

Use of Borehole Camera to Explore a Shallow Mine Void
OSM Western Region's Denver Field Division
Abandoned Mine Land (AML) Program
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A leak of CO₂ gas from a shallow void was discovered in the Black Diamond Mines Regional Preserve in Antioch, Contra Costa County, California. The CO₂ is leaking into the Black Diamond underground mine museum. The mine museum is located in old sand mines which are younger than and above abandoned coal mine workings. The portion of the mine museum with gas leaks is temporarily closed to the public.

OSM's Western Region AML staff used the borehole camera to explore and define the extent of the void affecting public space. Park staff used a corehole drill to drill 7 exploration holes. We found that the coal mine void on the 30-degree dipping Clark seam is 4 feet below the sand mine floor. The coal void is open for a height of about 3 feet. This shallow coal mine room is directly below public access into the museum. High levels of CO₂ are present. The data obtained from the borehole camera exploration is being used to develop a reclamation plan to fill the coal mine void and thus eliminate both the flow of CO₂ gas and subsidence potential under the mine museum entry.

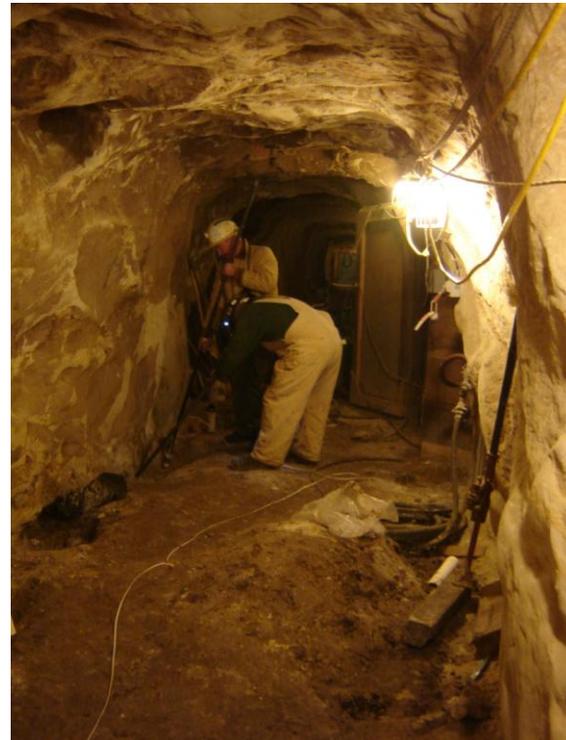


Preparing the camera



Lowering the camera down the drill hole from inside the mine museum

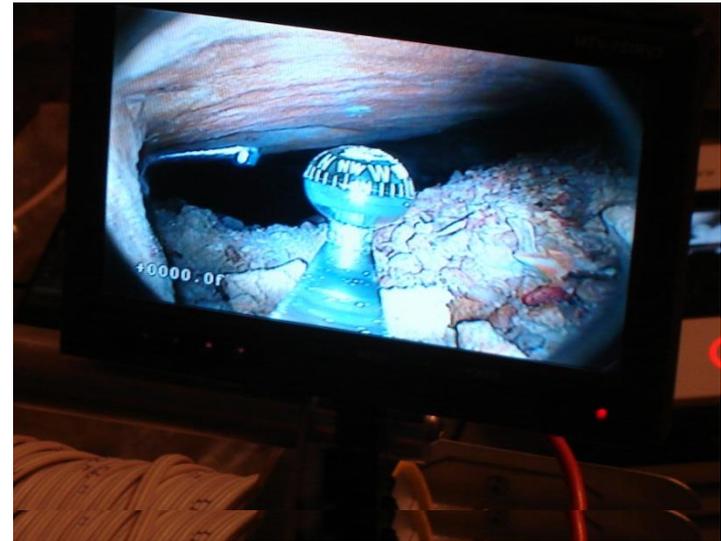
The roof of the mine void is about four feet below the museum floor. With a small LED light on a rod lowered down one of the seven exploration holes for illumination, we were able to lower the borehole camera and turn the camera at the angles we needed to view the void. The camera's mounted compass meant that staff knew exactly where the camera was pointing at all times. To explore the extent of the void, we moved the camera and the light source from hole to hole. It was easy and effective.



Camera in 1 hole and a light source in another hole



Looking at voids on the monitor



Mine voids on the monitor



Discussing the plan