

SOLUTION MINING RESEARCH INSTITUTE

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**MEETING
PAPER**



INVESTIGATION OF ACTIVE AND ABANDONED CLASS III SALT SOLUTION MINING PROJECTS IN OHIO

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ABSTRACT

Solution mining for salt in Ohio began in 1889. Since 1889, at least 234 solution mining wells have been drilled in Ohio at nine different solution mining facilities. Today, only two projects and 38 wells remain in operation.

The principal salt beds solution mined in Ohio occur within the Silurian-aged Salina Group and include the B, D, E, F₁, and F₂ salt units. Depths to these salt beds range from 1800 to 3150 feet below the surface and individual bed thickness rarely exceeds 100 feet. A number of different solution mining methods have been utilized in Ohio since 1889, but today most wells are operated as two-well galleries that are either hydraulically fractured or directionally drilled to achieve interconnection.

In July of 1989, the Ohio Division of Oil and Gas (Division) initiated a study of Class III salt solution mining operations in Ohio to determine whether current practices and regulations were adequate to ensure protection of Underground Sources of Drinking Water (USDWs). This study involved the investigation of five solution mining projects; two of which are currently active, and three which were abandoned.

During this project, the Division investigated 90 oil and gas wells near the five solution mining facilities to determine the possible extent of the solution mining caverns and whether the uncemented surface/production casing annuli of these wells could provide potential avenues for fluid migration from the caverns into USDWs. Special permit conditions for drilling, completion, and plugging of oil and gas wells have been developed and implemented as a result of this study. Review areas have been delineated around all five facilities. If an application for permit to drill or plug is received for a site located within a review area, the Division performs a site specific review and designs special permit conditions for protection of USDWs.

One of the principal areas of concern investigated during this study was the abandoned PPG Industries, Inc. solution mining facility at Barberton, Ohio. Oil and gas drillers have reported encountering fluids with unusual pressures, volumes, and properties and/or gases while drilling through the Bass Islands-Salina Group interval. In addition, The Division found that plugged solution mining wells were leaking fluids to the surface. The Division of Oil and Gas and the Ohio EPA sampled 15 oil and gas wells that may have penetrated the Salina Group and two leaking solution mining wells in an effort to characterize the cavern fluids. Analyses revealed that three oil and gas wells and one solution mining well contained low concentrations of man-made chemicals. The remaining oil and gas wells and one solution mining well had constituents commonly found in typical oil-field brines. Although this initial sampling program revealed the presence of man-made chemicals, the investigation was not sufficiently exhaustive to determine all of the constituents present or their source.

On April 5, 1991, U.S. EPA, Region 5 issued an Administrative Order on Consent (Consent Order) to PPG Industries, Inc. to expeditiously abate or remove the threats presented by hazardous waste or hazardous constituents to human health and the environment at the Barberton plant site. In November of 1991, U.S. EPA issued a request for additional interim corrective measures that required the plugging and abandonment of the leaking solution mining wells. The Ohio EPA and the Division will continue to assist U.S. EPA with the investigation and remediation of the Barberton site.

Since the initiation of this project in July of 1989, the Division of Oil and Gas has continued to revise its Class III Program in order to enhance its ability to protect USDWs. Through the issuance of special oil and gas drilling permit conditions and modification of solution mining plugging procedures, the Division has been able to achieve this goal.

Research and investigation of Ohio's solution mining operations will continue. Much of the data and information obtained during this study should prove to be very beneficial to both the U.S. EPA and other states with regulatory responsibilities for solution mining activities.

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