GE Energy

Marafiq Plant Profile

MARAFIQ PLANT PROFILE

RESPONDING TO ECONOMIC AND POPULATION GROWTH

In the Kingdom of Saudi Arabia, booming industrial economic growth and a spike in the population have dramatically increased the need for electricity and clean water. Marafiq, the first privately owned utility company located in the Jubail Industrial City of Saudi Arabia's Eastern Province, is addressing these critical demands with a series of projects intended to produce power and water to meet current and future needs. As part of a consortium, General Electric will supply four combined-cycle power blocks, including a complete plant control system for the Marafiq Independent Water and Power Plant (IWPP).

THE PLAYERS

Drawing technological and logistical strength from several countries, the Marafiq Independent Water and Power Project in Saudi Arabia is owned and operated by a diverse, regional consortium group of developers composed of Suez Energy International (Belgium) in partnership with Arabian Company for Water and Power Development (ACWA Power) (Saudi Arabia) and Gulf Investment Corporation (Kuwait). Through an Engineering Procurement and Construction (EPC) contract, the developers extended the consortium to include additional members, General Electric (USA), Hyundai Heavy Industries (Korea), and Société Internationale de Déssalement (SIDEM) (France), who were commissioned to construct the new power and desalination plant.

Ownership of the new facility will be divided among Suez-Tractebel S.A., Gulf Investment Corporation, ACWA Power, Marafiq, Saudi Electricity Company, and Saudi Public Investment Fund.

ADOPTING GE TECHNOLOGY

Upon completion, the Marafiq IWPP will include a net output of more than 2,740 megawatts of power generation, with steam production of 800,000 m^3/day for desalinated water production. The Marafiq IWPP will be the largest combined power generation and desalination plant in the world. The GE scope of the project will include twelve 7FA gas turbine-generators, twelve heat recovery steam generators, four steam turbine-generators, a distributed plant control and protection system, design and engineering, project management, technical advisory services, performance testing, training and plant maintenance. The primary fuel used will be natural gas, with distillate oil as a backup.

In an IWPP of this size and complexity, optimization and plant control is a major operation management concern. GE's Mark* VIe control system helps to mitigate this concern by providing a common platform for control of the rotating machinery, heat recovery steam generators power island balance of plant, and desalination units. The same control hardware and software is used for the turbine, generator and plant controls, communicating on a common network.

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Controls of the past were comprised of equipment from different sources, resulting in limited collaboration and communication among systems. GE's single control system provides seamless integration of common networks, operator stations, and engineering tools.

CUSTOMER BENEFITS AT A GLANCE

GE's Mark* VIe control system combines the best attributes of turbine and generator controls (reliability, availability, and speed) with the flexible and distributed properties available in a plant-wide distributed control system (DCS). The combination of advanced controls technology coupled with the knowledge and experience of a power plant Original Equipment Manufacturer (OEM), provides benefits during the planning, commissioning and operation of a power plant.

Planning and Commissioning Phase Benefits

- **Revised traditional segregation of plant and unit level controls** to reduce system complexity, decrease start-up problems and allow for commissioning in less time. Tighter integration of plant control allows for operational improvements.
- **Streamlined plant system planning** through the use of a single control system for all plant equipment.
- **Reduced cost and project risk** associated with the integration of different systems and suppliers.

Operation Phase Benefits

- **Increases flexibility of the operator interface** allowing the control room to be set up on a per block basis. Each interface station allows operator access to both the power and desalination plants.
- **Enhances operator productivity and operational awareness** through access to a common interface of all equipment, operator screens, process data, trend data, alarms and events.
- **Diminishes mean-time-to-repair** using enhanced diagnostic capabilities with sophisticated data collection and analysis tools and a common time-synchronized database resulting in data that can be analyzed more quickly and thoroughly.
- **Simplifies operations and maintenance** providing a common control system for the power island equipment and desalination units.
- **Provides plant operators with access to a knowledgeable and experienced team** from the OEM's of the rotating equipment to the designers of combined-cycle power plants.

Equipment for the Marafiq project was shipped from February 2008 and will continue through the end of January 2009. Block 1 is scheduled to enter commercial service during the second quarter of 2009, block 2 in the third quarter of 2009, block 3 during the fourth quarter of 2009, and block 4 during the first quarter of 2010.

Customer Benefits

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