

TECHNOLOGY @ ROCKY FLATS

Demonstration & Deployment Summary

Radio frequency alarms support “cold & dark” deactivation at Rocky Flats

Summary

DOE’s Office of Science and Technology provided partial funding for the deployment of new UL 864 Listed wireless alarm system technology to transmit fire alarms over radio frequency at Rocky Flats. Solar power technology was integrated into the system and used instead of hard-wired power for exterior repeaters, greatly reducing costs now and during future D&D activities.

At the Rocky Flats Closure Project, this new system, operable in all areas of the site, has resulted in estimated savings of more than \$600,000 by eliminating the need to rewire the site alarm system as buildings are decontaminated and decommissioned. Resources important to the Closure Project mission can be better used for closure instead of reroutes. The equipment is reusable. When a building is demolished, equipment can be moved to the next building. When the site is closed, the equipment can be re-deployed at other DOE sites or sold if uncontaminated. From a safety perspective, this wireless alarm system allows D&D facilities to operate only on temporary power, thereby reducing the potential of cutting energized wires.

The Need

The safest way to decommission the buildings at Rocky Flats is to turn them “cold and dark” by separating them from the site’s infrastructure system. Disconnecting electrical, steam, gas and pressurized water lines before workers begin dismantling and removing equipment, conduit and pipes protect workers from many electrical, stored energy and contamination hazards.

But turning a building cold and dark also eliminates



Integrating solar power into the design of the Rocky Flats wireless fire alarm system was a key innovation that resulted in significant cost savings and eliminates alarm issues during future D&D of the site electrical infrastructure.

some necessary safety systems, including fire alarms, which are essential to worker safety. Alarm systems operating on temporary power must be installed for each cold and dark building undergoing decommissioning.

In addition, the fire alarm system on site is a closed loop system that must provide two reporting pathways for code-compliant operation. If you disconnect a building from the system, one reporting pathway is cut. This means that the system has to be rewired around each building that is taken out of the loop for D&D.

The Technology

The Rocky Flats Fire Protection Program determined that the best solution to this dilemma was to adapt currently available wireless radio frequency alarm technology to the site’s requirements.

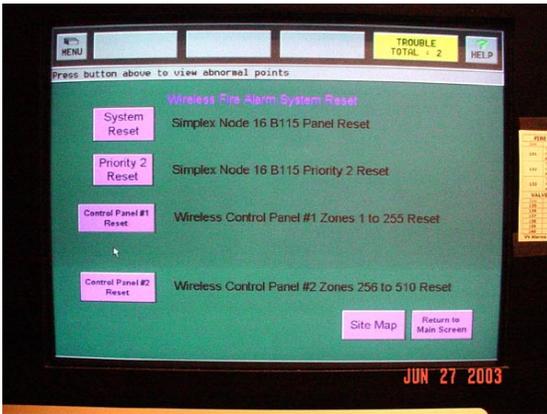
Fire protection personnel identified an existing wireless system manufactured by World Electronics. The system is currently used on the Statue of Liberty, Smithsonian Museum, Virginia State Capitol and other locations. It was determined to be the most applicable technology to replace

the hard-wire system in D&D buildings and provide fire alarm coverage in relocatable structures.

The system consists of individual wireless transmitters reporting to repeaters that report to head-end equipment that integrates with Rocky Flats’ existing Simplex fire alarm system. The system operates within the 290-305 MHz band. No commercial radio signals are allowed in this frequency range. Radio Frequency signals consist of words comprised of binary-coded audio tones. Groups of multiple words are transmitted on multiple frequencies to provide



A wireless transmitter installed at Rocky Flats



Head-end receiving equipment is located at the site's Emergency Operations Center in Building 115 and integrates into the existing Simplex system. Individual transmitter alarms are received on the Simplex system at Fire Dispatch with no additional screens to monitor.

assurance of reception in varying physical and noisy environments.

The wireless transmitting devices can include photoelectric smoke detectors, pull stations, heat detectors, maintenance transmitters for connection to any device with contacts, plus a host of security devices. At Rocky Flats, wireless transmitters were installed for automatic sprinkler water flow, smoke detection, fire phone and manual pull station replacement, and flow and level for waste valve vaults. All transmitters are surface-mount and microprocessor-based to provide special and selectable performance parameters. All devices are supervised

for power source, device removal and transmission reliability.

Following installation and testing of a sitewide reporting loop consisting of approximately 30 repeaters, alarm transmitting devices were installed in Building 881. Repeater locations were chosen based on facility input and vendor specifications and verification. Most importantly, locations were chosen to be at safe distances from D&D activities to ensure that alarm functions do not impede closure progress.

Integrating solar power in lieu of hard wiring for exterior repeaters proved to be a significant innovation as the project was implemented. Solar panel use on external repeaters eliminated reliance on site electrical power, resulting in no impact to future D&D of the site's infrastructure. It also greatly

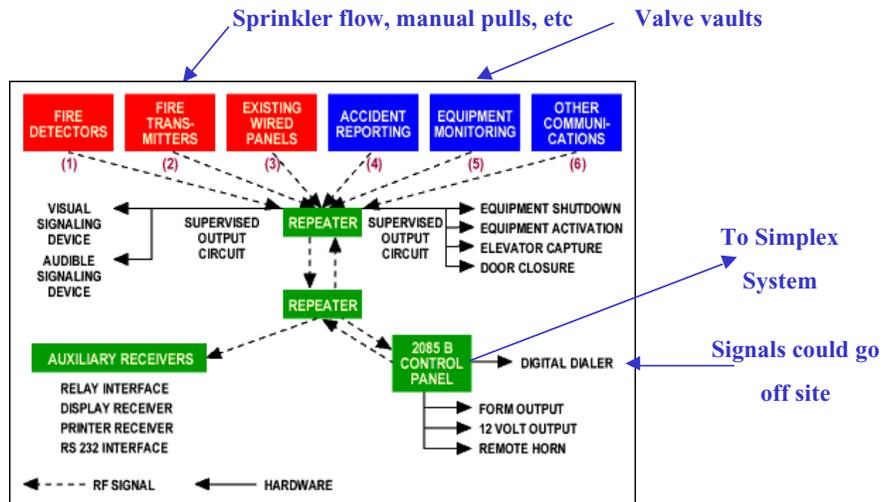
reduced cost to the project. Interior repeaters are powered from temporary power sources.

The Results and Benefits

Use of wireless fire alarm systems has proven to be extremely successful at Rocky Flats. Its benefits include:

- Class A signaling
- Rapid installation
- Addressable sensor ID
- Ease of expansion
- Multiple alarm reporting
- Ease of maintenance
- Alarm verification
- Substantial cost savings
- Alarm archiving and recall
- Fully supervised
- Trenching eliminated
- Reduces alarm resource requirements
- Improves safety of workers during D&D activities

Cost savings for initial deployment are estimated at approximately \$600,000. Further savings will be realized when the system is expanded to additional major facilities.



Technology Supporting the Path to Closure

For more information about Technology at Rocky Flats, contact David Maloney, Kaiser-Hill Company, (303) 966-7566, or Gary Huffman, DOE, Rocky Flats Field Office, (303) 966-7490

