

Sensaphone[®]

APPLICATION NOTE

Application:

Groundwater Remediation

Functions:

**Blower & Pump Control,
Alarm Notification, Data Logging**

Sensaphone Model:

Sensaphone SCADA 3000

What is Groundwater Remediation?

Groundwater remediation is the process of cleaning water and/or soil that has become contaminated as the result of storage tank leakage, chemical spills, waste spillage, etc. Variations and enhancements of conventional pump-and-treat systems include several physical, chemical and biological options.

Who needs groundwater remediation?

Groundwater remediation projects are usually required by industrial/commercial companies that bear responsibility for some form of environmental contamination. Local, state, and federal agencies also get involved with environmental cleanup projects. Groundwater remediation is used at about three-quarters of the Superfund sites where groundwater is contaminated, and at most sites where cleanup is required by the Resource Conservation and Recovery Act and state laws. The EPA is the government body enforcing the rules designed to safeguard the environment.

Who specifies groundwater remediation equipment?

Mostly environmental companies that provide engineering services for hazardous waste cleanup. An in-depth understanding of hydrogeology and groundwater engineering is required to design and operate a remediation system.

Why is SCADA 3000 a good choice for groundwater remediation applications?

The SCADA 3000 can provide the necessary control, system monitoring and data collection activities all in one unit. In addition, the system can be programmed and controlled remotely via the unit's internal modem. Any other solution would require a separate PLC to operate the equipment, a datalogger to store process data, and an autodialer to monitor the system for continuous operation. By comparison, using separate components increases the cost and provides less capability because the components are not integrated with one another.

Case Study

At Trans World Airlines' central aircraft maintenance facility in Kansas City, Missouri, Sensaphone SCADA 3000 is at work controlling the cleanup of contaminated groundwater. Over decades of operation, chlorinated solvents used to clean metal aircraft components have affected soil and groundwater.

The cleanup method is called "Vacuum Enhanced Groundwater Extraction." As the name suggests, water is drawn out of the ground by vacuum at three well sites and collected in a tank. The contaminated water is then pumped into an air stripper which separates the solvents from the water. The solvents are left to evaporate into the atmosphere and the cleaned water is discharged into the public sewer system.

The system was designed by the engineering firm of Burns & McDonnell. They chose the SCADA 3000 for its combination of control, alarm notification, and datalogging features.

The entire system—including compressors, air stripper, collection tanks, and the SCADA 3000 control panel—is housed in a single-wide wheeled trailer.



A SCADA 3000 Main Unit, one Universal Input Module, and one Relay Output Module handle the control I/O. A Ladder Logic program controls the operation of the system.

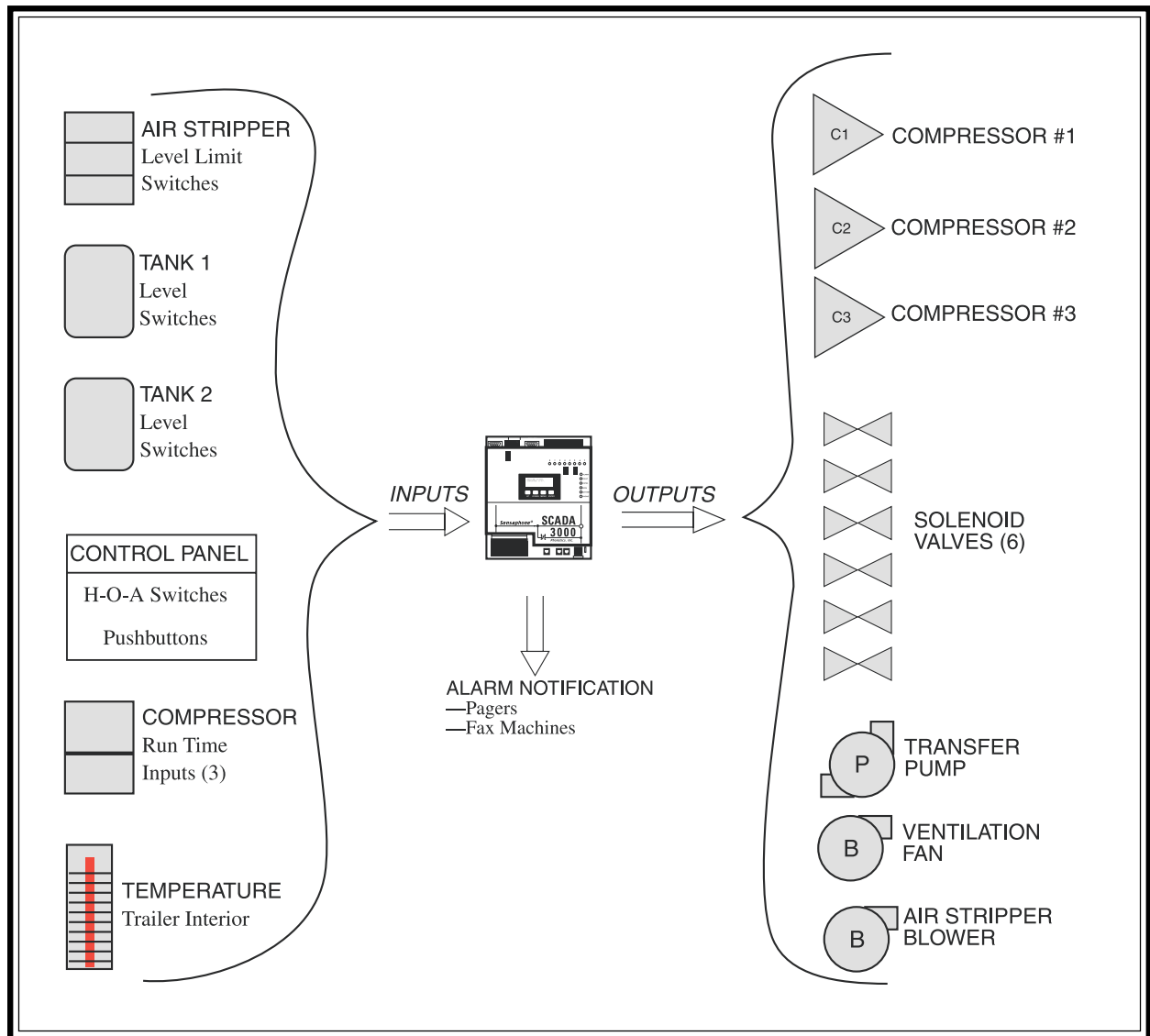
The entire remediation system is designed to be portable so that when the cleanup is finished, the trailer can be re-used at another site. Because of this portable design, the SCADA 3000 uses a cellular phone for communication.

SCADA 3000 monitors the site for various alarms like motor starter thermal overloads, high tank levels and temperature inside the trailer. When an alarm occurs, SCADA 3000 pages both TWA's environmental safety director and the Burns & McDonnell engineer in charge of the site. The unit then sends faxes to TWA and Burns & McDonnell so that they both have a written record of the alarm event.

The SCADA 3000 saves operation and maintenance costs by allowing remote access to the system by telephone. This helps avoid unnecessary and time-consuming visits to the site to check system status.

The entire SCADA 3000 system is backed up by a 5.2AH lead-acid battery so it will be able to make alarm calls if the power goes out.

Before discovering the SCADA 3000 system, consulting engineers had to integrate separate logic controller, datalogger, and alarm notification systems. SCADA 3000 gives them all three in one unit.



SCADA 3000 shown with typical I/O found in groundwater remediation application



Sensaphone® SCADA 3000

HARDWARE CONFIGURATION

16 Universal Inputs:

- Contact closures
- Thermistors
- 4-20mA Analog
- 0-5 Volt Analog
- Run time accumulation

8 Outputs:

- Latching 2 amp relays
- LED status indication

2 RS232 ports:

- Local programming
- Data radio communications

RJ11 Phone interface for optional voice and data communications

LCD:

- 4 by 20 character scrolling display
- User customized content for local viewing

FEATURES:

Data Logging:

Fully user programmable built-in data storage for logging I/O points or calculated variables

Event Logging:

Internal tracking of all significant alarms and events

Ladder Logic Programming:

Standard ladder programming included for true PLC-type control

Visual ladder editor is part of free software package

C-Programming:

Built-in C-compiler, allowing complex calculations
C-program is capable of running on a schedule, independent of ladder program

PID:

Eight PID loops are built-into internal programming
Any I/O points are selectable to function in PID calculations

AGA Gas Flow Calculation

Options:

Input/Output Options (expandable to 144 points):

- Universal inputs (same as 16 already built-in)
- High Speed pulse count inputs, up to 10kHz
- Thermocouple inputs: Types J,K,R,S,T and E
- Relay Outputs
- Analog Outputs (4-20mA)
- Annunciator Panel

Communication Options:

- Phone modem – allows modem, fax, and pager communications
- Voice module – allows custom voice messages over standard phone lines

Power Supply Options:

- Hard-wired power supply for 110 or 220 VAC operation
- Plug-in power supply for 110 or 220 VAC operation
- Standard battery backup
- Extended battery backup

SOFTWARE:

Included in the purchase price, it provides the capability to program units, develop ladder programs, develop C-programs, retrieve and analyze the data and event loggers plus print all necessary reports.

- Automatically polls for data using phone lines or radio modems.
- Performs all standard SCADA functions with customized on-screen graphics
- True 32-bit code for Windows® 95 or Windows® NT