

TITLE: CASE STUDY OF SINKHOLES OVER A NEBRASKA LIMESTONE MINE

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ABSTRACT:

The USBM responded to a citizen's request for assistance when five sinkholes, each 20 m to 25 m in diameter, developed within a 90 m by 105 m area on agricultural land overlying an abandoned section of an underground limestone mine. It was determined that the subsiding area could enlarge due to three mechanisms: (1) caving and sliding of soil into the existing sinkholes, (2) new roof falls in the mine adjacent to the existing sinkholes, or (3) new pillar failures in the mine adjacent to the existing sinkholes. The safety of agricultural workers was the main consideration at the site and so it was recommended that a buffer zone be created around the subsiding area based on the mechanism that could cause the greatest sudden increase in the subsiding area. Drilling logs were used to create a geologic model from which a simplified computer simulation of the stress distribution in the rock mass was developed. It was determined that the vertical stress had increased in the pillars near the existing sinkholes during sinkhole formation and that this may have weakened the nearby pillars. These pillars are currently stable, but may eventually deform or fail due to this weakening. Subsequent roof failure would then result in enlargement of the existing sinkholes. Therefore a buffer zone extending 43 m from the edge of the existing sinkholes was recommended.

TITLE: ABANDONED MINE LAND INVENTORIES AND PRIORITIZATION: EFFICIENT METHODOLOGIES AND COSTS

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ABSTRACT:

The USBM has conducted numerous AML inventories for other Federal agencies. As such, the USBM has developed and evaluated several methodologies for conducting inventories. Prioritization and ranking of mine sites for physical and environmental hazards are performed after field assessments and analytical sample data are evaluated. Based on results from eleven different AML inventories, the USBM has developed predictive methodologies for preliminary assessments of the extent of AML problems for a given area, the relative amount of hazardous sites by ranking criteria, and empirical formulas for predicting costs and time for AML inventory plans.

Lessons learned from these efforts have also allowed the USBM to identify fundamental elements and issues which should be considered before inventory efforts are conducted. Elements and issues such as driving forces, what is inventoried, inventory forms, sampling protocols, data bases, jurisdictional administration, coordination and partnerships, prioritization and ranking standards, cost-benefit considerations, and risk assessments should be included in the process.

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