CIMTEC
Remote Telemetry Unit

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Monitoring within Wastewater Treatment Plants

Cimtec developed a remote telemetry unit (RTU) monitoring system for a large private wastewater treatment facility in the United States. The RTU logs and monitors water quality instruments using analog measurements and discrete alarm signals. The goal of the RTU system development is to perform local monitoring of multiple process instruments and various discreet I/O, logs data, reports alarms as necessary including a "timed call-in" at intervals configured in its site specific set-up. Data up-link to the Wastewater server is performed over the cellular network. Logged process information can be viewed locally to assist in plant optimization.

Wastewater RTU Design

The wastewater RTU consisted of the following components:

Enclosure - Class 250 Type 4 (Exceeds NEMA 3R) UL Listed
Un-interruptible battery back-up - Provides seamless switchover to battery power upon AC main power loss and switchback to normal AC power source upon restoration with continuous battery charging. As part of the RTU functionality, the UPS switchover and restoration are reported to the Wastewater server.
Externally mounted antennas - For this application, a free-standing 16 ft. antenna mast was mounted in concrete. The cellular antennas have a minimum of 3DB gain
Surge suppressor - Each telemetry unit location was provided with a bulkhead-type, Polyphaser coax surge suppressor connected at the enclosure junction of the antenna coax. Cimtec provided standard Type N connectors for all antenna connections. The transmission cable is suitable for direct environmental exposure.
Instrumentation - An array of sensors are included within the RTU, including a PH sensor, Chlorine (free) sensor and analyzer, turbidity sensor and analyzer, dissolved oxygen sensor and analyzer, and transmitters for all sensors.

Wastewater RTU Operation

The Aqua North Carolina RTU system uses an integrated operator interface / programmable logic controller to continuously monitor the status of all inputs. "Out of limit" events and "Timed Reports" are reported and/or process data are communicated to the wastewater server. This includes process variables monitored continuously to assert that they remain within specified parameters that are tailored to the specific location. In case of process measurement by analog method the process variables are sampled every minute, and every 30 minutes the average, minimum, and maximum levels are stored in the controller memory for reporting. All monitored process variables are sampled every 15 minutes except effluent flow, which is sampled every minute for higher accuracy. The data for the most recent eight plus hours is retained in the controller's memory.

The conditions that generate a call by exception to the server are a change in state of any of the following:

WasteWater RTU AC Power (1 Min delay)
Utility Power Failure (Automatic Transfer Switch)(5 Min delay)
Utility Power Failure from alternate monitor (5 Min delay)
Automatically activated stand-by power generation source failure (5 Min delay)
Out of Range alarm on any monitored variable (15 min delay)
Automatic 8 Hr. update (Update time shall be adjustable)
Aeration Blower Overloads (1 min delay)
Door Security (1 min delay)
Influent High Level (1 min delay)
UV System Failure (1 min delay)
Process Monitoring Disabled longer than 24 Hrs.

After the RTU system was installed, Cimtec performed a full set of diagnostic tests to ensure full functionality of the system before handing operation over to the utility.