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Chapter Pilot: P. DOMON Name/Initials  Date 25-03-2011		
Approved for EDF by: A. PETIT Name/Initials  Date 29-03-2011		Approved for AREVA by: C. WOOLDRIDGE Name/Initials  Date 29-03-2011

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02	PCSR June 2009 update: – Clarification of electrical equipment rooms.	27/06/2009
03	Consolidated Step 4 PCSR update: - Minor editorial changes - Sections 1.1 and 2, clarification of text regarding physical separation of equipment in separate fire zones	29/03/2011

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For information address:



AREVA NP SAS
An AREVA and Siemens Company
Tour AREVA
92084 Paris La Défense Cedex
France



EDF
Division Ingénierie Nucléaire
Centre National d'Équipement Nucléaire
165-173, avenue Pierre Brossolette
BP900
92542 Montrouge
France

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SUB-CHAPTER 8.5 – INSTALLATION

1. DESCRIPTION OF INSTALLATION

This sub-chapter summarises the main features of the civil installations in the Nuclear Island, Conventional Island and the Balance of Plant where the electrical distribution and instrumentation and control systems are installed, thereby contributing to the safety functions they perform and their availability requirements.

1.1. GENERAL

Each emergency power supply train is installed in a separate division. The separation into divisions ensures that in the event of an internal hazard within a division, only the division in question is affected.

The Diesel Generator Buildings are geographically separated so that an aircraft crash can only make two main diesel generators and one ultimate diesel generator unavailable. The layout enables functional separation between the normal and emergency power supply systems.

Physical separation of the normal and emergency power supply is not necessary. Separation between the medium and low voltage equipment and DC voltage equipment is also not required.

In divisions 1 and 4 of the Nuclear Island, electrical switchboards fed with main diesel generators and electrical switchboards fed with Station Black Out (SBO) diesels are installed in different fire zones.

Most of the Nuclear Island electrical equipment is installed in the electrical buildings. Some decentralised equipment such as the local sub-distribution systems, are installed in other rooms.

Conventional Island and Balance of Plant electrical equipment is installed in the non-classified electrical buildings. This equipment is installed in two physically separated non-classified electrical buildings (one for trains 1 and 3, and one for trains 2 and 4), located in separate fire zones.

1.2. ELECTRICAL EQUIPMENT ROOMS

The electrical equipment rooms are designed in accordance with the current codes. For example, the walls, floors and ceilings are maintained free from dust, the rooms contain no mechanical equipment, and access is limited to authorised personnel only.

The civil structures are required to resist hazards.

The battery chargers are installed as close as possible to the accumulator batteries to minimise the length of the connection cables, thereby minimising risk of short-circuits. Connections between batteries and distribution switchboards with direct current are realised by cables separated by polarity. Every polarity routes individually, at a minimal distance of 300 mm.

The local environmental conditions are as described in Chapter 9.

1.3. BATTERY ROOMS

The battery rooms are designed in accordance with the current codes.

The accumulator batteries are located in dedicated rooms which have an acid-resistant floor and a separate fan for hydrogen extraction (see Sub-chapter 9.4).

1.4. CABLE TRAYS

For the description of cableways and the installation of cables, see Sub-Chapter 8.4.

1.5. INSTALLATION OF INSTRUMENTATION AND CONTROL EQUIPMENT

For the installation of instrumentation and control equipment, see Chapter 7.

2. LOCATION OF ELECTRICAL AND CONTROL EQUIPMENT

Electrical and I&C systems in conventional and nuclear islands are installed in different buildings; the first ones in the conventional island's non-classified electrical building and the others in Safeguard Auxiliary Building 4, in dedicated rooms.

This location enables reduction of the connecting distances between actuators of safety systems located in lower levels of the Safeguard Auxiliary Buildings and the Reactor Building via electrical penetrations. In the same way, the short distance between the conventional island's non-classified electrical building and the Turbine Hall allows to reduce distances between actuators in the conventional island.

A room for 10kV sources and 400 V AC non-classified is dedicated to each file of pumping station. The pumping station is not concerned by I&C.

Main Diesel Generators are installed in two physically separated buildings (divisions 1 and 2 in one side and divisions 3 and 4 in the other side).

SBO Diesel Generators are installed in each building (one in each group of two divisions).

Classified and non-classified electrical switchboards are installed in the same rooms. Rooms for I&C cabinets are different from rooms for electrical switchboards.

In divisions 2 and 3, storage batteries are installed in dedicated rooms at level +12 m.

In divisions 1 and 4, storage batteries are installed in dedicated rooms at levels +4.70 m and +8.10 m.

12-hour autonomy storage batteries foreseen in case of serious accident are located in dedicated rooms at level -3.78 m in the Diesel Buildings.

In the non-classified electrical buildings, the accumulator batteries are located in dedicated rooms at +5.50 m.

For fire protection structural statements, see Sub-chapter 13.2 section 7.2.