Water Quality Data Logger for Monitoring Coal Mine Runoff

High Salinity Water Runoff Monitoring Solutions

CAS DataLoggers provided a water quality data logging solution for an open-cut coal mine to monitor high salinity water runoff into local retaining ponds. The water from these retention ponds could only be released into the local river system when it was of sufficient quality so as to have no effect on the irrigation supplies for the surrounding farming district. Therefore it was necessary to closely monitor water quality in the lagoons for several key parameters including pH, salinity, and turbidity.

Mine management searched for a data logging system with the versatility to connect to a range of water quality sensors that was capable of remote communications to allow convenient access to real-time and stored data. The data logger also had to offer low power operation with the ability to operate off a solar panel since mains power was not available at the remote sites.

Installation

The coal mine choose a dataTaker DT80 Universal Input Data Logger to monitor the quality of the coal mine water discharge. The data logger was mounted in a weather-

proof enclosure suitable for outdoor exposure at the monitoring site. The DT80 was connected to multiple sensors to allow measurement of conductivity (salinity), turbidity, pH, and water levels as well as thermocouples for water and air temperature.

For example, the sensor used to monitor the water level provided a 4-20 mA current signal proportional to the water depth (pressure). This current was passed through a simple shunt resistor to generate a voltage, which was then measured and automatically scaled by the DT80. The water quality sensors such as the one for turbidity utilize the SDI-12 serial data communication interface which is commonly found in environmental applications.

The DT80 offers four SDI-12 buses with up to 10 sensors per bus. For powering the data logger, a small solar panel, charge controller, and battery providing 12 VDC were connected directly to the data logger providing uninterrupted operation without external AC power. The DT80 features a low-power sleep mode when it is not actively taking a measurement, which combined its ability to only power the sensors during this time allows the system to run off a 20-watt solar panel and 25 Ahr battery.

USAGE

The DT80 data logger is a very cost-effective device for water quality and environmental monitoring. It offers expandability to 100 channels or 300 single-ended analog inputs, and also features digital channels, high-speed counter inputs, SDI-12, and serial sensor channels for connection to almost any type of analog or smart sensor. The stand-alone data logger features a built-in display and keypad, high accuracy 18-bit measurement resolution, and dataTaker's renowned robustness and durability

providing reliable low-power operation even under extreme conditions.

The dataTaker data logger can store as many as 10 million data points in internal memory, offering control of allocation and storage mode allowing users to record exactly what and how much as needed. The DT80 provides multiple communication options including RS232 and RS485 ports, USB, and Ethernet ports so users could connect to the datalogger locally, remotely, or over the Internet. A USB memory stick port allows stored data to be downloaded directly to a USB stick with just the push of a button.

The DT80's built-in FTP server enables the logger to automatically push recorded data remote to a server. Additionally, the dataTaker DT80 comes with dEX software featuring an intuitive graphical interface enabling operators to configure the data logger, view real-time data in dashboards, create trend charts and tables, and retrieve historical data for analysis. dEX offers cross-platform support with versions for Windows, macOS, and Linux and could be accessed locally or remotely, anywhere that a TCP/IP connection was available including globally over the Internet.

Benefits

In this water quality monitoring application, remote telemetry via a Microhard LTE Cube cellular modem was used to create a wireless link from the logger to the central PC in the mine's office. This connection allowed personnel to remotely observe changes in water quality in real-time during water management operations such as mixing water from different sources. For ongoing operations, periodic connections were made to the dataTaker for mine water discharge monitoring. At these same intervals, the data was downloaded and saved to a database, allowing for data backup and long-term environmental monitoring. Finally, the wireless connection also enabled users to remotely adjust calibration parameters in the data logger in the event of a sensor replacement or to make program modifications required by authorities.

CAS DATALOGGERS

The coal mine's water discharge monitoring operation benefitted significantly following the installation of the dataTaker DT80 intelligent data logger, primarily by enabling measurement of all the different types of water quality parameters--all this data was made available through a single device. Personnel was also able to keep a constant watch on the data using the data logger's remote access capabilities and rely on the logger to send the data to their company database for storage. The dataTaker's included dEX software made configuration simple and was easy to navigate for both novice and experienced users.

For more information on the dataTaker DT80 Universal Input Data Logger, or to find the ideal solution for your application-specific needs, contact a CAS DataLogger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.