

Sensaphone[®]

APPLICATION NOTE

Application:

Wastewater Treatment

Functions:

Blower & Motor Control, Alarm Notification,
Data Logging

Sensaphone Model:

Sensaphone SCADA 3000

What is wastewater treatment?

Wastewater treatment plants take sewage and make it environmentally safe using specialized equipment and chemicals. After processing, the remaining waste can be safely discharged into the environment.

What government laws apply to wastewater treatment?

The Clean Water Act prescribes performance levels to be attained by municipal sewage treatment plants in order to prevent the discharge of harmful wastes into surface waters. The Act also provides financial assistance so that cities can construct treatment facilities in compliance with the law. The availability of funding for this purpose continues to be a major concern of cities and states.

Who specifies wastewater treatment equipment?

Wastewater treatment equipment is specified by engineering firms that are contracted to design treatment facilities.

Why is SCADA 3000 a good choice for wastewater treatment 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: Beaver Lake Wastewater Treatment Plant, Plattsmouth, Nebraska

A Sensaphone SCADA 3000 is in place at the Beaver Lake Wastewater treatment plant in Plattsmouth, Nebraska, about 15 miles south of Omaha. The plant serves a community of 2500 people in 800 residences using Parkson Corporation's patented Biolac® process to treat an average of 175,000 gallons per day.

A SCADA 3000 Main Unit, one Universal Input Module, and one Analog Output Module provide the control I/O. Beaver Lake uses the SCADA 3000's monitoring, control, data-logging features to achieve an integrated operating system for the plant. Transducers monitor the sludge blanket level, influent and effluent flow rates, dissolved oxygen, and suspended solids concentrations.

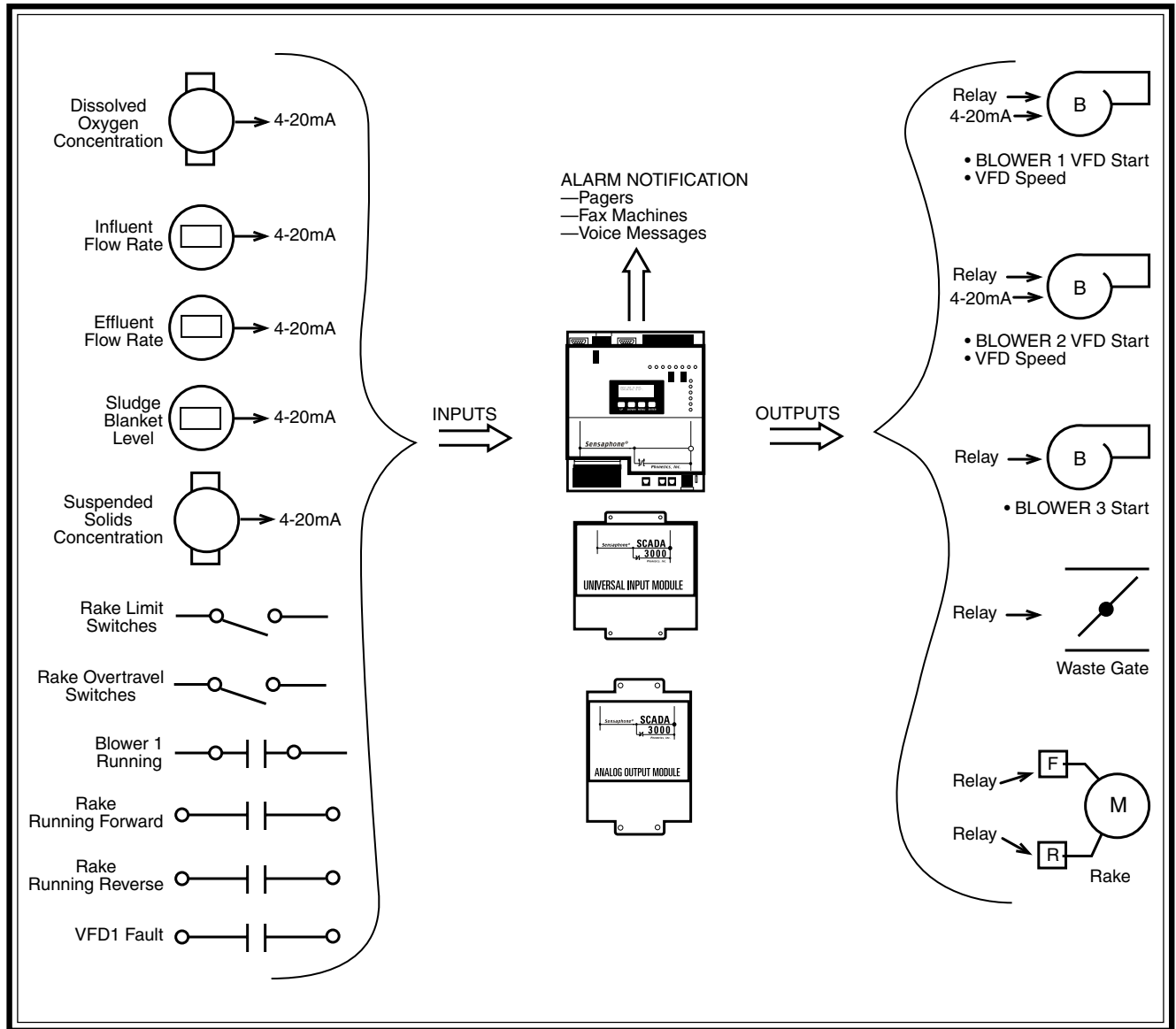
Operation of the plant's Biolac® treatment process requires 2 logic control programs running simultaneously. A single SCADA 3000 runs both a Ladder logic program and a C-program. The C-program performs alternation and PID control of 2 VFD blower motors and one single speed blower. The blower motors are called to run and speeds are adjusted based on the level of dissolved oxygen in the aeration basin. The Ladder logic program controls the operation of an oscillating aeration rake.

System monitoring is handled internally in the SCADA 3000 using the built-in alarm notification functions. This powerful integration feature allows any of the system's 64 alarms to be based on both external I/O points and internal Ladder and C program variables. Unlike typical SCADA RTUs, the Sensaphone SCADA 3000 can dial plant operators directly to deliver user-recorded voice messages when system alarms occur. Beaver Lake's SCADA 3000 is programmed to call the plant operator, then the Managing director of the Beaver Lake Association.

Total plant flow in gallons per day and sludge blanket suspended solids concentration are among the critical plant data gathered and stored using the SCADA 3000's built-in Data Logger. Each SCADA 3000 Main Unit can store up to 50,000 time-stamped records in its internal memory. Data retrieval is done using the Polling function included with the SCADA 3000's programming software. One of the plant's computer's is set up to automatically download logged data from the SCADA 3000 Main Unit according to a user-programmed time interval.

Beaver Lake's operators monitor the treatment plant using the SCADA 3000's Real-time screen application. A Real-time operator interface screen has been designed to display and control critical system parameters such as blower running status, blower speeds, aeration process setpoints, blower failure alarms, and the aeration basin dissolved oxygen content.

SCADA 3000 SHOWN WITH EXPANSION MODULES AND TYPICAL I/O FOUND IN WASTEWATER TREATMENT APPLICATIONS





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