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Deep shaft 220 KV XLPE cable installation for hydroelectric power plant

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The hydraulic power plant at Montorio al Vomano (province of Teramo central Italy) has been in service since 1954.

This plant uses the different levels of the Vomano river, the same river also feeds the two others power plants of S. Giacomo al Vomano and Provvidenza.

The Montorio power plant is installed in a cavern, and the three 46 MVA generators are connected to the external switchgear station by three cable circuits placed in a 240 m deep shaft.

During the recent refitting of the power plant ENEL decided to replace together with the machinery also the 45 years hold 220 kV existing oil filled cables. In order to avoid the presence of the oil, an XLPE extruded insulation cable has been selected for this installation.

The shaft civil and steel works were existing for the previous installation and were reused for the new cable circuits. A suitable cable design has been selected in order to adapt to the structure and guarantee the required performances. In such a way the modification of the existing structures have been then reduced at a minimum.

This connection is one of the first and highest vertical shaft installation of 220 kV XLPE extruded cables in the world. Innovative laying and clamping technologies have been studied and developed with laboratory tests in order to guarantee the reliability of the system in service.