

**PROCEEDINGS  
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SIXTEENTH ANNUAL INSTITUTE ON COAL MINING HEALTH,  
SAFETY AND RESEARCH**

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**DEPARTMENT OF MINING & MINERALS ENGINEERING  
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY**

**MINE SAFETY AND HEALTH ADMINISTRATION  
U.S. DEPARTMENT OF LABOR**

**BUREAU OF MINES  
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**EDITED BY:**

**Michael Karmis**  
Department of Mining and  
Minerals Engineering  
Virginia Polytechnic Institute  
and State University

**William H. Sutherland**  
Mine Safety and Health  
Administration  
U.S. Department of Labor

**Gavin Faulkner**  
Department of Mining and  
Minerals Engineering  
Virginia Polytechnic Institute  
and State University

**David R. Forshey**  
Bureau of Mines  
U.S. Department of the Interior

**J. Richard Lucas**  
Department of Mining and  
Minerals Engineering  
Virginia Polytechnic Institute  
and State University

## INTRODUCTION

These Proceedings contain the presentations made during the program of the Sixteenth Annual Institute on Coal Mining Health, Safety and Research held at the Donaldson Brown Center for Continuing Education, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, on August 27, 28 and 29, 1985.

The Sixteenth Annual Institute on Coal Mining Health, Safety and Research was the latest in a series of conferences held at Virginia Polytechnic Institute and State University and co-sponsored by the Mine Safety and Health Administration, United States Department of Labor and the Bureau of Mines, United States Department of the Interior.

The Institute provides an information forum for coal operators, mine managers, superintendents, safety directors, engineers, inspectors, researchers, teachers, and state agency officials, and others with a responsible interest in the important field of coal mining health, safety and research.

In particular, the Institute is designed to help mining operating personnel gain a broader knowledge and understanding of the various aspects of coal mining health and safety, and to present them with methods of control and solutions developed through research.