

Phillips Mine Fire – A Containment & Extinguishment Design Plan¹

C.A. Neely*, T.P. Danehy, R.M. Mahony, B.J. Page, M.H. Dunn,
D.A. Guy, D. Baker, and R. Rummel²

Abstract: This case study highlights the design and construction approach taken to contain and extinguish a mine fire in the abandoned underground H.C. Frick Coal and Coke Company's Phillips Mine (operational from 1907 to 1944 in the Pittsburgh coalbed). The Phillips Mine is located in North Union Twp., Fayette Co. PA (north of Uniontown, PA). The age and origin of the fire are uncertain, as there are indications of sections within the vicinity of the current fire noted on the original underground mine maps as 'Barren – Coal Burned Out' and 'Burned Sec' dating back to the 1950's and earlier. Presence of the current fire was first observed and reported to the PA Department of Environmental Protection (DEP) in 1997. Subsurface investigations by the PA Bureau of Abandoned Mine Reclamation (BAMR) were performed in 2003 and 2008 to evaluate the fire's extent, potential to migrate, and potential to impact man-made structures. It was determined that site conditions within the Phillips Mine appeared conducive for migration toward reaches of the mine-workings that underlie numerous roadways, residential areas, and occupied structures (including a gas station in close proximity). These findings led to the 2014 contract with BioMost, Inc. to develop a containment and extinguishment design plan for the mine fire. The approach taken and described in this presentation includes drilling and installing 43 steel-cased (and capped) monitoring wells between March and April of 2014. Monitoring in selected wells included measurements for: combustible gas (% LEL), carbon monoxide (ppm), oxygen (vol %), and hydrogen sulfide (ppm). Downhole temperature probes were deployed for continuous temperature readings of mine-atmosphere and mine-pool temperatures (where applicable). The monitoring well data contributed to the interpretation of current impacts and communication of the fire within the underground mine-workings and overlying carbonaceous zone. This information was used to develop the design that was implemented to contain (using a cut-off trench consisting of fire barriers and air barriers) and extinguish (excavate and quench actively burning sections) the Phillips mine fire. Further details of the design and construction status are expanded upon in the presentation.

Additional Key Words: Cold Perimeter, Fire Barrier, Temporary Surface Seal, Firefighting Foam.

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2. Cody A Neely, Environmental Engineer (PE); Tim Danehy, (QEP); Ryan M. Mahony, Environmental Scientist; Bryan J. Page, Environmental Scientist; Margaret Dunn, (PG); and Dan A. Guy, (PG) - BioMost Inc., 434 Spring Street Ext., Mars PA 16046; and Dean Baker (PE); Roger Rummel (PE) – PA DEP Bureau of Abandoned Mine Reclamation, Ebensburg Office (Cambria Office) 286 Industrial Park Road, Ebensburg, PA 15931.