



A Rockwell Automation Company

City of Escondido Utilities HARRF Phase-II

The Client:

The Hale Avenue Resource Recovery Facility is a conventional wastewater treatment plant that collects and treats grey water from two cities – Escondido with 130,000 residents and Rancho Bernardo with 50,000 residents. It gathers water from a 360-mile long network of pipes through 6,000 manholes via 14 pumping stations. The plant capacity is 16MGD split

among two areas – 12MGD from Escondido and 4MGD from Rancho Bernardo. The plant was originally built to produce reclaimed water for local non-potable reuse to meet the demands of the growing population. Phase-I was completed in 2000 providing improved operation of the secondary treatment process along with rehabilitation of existing facilities.

The Requirement:

The existing SCADA system required a complete upgrade because the control system did not have the functionality that the plant operators required. Hinz provided new electric enclosures and components for the PLC, HMI and radio controlled SCADA communications for the new control room and remote sites.

A small portion of the plant's automation system remained unchanged, but all new and existing PLCs required new PLC code generation, testing and commissioning.

The Design Solution:

All software design, development and commissioning work was awarded to Hinz. A detailed Functional Requirements Document (FRD) was created to define and document the control philosophy standards for: Hand/Off/Auto modes, Local/Remote modes, signal handshakes, pump fault scenarios, pumps Lead/Lag sequencing, process totalizes, PLC control recovery after power failure, and single and cascade closed loop control. The PLCs were used to control the following treatment subsystems: grit removal, odor control, RAS and WAS pumping stations, UV system, flocculation/sedimentation basins, de-aeration systems, ozonation facilities, media filters, chlorination facility and a series of chemical storage with chemical delivery systems.

The new PLCs selected had Ethernet connections capable of networking the 2048 I/O points.

The SCADA system was developed around Wonderware's InTouch software. Process screens and control screens were linked with the QuickLinks navigation banner, for fast and intuitive screen coordination. Different networked computers were

assigned for the following roles: Data Historian – SQL Server; Internet Information Server; SCADA control, backup SCADA control, SCADA development, SCADA lab data; remote access laptops, SCADA view only.

Communication between SCADA nodes and the plant PLCs used an Industrial Ethernet network with 17 network switches, routers and hubs. The plant could be controlled over the internet running dedicated application from SCADA laptops while remote alarm annunciation could be performed on the operators' alpha-numeric pagers via telephone modems.

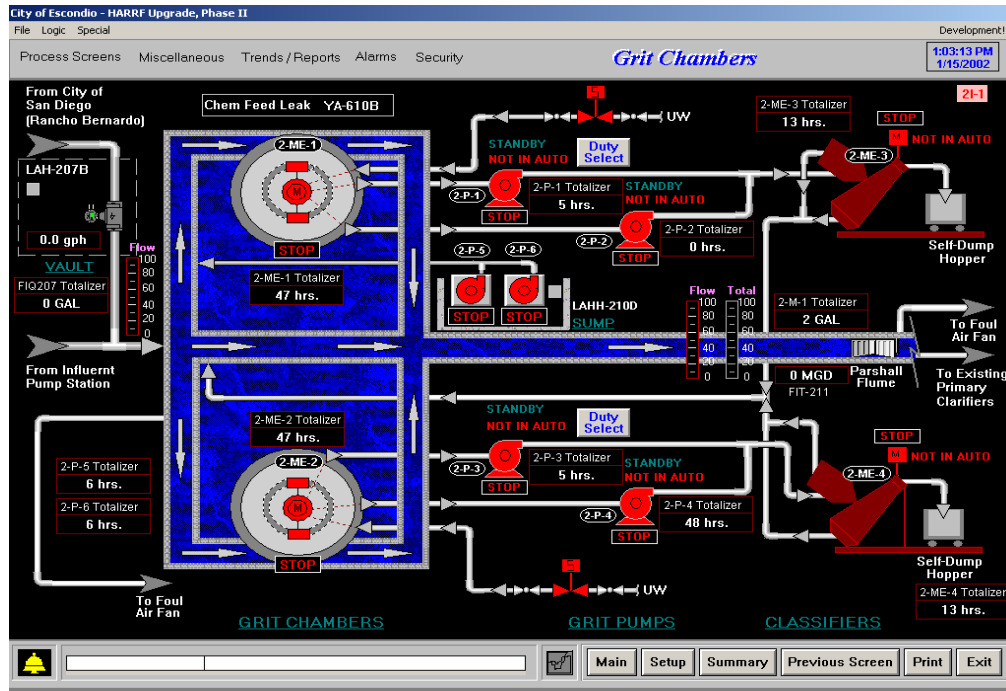
A Motorola MOSCAD remote terminal unit with dual functionality (PLC and radio communication) was used for the remote sites. Modbus protocol was used to link the plant side RTU to the remote PLCs.

A training and video conferencing center was provided with a complex overhead projection system to enable videoconferencing over the Internet and telephone lines.



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System Specifications:

- **Total field associated tags** – 1100; Total PLC program tags – 5,700.
- **PLC** – six A-B PLC 5 series 40E processors mounted on 16 slot racks; two remote 16 slot I/O racks; eleven analog input cards, one analog output card; thirty discrete input cards, nine discrete output cards.
- **Power** – six smart uninterruptible power supplies plus two on-site diesel generators.
- **Field HMI** – six CTC Parker panel mount industrial PC stations with flat touch screens. Telemetry – two Motorola MOSCAD remote terminal units.
- **Connectivity Protocols Used** – Ethernet (TCP/IP), DH+, Modbus, ControlNet.
- **Remote Alarm Annunciation** – two AutoDialers to Alpha-Numeric pagers.
- **Redundancy levels** – PLC redundancy on engineering stations, Alarm annunciation redundancy with dual modems at separate stations.
- **Networking** – four fiber optic 100Mbit Ethernet switches, eleven Ethernet switches and hubs.
- **Computer stations** - one Historian server, one Internet Information Server, two redundant Engineering Stations, three Supervisor View Stations, One video Internet Conference Station, one Engineering Development Station, one Laboratory Work Station, two Laptops for remote SCADA control.
- **Media Devices** – one large screen overhead projection display, three network printers.

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com