

Saudi Aramco Utilizes Energy Manager EXT and Nexus® 1252 Series to Monitor System Power Quality, Including Process Motor Reliability

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أرامكو السعودية
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BACKGROUND

Saudi Aramco is one of the largest oil refinery companies in the world with operations that span the globe and the energy industry. The world leader in crude oil production, Saudi Aramco also owns and operates an extensive network of refining and distribution facilities, and is responsible for the gas processing and transportation installations that fuel Saudi Arabia's industrial sector. An array of international subsidiaries and joint ventures, including one of the world's largest and newest fleets of supertankers, deliver crude oil and refined products to customers worldwide.

When producing and distributing oil in such a high demand environment, insuring reliable electrical distribution within the multiple processes is imperative. To this end, Aramco utilizes power quality monitoring systems throughout their facilities to study the reliability of the power systems. The information thus obtained helps Aramco to increase efficiency of their electrical systems and address any power quality issues as they arise.

Like many petroleum companies, Saudi Aramco makes use of large motors for various purposes. Since the most frequent occurrence of motor malfunction is at startup, the voltage and current must be monitored at that time. This voltage and current start up information is used in motor maintenance.

Nexus® series meters are approved power quality meters in Saudi Aramco. They are approved by both 16-SAMSS-500 and SAESS-500 Aramco standards.

Project Thumbnail

Application

Power monitoring and troubleshooting during motor equipment startups.

Equipment

Nexus® 1252 meters
Nexus® 1250 meters
HMI EXT SCADA software

Benefits

- Monitors and prevents the malfunction of motors during start up.
- Accurate load readings and complete power quality analysis.
- Improved equipment maintenance.
- Prevention of down-time due to repairs.



SAUDI ARAMCO TANAJIB PROJECT

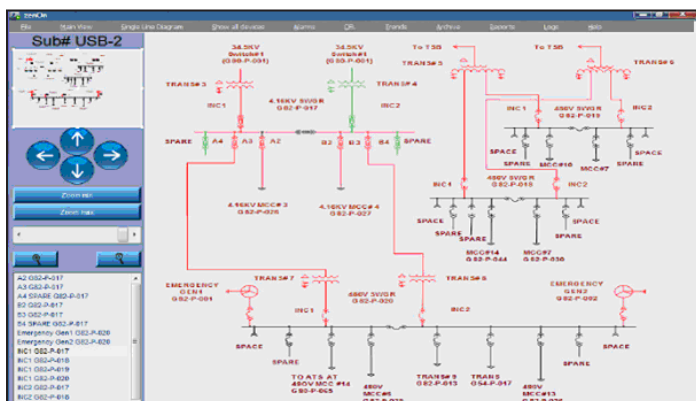
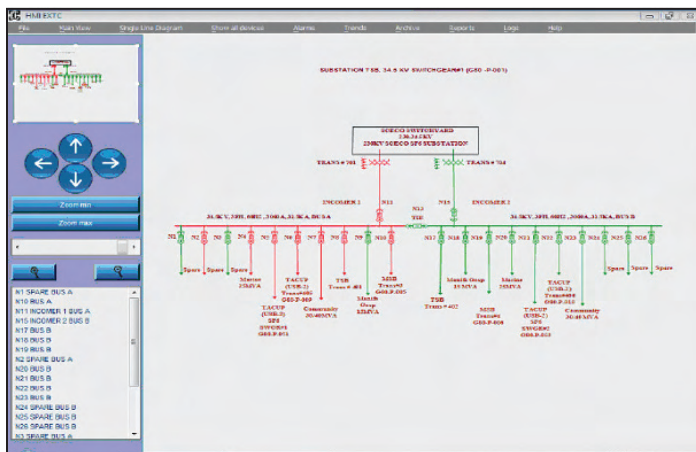
In this project, 16 Nexus® 1252 meters and 66 Nexus® 1250 meters were used with monitoring software to achieve complete power quality analysis online.

In addition to monitoring overall power quality during the Tanajib project, Aramco planned to utilize the Nexus® meters to monitor critical motor startups on a cycle by cycle basis. The reason for this monitoring was the need to determine the reliability of the motors and to collect analysis

data that could be used to indicate when a motor was likely to fail. This was an important issue for Aramco—although the motors themselves may not be costly, the wasted production time caused by malfunctioning equipment is highly costly. Using the Nexus® meters to collect motor startup data insures that the related processes are running reliably. The data was collected utilizing Electro Industries' Energy Manager EXT. This full Enterprise-level SCADA system was used to collect data and provide analysis for many critical points within the Aramco system.

MONITORING SCREENS

EIG SCADA HMI EXT sample screens: Single line Master systems diagram screen



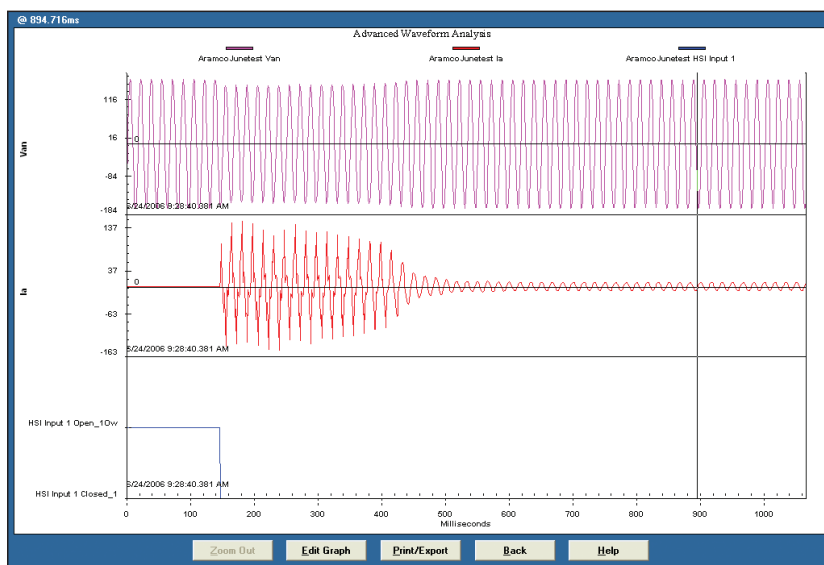
A total of five substations were equipped with the Nexus® meters. Some of the functions of Nexus® power quality meters are:

- Billing Grade Revenue metering
- Optional external outputs
- Extensive Communication capability
- Power Quality control
- EN61000-4-15 Flicker monitoring
- Logging desired parameters using multiple historical (trending) logs
- Independent CBEMA Log plotting for quick Power Quality reliability information

- Out of limits recording
- Monitoring of harmonic magnitudes
- Waveform recording
- Motor Startup trending

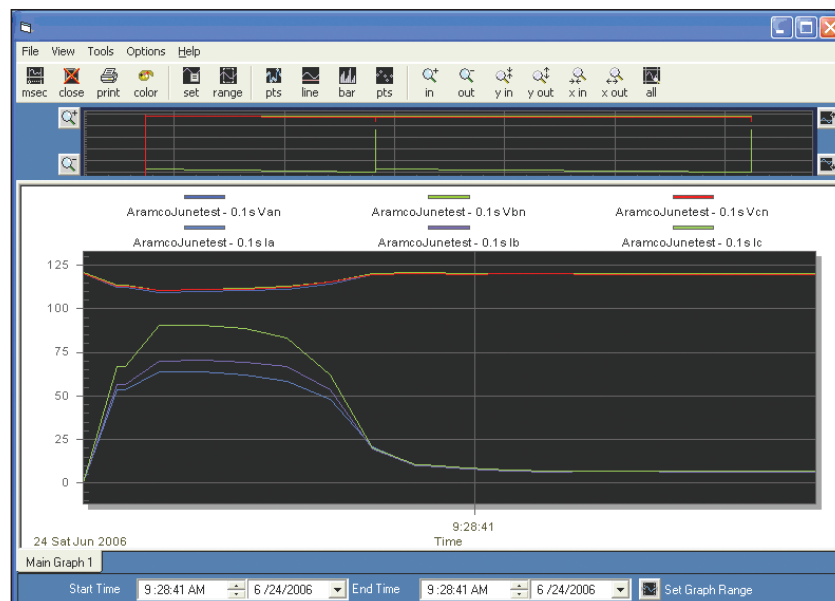
MOTOR START UP TRENDING

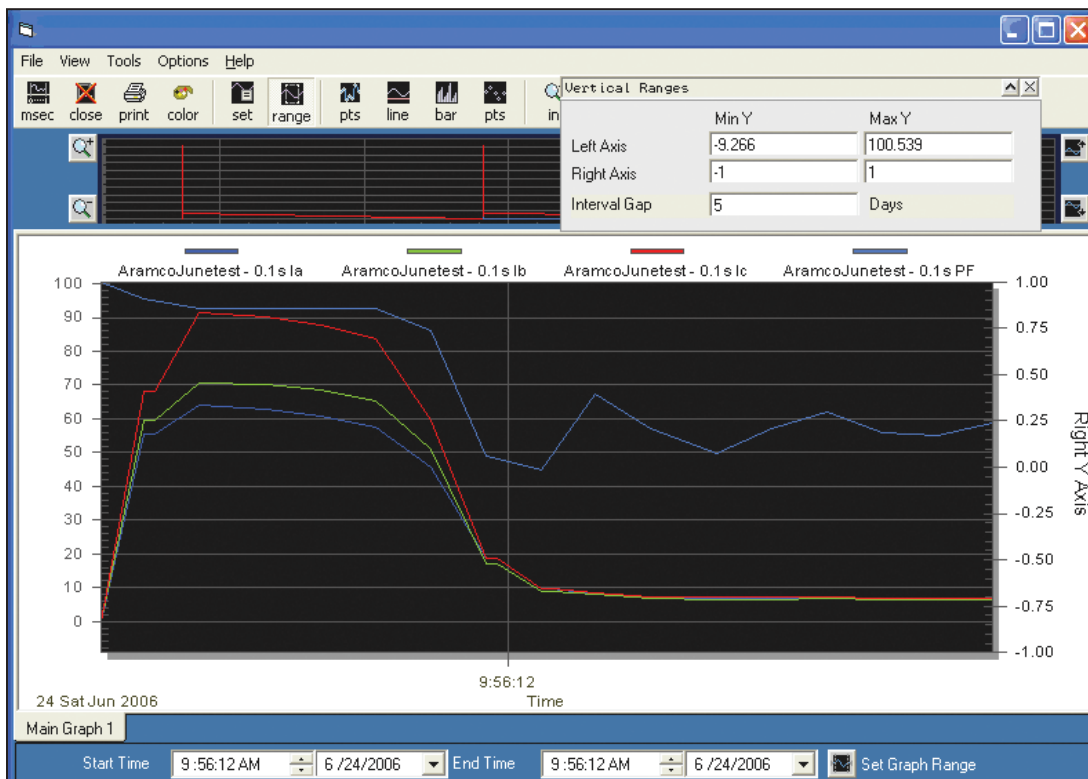
As mentioned earlier, Aramco's high powered pump motors needed to be monitored during startup. Nexus® 1252 Power Quality meters are capable of monitoring motors for a duration of 60 seconds and can record TRMS values for any 50 second measurements.



The screen shows a typical motor startup waveform reading.

The screen shows the TRMS value recording chart for voltage and current.





This screen shows the relationship between PF and Current.

RESULTS

The Nexus® 1252 monitor is one of the world's most advanced meters. In the Tanajib project, Aramco made use of the meter's advanced features to monitor critical motor startups. Using the Nexus® 1252 meters they were able to view PF distribution and cycle by cycle values over time whenever a motor started up. Utilizing this information Aramco was able to monitor the reliability of the motor and predict when failures would occur. The Nexus® meter was proven to be a reliable and useful tool for improving critical process reliability.

Clients can use different functions of the Nexus® meter for their specific requirements. The Nexus® meter offers unbeatable performance in accuracy together with power quality monitoring functions. Motor startup monitoring can be implemented for clients who need to monitor their equipment at the time of startup. The Nexus® meter is capable of monitoring motor startup can be monitored for 1-60 seconds, and can monitor all performance of the load with the best accuracy in the market.

Special thanks to SESCO-GPDS for performing on-site integration of the monitoring units through a central HMI EXT SCADA system.

