CONSPEC® CASE STUDY

ARPA Lamar

FACILITY

The coal-handling facility at the Lamar Power Plant in southern Colorado is an interesting and somewhat unique design. This small generation station serves several communities in southern Colorado and northern New Mexico. Located in the middle of a light industrial and residential neighborhood, the plant originally was gas fired but was converted to coal.

Two large dome structures provide live pile storage. Ventilation fans, part of the dust collection system, control air movement within the domes. Coal is transported from the live piles to day-storage bins in a relatively standard system of reclaim area, conveyor belts, belt transfers, etc.

In order to meet permitting requirements by the State of Colorado, the coal-handling portion of this plant has been constructed to be as dust tight as practical. Beltways are within sealed tube structures and very little air from outside the containment zone is allowed to enter or exit uncontrolled.

A high-quality, extensive dust collection system effectively reduces the amount of dust that settles in various areas, but a small amount of loose product always collects on surfaces exposed to the coal transport.

Carbon monoxide (CO) monitoring, IR black-body scanning, and thermal imaging are all used as parts of the fire detection system. CO tends to be the first line of defense due to the sensitivity electrochemical sensors provide.

Powder River Basin (PRB) coal is delivered through a large hole in the center of the dome. Each dome contains four smaller holes, each with an inspection/ firefighting hatch where personnel can observe and also insert a device (developed by Hazard Control Technology) called a piercing rod.

INSTALLATION

Two CO detectors were installed at the top of each of the dome at about 180° apart. CO and methane monitors were installed throughout the coal transfer structure and dust collection system at key locations such as the domes, beltways, belt transfers, etc. In some instances, the sensors were incorporated directly into the dust collection hoods surrounding the belts at the transfer points.

In the reclaim tunnel, three technologies are used: CO detection for early warning of the potential for fire, linear heat sensors to detect any stationary fire, and IR scanners (manufactured by Patol Ltd.) to detect any moving hot spots.

The monitors send measured readings to several control panels, where individual alarming takes place. The alarm outputs consist of two relays for each monitor. A relay will energize when its associated.

Once such a system is in place, it may take several weeks to gather sufficient historical data to determine a baseline of normal CO concentration; this varies from one location to another. After a baseline is set, audible and visual alarms alert personnel when there is an upward trend in CO concentration. Further, if the coal supply source changes, this will cause further variation of CO levels and require further evaluation.

If the rate of rise of CO concentration is noted in a silo, one of two actions can be taken immediately: the use of a piercing rod to displace CO, or a deluge wash-down using F-500 solution (developed by Firetrol). The fire suppression system is set up so that both actions can be taken quickly.

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CONSPEC® CASE STUDY

ARPA Lamar, continued

FINDINGS

From the first day coal was loaded into the storage facility, it became apparent that the nature of the dust protection design was unique. When the air movement within the structure was stopped, relatively small amounts of coal dust produced fairly high-volume CO concentrations.

The initial run of coal into the plant was conducted between midnight and 4:00 a.m. Roughly five cars were unloaded into the car dump and sent to one of the domes. Following the completion of car unloading, all fans within the dust collection system were turned off. By 8:30 a.m., all the CO monitors located in the coal-handling areas were registering over 400 ppm, and several were above 500 ppm.

Operators at the plant suspected that the monitor and fire alarm systems were not working properly due to the levels seen on the controllers and fire alarm panels. They initially were hesitant to accept the presence of high levels of CO within the dump and transfer belt areas once active car dumping activities were complete. The truth is that these levels exist, primarily due to the lack of air movement built in to the mechanical design of the facility.

The operators were advised to turn on the fans that had been shut off earlier. While the readings at the top of the active dome remained in the 30 to 50 ppm range, within 5 minutes, all CO readings dropped to less than 50 ppm. This points up the benefit of CO monitoring and also the importance of using proper ventilation in tandem with the monitoring. Conspec Control's monitoring and control system does both.

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