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Pumped-Slurry Backfilling of Abandoned Coal Mine Workings for Subsidence Control at Rock Springs, Wyo.

By G. J. Colaizzi, R. H. Whaite, and D. L. Donner

UNITED STATES DEPARTMENT OF THE INTERIOR

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With an appendix on Hydraulic Model Studies for Backfilling Mine Cavities by E. J. Carlson, U.S. Bureau of Reclamation, Denver, Colo.

UNITED STATES DEPARTMENT OF THE INTERIOR
James G. Watt, Secretary
BUREAU OF MINES

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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PUMPED-SLURRY BACKFILLING OF ABANDONED COAL MINE WORKINGS FOR SUBSIDENCE CONTROL AT ROCK SPRINGS, WYO.

by

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ABSTRACT

The Bureau of Mines, at the request of local authorities in Rock Springs, Wyo., investigated and conducted through contracts a multistage program of exploratory drilling and pumped-slurry backfilling of 15 areas of potential subsidence in abandoned mine workings underneath that community. Initially, the Bureau in 1969 had recommended a program of gravity blind flushing of some of the inaccessible mine voids, and in 1970 a new technique, the pumped-slurry injection process, was tested for the first time in a site adjacent to the city's area of severe surface subsidence. Success of this initial testing program, and of a large-scale project in Scranton, Pa., led to further large-scale projects, funded by Congress, that resulted in the successful backfilling not only of all 15 target areas of potential subsidence in Rock Springs, but also of several areas in other States. Total cost of the projects in Rock Springs, including the original pumped-slurry test, was $3,243,993. A total of about 923,000 tons of sand was injected hydraulically into mine voids, rendering 178 acres of residential and central-downtown areas of Rock Springs less susceptible to subsidence damage. The pumped-slurry method was proved to be much superior to the gravity blind flushing method in terms of the amount of solids that could be injected underground through a single borehole. However, there are special conditions that make this technique more or less applicable in different areas or underground configurations, as noted in the report's conclusions.

INTRODUCTION

Surface subsidence is often the consequence of underground mining operations. Removal of solid material from beneath the earth's surface produces voids, and once the natural support afforded by this material is taken away, the weight of the overburden is redistributed. If pillars of material that are left unmined or timbers or other artificial support left underground are

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