <sup>2</sup> Al
Insulation	XLPE
Weight	13.2 kg/m
Shaft depth	220 m
Customer	Gullspång Kraft AB
Year	1991

### Project content

- Removal of existing LPOF cables
- Supply of new XLPE cables
- Supply of terminations
- Cable system design
- Shaft installation and supporting
- Testing and Commissioning



In 1991 Gullspång Kraft AB awarded the contract to refurbish the cable link in the “Långå” Hydro Power Plant to ABB. Långå is an underground power station, built in 1973, situated in the picturesque mountain region of western Sweden.

The cable link connects the underground generator transformer to the above ground switchyard. The original two circuits of 230 mm<sup>2</sup> aluminium conductor, paper insulated oil-filled cables were to be replaced.

### The cable

The new cable chosen was a 1200 mm<sup>2</sup> aluminium conductor XLPE cable with copper wire screen and PVC outer covering. No metal shielding or armouring was considered necessary in this application. The PVC jacket was chosen due to its flame-retardant properties.

XLPE insulation at 245 kV in the year 1991 was generally not the obvious choice for power utilities around the world. After having installed more than 85 km of 220 kV grade XLPE since the world's first installation in Libya in 1978 and successfully completed an electrical type test for a 400 kV system, ABB considered 245 kV XLPE a proven design for this type of installation.

### Installation

The procedure chosen for the cable installation was typical of that employed for vertical shafts.



The cable drum and control winch were placed above ground. The cable was fed into the shaft over rollers where it was attached to a winch wire. The winch wire takes the weight of the cable and the winch controls lowering.

Apart from the depth of the shaft, another major issue in vertical installation of XLPE cables is to hold the cable firmly and simultaneously let the cable expand both radially and axially when it is subject to cyclic load. ABB's experience in similar installations has contributed to the development of a flexible gripping device. The Långå cable was supported and clamped every second metre.

The installation procedure at Långå was undertaken in two steps. The first circuit was exchanged in 21 days in August and the second was fast-tracked in October in 14 days. This time included removal of the old cables and installation of the replacement cable.

### Commissioning

The cables have provided fault free operation since commissioning on 22<sup>nd</sup> of October 1991.

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