

SIXNET®

SCS Partner Application Stories

End User: US Department of Energy (DOE)

Location: Carlsbad, NM USA

Integrator/Supplier: Custom Automation (www.CustomAutomation.com)

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Introduction: Custom Automation completed work at the Waste Isolation Pilot Plant (WIPP) to replace an aging Westinghouse Distributed Control System (DCS). WIPP is the world's first underground repository licensed to safely and permanently dispose of transuranic radioactive waste left from the research and production of nuclear weapons.

Scope of Project: The new hardware and operator interface software monitor and control 13 vital systems at the site, including Underground Ventilation, Electrical Distribution, HVAC, Fire Protection, Environmental Monitoring, Radiation Monitoring, and Plant Protection. This vital system ensures the continued safety and security of the facility. The new system is based on open industrial standards for extensibility and preserves viability well into the future.

"The resulting selection of Custom Automation to provide a modern monitoring and control system was a multi-tiered process," says Ron Dickert, Senior WIPP Engineer. "A technically qualified team of individuals evaluated many proposals against detailed criteria. These individuals represented several viewpoints including engineering, maintenance, and operations. The team decided that Custom Automation and their proposed solution of Sixnet hardware and Citect graphical user interface software was the best overall choice for the WIPP."



Industry-standard Ethernet fiber optic cable (orange) replaces proprietary coax

Solution: Custom Automation selected Linux-based IPm units from Sixnet for the panel controllers, which support industry-standard Modbus protocol. The IPm panels independently monitor and control all vital processes within the site, both above and below ground. The IPm controllers are programmed in IEC-61131-3 standardized languages for distributed control, and are lightly loaded for extensive growth potential. Redundant controllers were used in key locations. Peer to peer controller and HMI communications were implemented with redundant Ethernet fiber optic cabling managed by Hirschmann Ethernet switches (Sixnet didn't have redundancy technology at that time). Central monitoring and control HMI was implemented with Citect SCADA. Custom Automation is a Sixnet IPm Qualified Integrator.



The Human-Machine Interface (HMI) chores were done using a Citect SCADA package configured to resemble the screens of the previous DCS, to minimize re-training requirements. Custom Automation is a Citect Gold Integrator.



Transition to the new system from the old 1980's Distributed Control System (DCS) had to be accomplished while WIPP was fully operational, without disruption of ongoing radioactive waste handling. With careful planning and timely execution, controller panels were sequentially commissioned and put "on-line" with the new SCADA system, while the old DCS was proportionally decommissioned. The project was completed ahead of schedule while the plant continued to operate at full capacity.



Radioactive waste transport container

Products Used:

Qty	Part Number	Description	Qty	Part Number	Description
*	ST-GT-1210	SixTRAK I/O Controller	*		Citect SCADA HMI
*	ST-DI-024-16H	Digital Input Module			
*	ST-AI-INS-08U	Analog Input Module			
*	ST-DO-DC2-16H	Digital Output Module			
*	ST-AO-20M-08F	Analog Output Module			

*Quantities not disclosed for site security reasons.

Resulting Benefits: The new system leverages distributed control and redundancy to avert problems associated with any single point of failure. The system is very quick to respond with IPm's Industrial PowerPC CPU horsepower at the remote panel sites and 100Base Tx networking speeds. Implementation based on open standards assures continued maintainability and expandability.

No problems have been encountered with the system since final commissioning and testing in February 2004, and based on that success WIPP is expanding the reach of the Sixnet system to control and monitor additional plant systems.