

## PACIFICORP USES MAGNUM ETHERNET CONTROL SYSTEM FOR SAFETY IN COAL MINE

### An Industrial Ethernet Application

#### TECHNOLOGY TODAY

Coal is a valuable resource and is used as a low cost, quality fuel for many power plants. Mining operations are being equipped with sophisticated industrial controls and sensors for safety and operations efficiency. In many mining applications, live video data is joining with information from sensors and industrial controls, pushing the bandwidth requirements up and causing serial technology to be upgraded to Ethernet over fiber media. Ethernet is preferred for its interoperability, flexibility, and cost effectiveness.

#### ABOUT PACIFICORP

PacifiCorp is one of the lowest-cost electricity producers in the United States, providing more than 1.5 million customers with reliable, efficient energy. The company works to meet growing energy demand while protecting and enhancing the environment. PacifiCorp has more than 8,300 megawatts of generation capacity from coal, hydro, renewable wind power, gas-fired combustion turbines and geothermal. PacifiCorp's mines produce approximately 11 million tons of coal annually from both surface and underground mines.

#### THE CHALLENGE

PacifiCorp operates the Deer Creek Mine, an underground coal mine located in the Wasatch Plateau in Utah. The mine extends for about 18 miles and has used serial technology for information. In designing a systems upgrade, PacifiCorp ran into limitations in both distance into the mine and the total number of serial end-devices that could be supported.

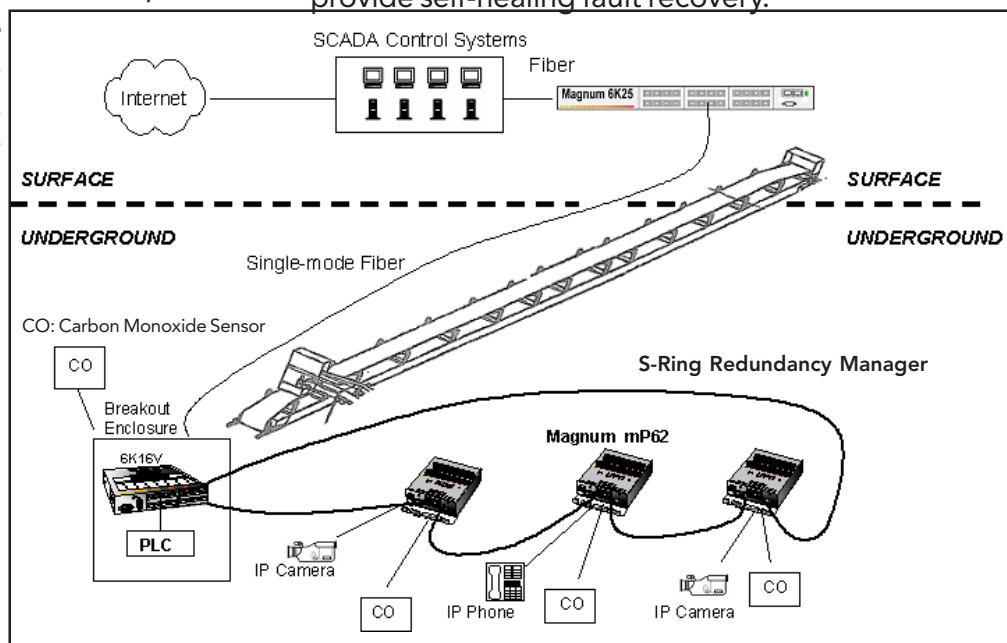
The environmental controls system is a 7-days round-the-clock operation that is critical to keep the mines safe and also for management of the control systems.

Using the system, PacifiCorp evaluates underground air quality and whether it is safe for workers to enter the mine. Carbon Monoxide (CO) sensors and Methane sensors are used underground to monitor the air quality.

PacifiCorp also needed live video data to monitor the equipment in the mine, instead of sending manned vehicles to the equipment location to get operations status data. All of the mine equipment and environmental information needed to be available without interruption in order to support operating decisions and to avoid compromising safety.

#### THE SOLUTION

Ethernet technology opens up the ability to have an industry-standard common network for all of the real time information that is crucial for safe operation of a mine. Bandwidth and number of end-devices limits, which had been considerations for serial lines, are readily handled by shared Ethernet media. Fiber media is future-proof for speed, and single-mode fiber easily handles the huge distances. For high availability, PacifiCorp implemented a single-mode fiber loop in the mine shaft to establish a ring structure that can provide self-healing fault recovery.



## PacifiCorp

### THE SOLUTION (Cont.)

PacifiCorp chose GarrettCom's Magnum™ switches and the Magnum S-ring™ Redundancy Management Software to meet their application requirements. They chose GarrettCom because of its cost-effective range of managed Ethernet products, fiber port configurability, industrial rating, AC and DC power options, and proven track record in industrial networks.

PacifiCorp has different network SCADA systems and VLANs to keep track of PLCs, environmental conditions, Longwall mining machines, Beltline conveyors, and pump stations. In addition, they are in the process of adding many IP phones and video cameras. All these networks are connected via the Magnum switches. Magnum 6K25 Managed Fiber Switches are used in the main office to interconnect with other switch brands. Magnum 6K16V switches are used in the underground control stations and are attached to end devices. Magnum mP62s and HMI units in NEMA enclosures are in the mining area.

### THE RESULTS

The use of Ethernet products in the Deer Creek coal mine has provided PacifiCorp with safe mining operations. The S-Ring Redundancy Manager Software with Magnum Switches allows PacifiCorp to eliminate network downtime inside of the mine, keeping information flowing at all times and informing them when the mine conditions are safe for workers to enter the mine.

The sealed case of the Magnum mP62 Switches is ideal for the mining environment, providing protection for the switch's internal electronics from dust and dirt. The per-port configurability of the Magnum 6K product line provides PacifiCorp with flexibility and cost-effectiveness should future expansion be required.

### ABOUT MAGNUM PRODUCTS

The **Magnum 6K25 Managed Switch** supports up to 24 built-in fiber ports with optional 1 Gb fiber uplink capability. Unlike other managed switches available with industrial specifications, the Magnum 6K25 offers per-port configurability for RJ-45 connectors and 10 Mb fiber as well as the full range of 100 Mb fiber and Gigabit connector types. The Switch comes with comprehensive MNS-6K software management.

The **Magnum mP62 Managed Hardened Switch** has six 10/100 Mb switched RJ-45 ports and two 100 Mb fiber ports and operates in temperature uncontrolled environments. It supports single mode or multi-mode line drivers on a per-port basis to accommodate different cabling distances between sites.

The **Magnum 6K16V Managed Switch** is highly configurable, providing two modular slots for user selection of 100 Mb and 10 Mb fiber ports, Gigabit fiber ports, and 10/100 copper ports, up to a maximum of 16 ports. Power input choices include: -48VDC, 24VDC, AC, 125VDC, optional dual-source DC.

The **Magnum S-Ring Redundancy Manager Software** provides fast fault-recovery in Ethernet LAN ring structures, including Gigabit rings. It supports large rings (50+ members) over long distances using fiber media and works with multi-vendor hubs and switches in the rings.

### ABOUT GARRETTCOM

GarrettCom, Inc., is the leading manufacturer of industrial and carrier-class Ethernet LAN products. GarrettCom offers a comprehensive line NEBS and ETSI-certified switches and hubs for use in telecommunications, industrial, and automated environments. For more information on GarrettCom and its products, visit [www.GarrettCom.com](http://www.GarrettCom.com).



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