

## CASE STUDY: SATORP JUBAIL REFINERY, SAUDI ARABIA



### FACTS AT A GLANCE

**Company:** SATORP (Saudi Aramco/ TOTAL)

**Website:** [www.satorp.com](http://www.satorp.com)

**Description:** Saudi Aramco TOTAL Refining and Petrochemical Company (SATORP) is a joint venture between Saudi Aramco and TOTAL, which was formed to develop 400,000 barrels per day at the Jubail Refinery in the Eastern province of Saudi Arabia. The plant will be a full conversion refinery and will process Arabian Heavy crude when fully operational in 2013.

**Project budget:** USD 8.5 billions

**Employees:** 30,000

**Industry:** Energy

**Country:** Saudi Arabia

### PRODUCTS USED

- SmartPlant P&ID
- SmartPlant Instrumentation
- PDS®
- SmartPlant Review

### KEY BENEFITS

- Single point of access
- Maximum data quality and usability
- Optimal knowledge sharing
- Shorter project schedules
- Reduced unplanned costs and shutdowns

### SMARTPLANT® INSTRUMENTATION HARMONIZES ENGINEERING DATA AT THE SATORP JUBAIL REFINERY

High quality data accuracy and knowledge sharing are instrumental for the success of the project



### IDENTIFYING GOALS

Oil companies Saudi Aramco (Saudi Arabia) and TOTAL (France) joined forces and expertise at SATORP to build one of the biggest refineries in the Middle East. The Jubail refinery will generate 400,000 barrels per day when it reaches full operational levels. 30,000 people from nine different contractors from Japan, Korea, Singapore, India, Saudi Arabia and Europe are working hard to ensure the plant will run at full capacity by the end of 2013.

Coordinating the instrumentation engineering data generated by nine different contractors is a major challenge. Measuring, recording and controlling all the different process/plant parameters, such as flow, temperature, level or pressure is crucial for the safe operation and shutdown of the plant. SATORP needed a solution able to handle a colossal amount of data.

After an evaluation of its needs in data accuracy, the scope of data collection and information sharing, SATORP adopted SmartPlant Instrumentation (SPI) as its Central Shared Instrumentation Database (CSIDB). SPI enables all the Engineering, Procurement, and Construction Contractors (EPCCs) working on the project to create and manage SATORP instrumentation documents/drawings. The system includes integrated modules for instrument indexes, datasheets, process data, preliminary instrument calculation, wiring, loop drawings, hook-ups, calibration and maintenance. In addition, the piping and instrumentation diagram – the “roadmap” of the plant – will be created and managed by SmartPlant P&ID.

### OVERCOMING CHALLENGES

- Generate, share and distribute accurate and up-to-date data throughout the plant life cycle
- Create a database focused on plant asset rather than document representation
- Coordinate data shared by all companies with a single point of access
- Deliver a system with a well-established application that can keep growing in parallel to plant construction and plant operations

## REALIZING RESULTS

SATORP requested a system providing a single source of instrumentation information that could be easily accessed and updated and ensures consistency across the different instrument tasks and deliverables, eliminating the need to search for information in multiple locations. SmartPlant Instrumentation reduces risks at the refinery by better managing and storing the history of the plant instrumentation and control system during construction, allowing the project to stick to its timeline and avoiding the extra costs associated with delays. An interface with upstream/downstream applications is also ensured and the focus on data rather than documents facilitates a faster project execution.

The database can be accessed 24/7 by all EPC contractors located worldwide through the CITRIX environment. The solution is designed and implemented to meet service-level requirements. The Central Shared Instrumentation Database infrastructure consists of a test environment accessible by domain administrator, a pre-production environment, a production environment based on redundant architecture and a ftp server for exchanging data files with other project sites in a fully secured environment.

Engineering standards related to design rules and validation are more easily met when members of the team are kept on the same page. The smallest modification is available to everyone, regardless of their location and shift.

The deployment of the database system started in 2009 and the system has been in full production since then. More than 300,000 instruments; 60,000 specs; 80,000 loops; 40,000 process datasheets; 80,000 cables have already been designed in the system. The numbers keep growing until the design is complete.

The database is being managed by the project controller, who ensures accessibility, maintains the templates and trains

the users. Each EPC contractor has assigned a SmartPlant Instrumentation super-user, who is the focal point for SPI-related issues and have an optimal knowledge of the database, in order to support the instrumentation engineers and the database administrators with system usability. Data ownership and the synchronisation of data with the “as-built” is guaranteed.

## MOVING FORWARD

Once the project reaches operational stage, report generation and reporting processes will also benefit from a well-maintained instrument performance database, as well as the possibility to create multiple production scenarios and adjust the variables to any change the project may face during construction or during the first phases of operation.

Both Saudi Aramco and TOTAL are committed to being reliable and cost-efficient in their business, while conforming to the highest safety, environmental and quality standards. The SATORP project and its engineering instrumentation are designed to maximize plant operations by reducing unplanned expenses, field changes and unplanned shutdowns. Design rules are enforced by all EPC contractors and relationships between components from various disciplines are effectively managed by an integrated database.

## ABOUT INTERGRAPH

Intergraph is the leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph's industry-specific software to organize vast amounts of data to make processes and infrastructure better, safer and smarter. The company's software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.

Intergraph operates through two divisions: Process, Power & Marine (PP&M) and Security, Government & Infrastructure (SG&I). Intergraph PP&M provides enterprise engineering software for the design, construction, operation and data management of plants, ships and offshore

facilities. Intergraph SG&I provides geospatially powered solutions to the public safety and security, defense and intelligence, government, transportation, photogrammetry, and utilities and communications industries. Intergraph Government Solutions (IGS) is an independent subsidiary for SG&I's U.S. federal and classified business.

Intergraph is a wholly owned subsidiary of Hexagon AB, (Nordic exchange: HEXA B) and (Swiss exchange: HEXN). For more information, visit [www.intergraph.com](http://www.intergraph.com) and [www.hexagon.com](http://www.hexagon.com)

