

**D.1.3. Câbles pour centrales nucléaires**

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D.1.3. Cables for nuclear power stations

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Sizewell B PWR Nuclear Power Station has recently finished construction for Nuclear Electric. It's the first of this class of station to be built in the UK and the highest level of safety standards have been adopted.

Design development of the completely new range of cables required for this and any subsequent PWR stations has taken place over a number of years from 1983. Pirelli Cables were selected as the supplier for the main cable contract for Sizewell 'B' which has resulted in the supply of some 2,500 km of cable.

The strict requirements for personal safety and minimising of plant damage in the event of fire together with requirements for Class 1E qualification for use within harsh environment areas resulted in the design, development, type testing and subsequent approval of some 200 items in a new cable range employing a number of novel features. The range developed has included:-

- single core power cables up to 11 kV
- multicore power cables up to 3.3 kV
- small multicore power and control cables at 415 V
- multipair control cables at 110 V
- miscellaneous items of equipment wires, flexible control cables, flexible power cables, thermocouple extrusion cables, earthing cables and fire resistant cables.

For economic reasons, two distinct cable ranges were developed, one for applications inside and around the reactor containment, and a lower cost range for applications outside the reactor containment area.

The main design parameters were:-

- high level performance under fire conditions
 - reduced fire propagation at loads up to 30 kg/m with fire sources up to 210,000 B Tu
 - low smoke emission
 - very low corrosive and toxic gas emission
- mechanical and electrical performance at least equivalent to existing types
- thermally qualified for 40 year life
- environmental qualification under irradiation and LOCA/MSLB for harsh environment cables.

The paper will review the designs developed and the performance achieved in the key design areas and discuss current developments aimed at providing the same high level of performance at reduced cost. Experience gained during the manufacturing and installation phases of the Sizewell B contract will also be reviewed.

Safety in nuclear power stations is of major importance and the design, development, type testing, approval and manufacture to exacting quality standards of the comprehensive new range of cables described in this paper will help ensure that safety standards are met.