

## Cable replacement in a generation plant

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### ABSTRACT

The project called "Le Havre Unit 0" consists in securing the auxiliary supply of a generation plant after a main refurbishment. This paper describes the main problems encountered: narrow spaces, cable removal and focuses on workers' safety.

### KEYWORDS

Cable laying, Installation, Safety

### INTRODUCTION

The EDF thermal power plant, Le Havre, in Normandy (France), was composed of 4 units, three of them being coal-fired, the last one being fuel-oil fired.

The plant is connected to the transmission network through a GIS substation belonging to RTE.

Unit 3 was closed down in 1994; Units 1 and 2 were closed down in 2013 and 2014. As a consequence, this site has only one unit operating and a new emergency auxiliary supply, usually coming from the other units, has to be installed.

It was decided to extend the lifetime of the 600 MW coal-fired unit #4 commissioned in 1983 up to 2035. As this unit will be the only one staying in operation on the site in the coming years, there is a clear need to secure the auxiliary supply.



LE HAVRE THERMAL POWER PLANT

### SCOPE OF WORK

As part of the complete refurbishment of the Generation Unit # 4 on LE HAVRE site, with the objectives to extend its lifetime to 2035 and improve its reliability, works were needed to build reliable emergency and auxiliary power supplies of LE HAVRE generation site. This project was

called "Unit 0", and this paper will report on the main encountered problems.

The whole project represent an investment of 160 M€, billion of working hours, 1500 employees of external service providers, 3400 tasks to achieve and more than 200 corporate partners.

The high number of companies working on this project increased the risks of accident. Moreover, the works have to take place in a limited space.

Our priority was to ensure that the works were progressing within the defined safety process.

EDF/CIST was in charge of installing and powering an auxiliary transformer to ensure the independent operation of unit 4 by increasing the reliability of the emergency power supply of Unit 4.

The project consists in using the cable route of past unit # 3 to build the new auxiliary system. Unit 3 output was composed of 400 OF cables, Unit 0 will be composed of 225 kV XLPE cables.

The main problems were the environment and the workers safety.

### Characteristics of the existing connection

The existing 400 kV connection of Unit 3 consists of 400 kV single core 1000 mm<sup>2</sup> copper oil filled cables paper insulated kept under an internal pressure of 6 Bars through the central channel of the conductor. A lead sheath provides sealing. This cable was commissioned at the same time as the plant.



### Characteristics of the future Unit # 0 connection

Even if the link belongs to EDF, we always try to stick to the TSO Standards. Regarding the cross section, RTE has a range of 630 mm<sup>2</sup>, 1200mm<sup>2</sup>, 2000m<sup>2</sup>, 1600mm<sup>2</sup> et 2500 mm<sup>2</sup>

- EDF advocated a 400 mm<sup>2</sup> Aluminum cable considering that our spare cables in 225 kV are already of that cross section
- Consequently, the future connection will be a