

PROJECT PROFILE

MINE WATER CONTROL, CONVEYANCE AND TREATMENT

Six separately owned coal mines operating in the same seam were abandoned within a one-year period. The seam dipped uniformly in one direction, and due to hydrologic connections between mines, mine water drainage accumulated in down-dip workings. After the last mine was abandoned and dewatering operations ceased, water began to flow from the mine shaft lowest in elevation in the whole mine complex. The high water level in this shaft caused outflow into the surrounding area, resulting in more than 40 seepage points observed in a six-acre area. The large number of seeps present over a wide area made collection very difficult.

A difference of only 23 feet in elevation between the top of the discharging shaft and a river 250 feet away presented a serious design constraint. The area between the shaft and the river was occupied by several railroad tracks, further constraining the area available for construction of drainage collection, conveyance and treatment facilities. Because of these constraints, other parties had developed designs for remediation using permanent mine water pumps and sophisticated water treatment facilities

that would have cost over \$3 million to build and \$400,000 per year to operate.

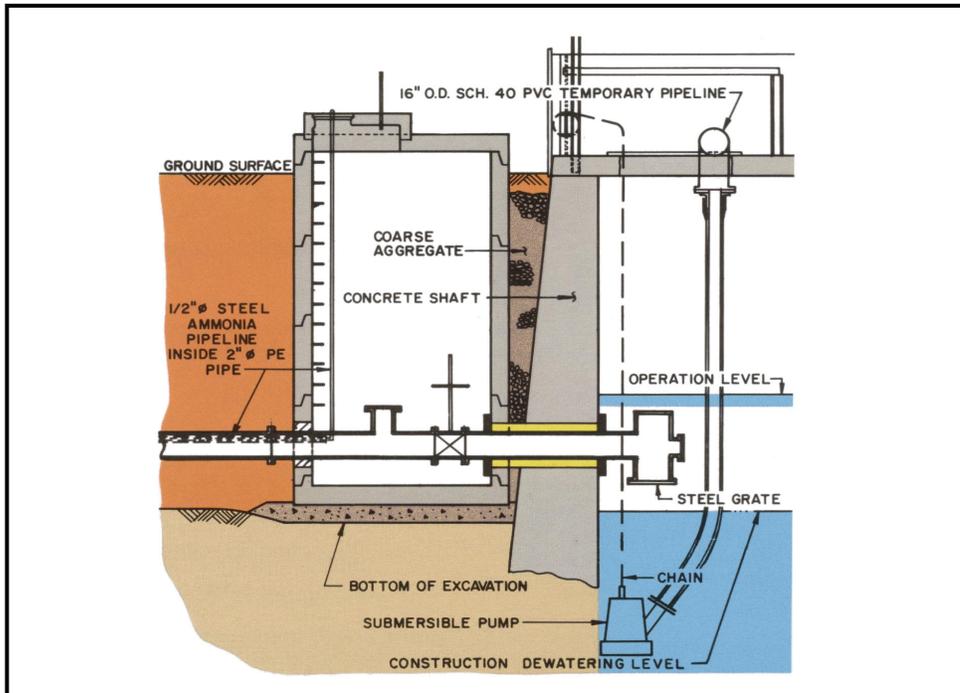
D'Appolonia conducted studies to determine the total drainage flow volume from the shaft area and developed several design concepts. The owner and D'Appolonia jointly evaluated the potential impacts of these various concepts on operations and a concept was then selected for implementation.

D'Appolonia developed a final detailed design for a recommended scheme that eliminated the need for a pumping system and new treatment facility. The design incorporated gravity flow pipes installed 16 feet below the ground surface and extending through the side of the mine shaft that was responsible for the seepage. The gravity flow pipes were designed to convey the mine shaft outflow to the existing treatment ponds.

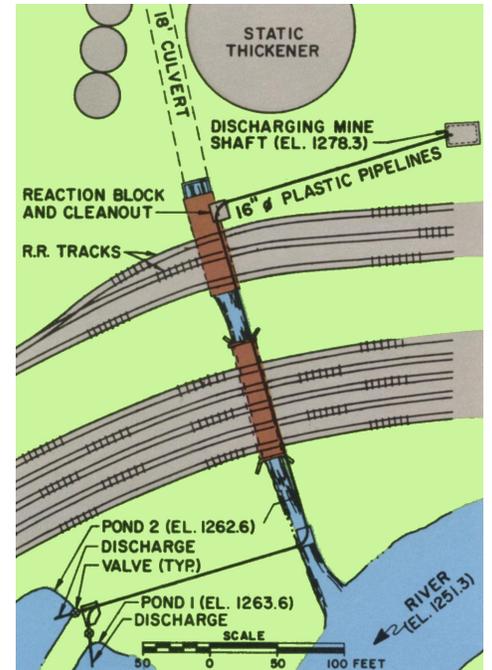


16-inch-diameter drainage pipes designed to convey water from mine shaft to existing treatment ponds.

The D'Appolonia design was implemented, and upon activation of the system, the water level dropped by 12 feet, causing the observed ground seepage to cease entirely and allowing treatment to be conducted at a single location in the nearby treatment ponds. Resulting treatment pond sludges were pumped to a permitted deep well injection facility that was also designed by D'Appolonia. Construction costs of \$2.4 million and more than \$200,000 in annual operating costs were saved through implementation of the D'Appolonia design.



Schematic cross section showing details of valve access and 16-inch-diameter pipe penetrating the mine shaft.



Plan of mine water conveyance system.