Case note
ABB PC and MCC switchgears are the best solutions for the biggest desalination plant in the world

Scope of supply
There is a long term cooperation between ABB S.p.A. and Fisia Impianti in the business of the water treatment; during those years several plants have been realized including the biggest desalination plant in the world: Jebel Ali, located in Dubai. The realization of the plant started in the early 90’s and it has been divided in several phases; in the Jebel Ali Power and Desalination Plant ABB delivered more than 2,000 columns which means over 14,000 motor and line feeders.

Power Center switchgears type MNS R have been used for the generation and the distribution of the energy requested by the desalination plants; these switchgears are designed to carried out high rated currents and resist to high value of short circuit level. Motor Control Center MNS switchgears have been supplied in order to control all the motors involved in the process of desalination. ABB together with the low voltage systems supplied also several other products like medium voltage switchgears.

Plant description
United Arab Emirates use every year around 3.2 m³ billions of water mainly supplied by the desalination plants; between them there is the plant of Jebel Ali, able to produce 778 m³ millions of distillated water per year. Desalination is the process to remove the excess salt and other minerals from water, usually marine water, in order to be able to use the water for human consumption, irrigation or industrial applications; the most used desalination technologies are multi-stage flash and membrane process.

The multi-stage flash technology used for the Jebel Ali plant is based on cycles of boiling and condensation; cycles are performed in different chambers with decreasing internal pressure. The pressures are always lower comparing the ambient pressure in order to reduce the boiling temperature and reduce the energy consumption during the process. Since desalination process always needs a lot of energy, several of the plants include a generation part; so almost all the plant can be defined as “Power & Desalt”.

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Technical Solutions

Every plant has its own characteristics based on the technical requirements but also based on the customer preferences. For example all the Jebel Ali switchgears have been designed to be installed in critical ambient; indeed they are suitable for an ambient temperature of 50°C and relative humidity of 100%. This type of plants needs flexible products able to be adapted to the different requests in the various phases of the process. These needs appear in the wide range of the power connections, for example cable from the top and from the bottom but also bus duct for the higher currents. Also the range of rated voltage of switchgears installed in the plant is wide and includes: direct current switchgears (24V, 110V and 220V), three-phase alternative current switchgears (380V and 230V) and single phase alternative current switchgears at 220V.

Some special solutions have been developed specifically for this plant like the mobile connection for the auxiliary contacts. The request of the customer was to have a test position on the drawers with power terminals disconnected and auxiliary contacts connected, in order to be able to made test on the drawers keeping the motors insulated. The application has been realized mounting the auxiliary contact on a sliding platform.

Result and customer benefits

The choice of ABB as supplier of the low voltage switchgear gave to Fisia and all other EPCs involved in the project the possibility of using the wide know how of ABB about water treatments plants.

The strong cooperation guaranteed the realization of dedicated solutions for the desalination plants in order to meet the process requirements but also to satisfy the final customers needs. The wide experience of ABB in this sector also provided to ABB the role of EPC in this project.

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