Power Plant Uses Controller and Autodialer for Groundwater Remediation Project

Using a centralized control system helps to ensure that the specific processes are operating properly as well as providing an efficient means for documenting and monitoring the activity of a plant s operation. Programmable logic controllers (PLCs) help implement this control.

For example, an oil-fired electric power plant is using a programmable logic controller and an autodialer to monitor their groundwater remediation project. The power plant is fed by four 2.5 million gallon aboveground storage tanks. Fuel oil is pumped from the storage tanks to the power plant via a 200 yard long underground pipeline.

Recently, oil leaks along the underground pipeline connecting the storage tanks were discovered. Environmental consultants were called in to prevent further migration of the oil to local water supplies and a nearby bay, as well as provide groundwater and soil remediation.

Five recovery wells were drilled along the pipeline to pump water to the surface for treatment. Clean water is discharged to the publicly-owned treatment works (POTW) and oil that is separated from the water is collected for recycling. The project is expected to take from three to five years to complete. A diagram of the system is shown below.

Test vaults were placed along the oil and water lines for monitoring by a system consisting of a programmable logic controller and the Verbatim Gateway Autodialer by RACO Manufacturing & Engineering Co., Emeryville,

CA. Controller data points were programmed for operating parameters such as pump operation, oil and water leaks, quantities of material pumped and tank levels. The autodialer was programmed to poll the controller for alarm conditions and to call remediation staff personnel in an emergency.

The system is equipped for local data logging. It is connected to a serial printer to provide a hard copy record of all events. At user-programmable intervals, the system will print the status of all channels on the local printer including run time, totalizer and analog input values. Reports also include details of alarm activity such as test vault station identification, date and time of report, alarm status, phone numbers called and conditions of acknowledgment.

During the early stages of the project, the consultants made frequent status checks on system operations from their offices which were located some distance from the actual site. They liked the ability to call the system over their standard TouchTone office telephone. The system has since gone fully automatic, with the system programmed to call staff phone numbers in the event of an emergency.

Verbatim Gateway units provide bi-directional communications with programmable logic controller networks by a serial cable connection. The use of controller outputs or modification of programs is not required. This gateway, in turn, is connected to the public telephone network via standard plug-in phone jacks.

When the appropriate contact or logic level inputs from the programmable logic controller network indicate an alarm, the system calls a list of phone numbers and provides clear voice-message reports of the alarm condition.

Operating personnel can also call in at any time from any standard TouchTone telephone to check the status of any channel, modify alarm criteria and monitoring points, and alter process variables and set points.

Continuous real-time communication between the Verbatim Gateway and the programmable logic controller network is performed by a serial link using the protocols supported by specific controller models. Any controller I/O points and data registers can be manually altered. In addition, the system provides automatic monitoring for as many as 96 points. These points can be any combination of discrete, analog, timer, counter or other controller data objects.

Only a single cable connection is needed to deliver the system s functionality, avoiding the cost of complex wiring, additional controller outputs and relays. Monitoring points can be easily added at costs that are lower than those associated with traditional controller-to-input configurations.

When an alarm condition occurs, the system starts calling a list of up to 16 pre-programmed phone numbers, calling until it gets an answer. When a connection is made, the system reports the station identity and alarm condition by playing the user s own voice-recorded messages.

Alarm and status messages are digitally pre-recorded in the user s own voice and stored in the system s non-volatile memory. The messages are then selectively played back exactly as recorded when an alarm occurs or a status condition is requested.
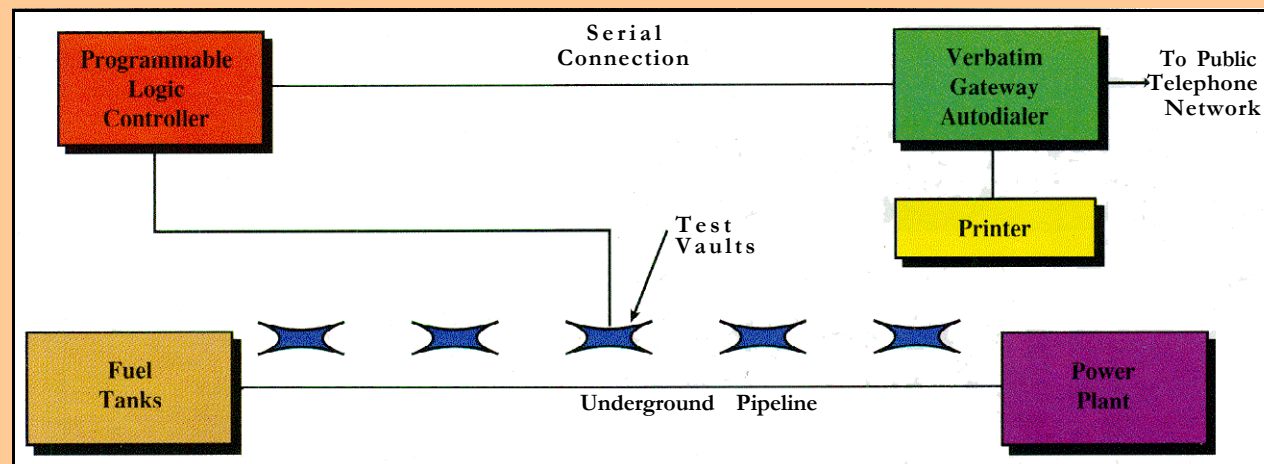
Groundwater remediation project alarm system network diagram.