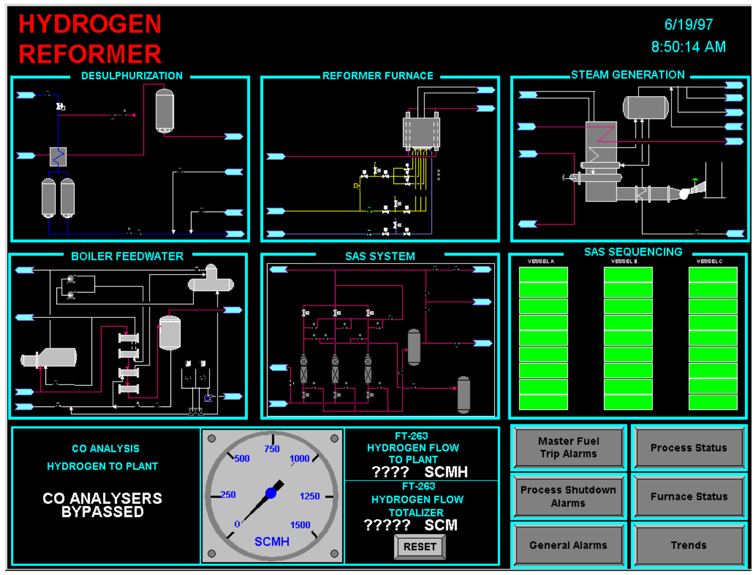
HYDROGEN REFORMER CONTROLS UPGRADE

A major producer of hydrogen peroxide is located in Prince George, British Columbia, approximately 500 miles northeast of Vancouver. This chemical plant produces hydrogen peroxide for use as a bleaching agent in the pulp and paper industry. The main source for the plant's hydrogen requirements is from a chlor-alkali facility located a short distance away, which produces hydrogen as a byproduct. As an alternative source of hydrogen, the hydrogen peroxide plant has a hydrogen reformer, which produces hydrogen from natural gas. If the plant loses both sources of hydrogen, the production must be halted, and much of the process has to be purged with nitrogen. After a nitrogen purge, it takes approximately 18 hours to bring production back online. For this reason, it is important that the plant has a reliable source of hydrogen.



Main control page of the Hydrogen Reformer

PROJECT SCOPE

Due to poor reliability of both sources of hydrogen, production rates in the peroxide plant were beginning to be affected. Each time a problem occurred at the reformer an operator from the main control room would have to walk out to the reformer to investigate, taking time away from regular duties. Large amounts of time were required by the maintenance department to troubleshoot problems, repair outdated control equipment, and purchase hard to find parts. When the plant's main source of hydrogen failed, the reformer could only supply part of the plant's demand.

An upgrade of the reformer to improve reliability and increase production rate was undertaken. The upgrade included replacement of the old control system, and the installation of new, more efficient burners.

Universal Dynamics was responsible for the control system part of the upgrade, including:

- Preparation of purchase requisitions;
- Installation drawings;
- Installation contract;
- MMI configuration;
- PLC programming;
- Installation supervision;
- As-built drawings;
- Commissioning and training for the new control system.

The control system upgrade included installation of new field instrumentation, PLC control, and a PC-based operator interface. Separate Allen-Bradley PLCs were used for the main reformer control and the burner management system. PC based Man-Machine Interfaces using FIX DMACS software were used for operator control of the process. The emphasis on designing a reliable control system resulted in the use of redundant MMIs. The new control system operation and operator interface design was developed in conjunction with the peroxide producer's operations to ensure the new system would operate in a way that operators would find familiar. This made the transition from the old system to the new as easy as possible for operations.

BENEFITS OF PROJECT

- False trips that previously shut down the reformer are no longer generated.
- Trips caused by brief spikes (less than 5 seconds) beyond trip points no longer cause shutdowns.
- Maintenance no longer has to spend time repairing old equipment and searching for hard to find parts.
- Operator interface provides the operators with more information in an easier to understand format, making troubleshooting easier.
- First Out alarming tells maintenance which condition caused a shutdown or trip. Without guesswork, the problem can now be fixed before the reformer is started up again.

- Operations does not have to make frequent trips to the reformer to investigate alarms.
- PLC control allows flexibility in the system for control changes, and/or additions in the future.

Both of the project's goals of improved reliability and improved production rates were achieved. The reformer is now capable of producing significantly more hydrogen than previously possible, due mostly to the new burner configuration. Improved reliability has been achieved due to the new field instrumentation and modern process control equipment.

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