



## PowerLogic in Industry

# US DOE Waste Isolation Pilot Plant cuts energy costs by 30%

### Application:

- Measure efficiency, reveal opportunities and verify savings
- Demand response
- Verify the reliable operation of equipment
- Improve response to power quality-related problems

### PowerLogic System:

PowerLogic ION Enterprise  
PowerLogic ION meters

The U.S. Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) near Carlsbad, N.M., is the nation's first underground repository for transuranic waste, or clothing, tools and other items contaminated by radioactive material during the research and development of nuclear weapons. Federal mandates to reduce energy consumption and provide ongoing documentation led WIPP to install a power monitoring system using PowerLogic ION Enterprise software and PowerLogic ION meters (formerly Power Measurement).

Subsequently, the PowerLogic power monitoring system helped facility engineers to slash energy use by 30 percent, investigate power quality issues, audit utility bills and identify energy efficiency opportunities.

The system provides:

- trend data and load profiles for analyzing energy use and establishing baselines
- complex power data, including waveforms, voltage and electrical distribution data for power quality investigations
- shadow billing reports for verification of utility charges

With its roughly 270,000 square feet of air-conditioned space, more than 60 buildings and an enormous underground storage area situated in a salt formation 2,150 feet below the Earth's surface, annual utility costs for the site in 2001 averaged \$755,000 and consumption 18 million kWh per year. Beyond the main utility metering point, the WIPP owns and maintains 11 electrical substations aboveground, three medium-voltage distribution switchgears, two substations and six portable power centers below ground to provide power for operating the numerous buildings and various industrial processes.

## Special consideration

Engineers knew the project would be labor intensive and would require cooperation among numerous departments. No overhead electrical lines are permitted, and ground excavations cost approximately \$150 per foot. Work cannot be performed when the system is hot, and de-energizing a substation requires extensive scheduling and coordination. Additionally, the WIPP site operates under stringent technical requirements and has specific equipment needs because it handles transuranic waste.

Most of the installation work for the project piggybacked onto major renovation or maintenance projects that already included excavation work and scheduled down times for the electrical systems.

## The PowerLogic System

Senior engineers selected PowerLogic ION meters, which communicate using native protocol over the WIPP Ethernet and provide energy data for authorized personnel through PowerLogic ION Enterprise. Because the metering system software has its own dedicated server that is accessible only over the WIPP Intranet system, firewalls protect against unauthorized access.

Facility personnel expanded the system from 0 to 16 meters that monitored mostly industrial processes to 40 meters currently monitoring all the substations, numerous processes and several individual buildings. The present system also includes four wireless RF modems that send data from meters installed at remote sites.

## Energy efficiency opportunities identified

Facility engineers began using meter data to commission new direct digital controls and occupancy sensors. The metering data quickly identified that the controls and sensors were not operating properly and adjustments have been made. WIPP engineers also now establish baseline energy use in areas where energy efficiency or load-shedding projects are planned.

## Power quality investigation and documentation improved

Using waveforms captured from the metering system and fault analysis, WIPP staff determined the cause of failure in one substation and reduced costly downtime and manpower. In addition, staff use power data to identify weaknesses in the power distribution and substation design, which can be caused by salt or sand, and recommend modifications.

## Improved documentation of energy use

Energy reporting purposes require differentiation of energy used for ventilation, air conditioning, lighting and heating from that used for industrial processes dealing with the waste. Forty PowerLogic meters distinguish building from process loads, making reporting more efficient.

## Enhanced utility bill auditing

PowerLogic ION Enterprise provided shadowing of utility billing activities, enabling WIPP personnel to more effectively audit utility costs and detect discrepancies.



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