

**PROCEEDINGS  
OF THE  
TWENTY-FIRST ANNUAL INSTITUTE ON COAL MINING HEALTH,  
SAFETY AND RESEARCH**

**BLACKSBURG, VIRGINIA  
AUGUST 28-30, 1990**

**SPONSORING ORGANIZATIONS:**

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

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

**BUREAU OF MINES  
U.S. DEPARTMENT OF THE INTERIOR**

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Published by the Department of Mining and Minerals Engineering  
Virginia Polytechnic Institute and State University  
Blacksburg, Virginia 24061-0239

*181 pages*

## INTRODUCTION

This *Proceedings* contains the presentations made during the program of the Twenty-First 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 28, 29 and 30, 1990.

The Twenty-First 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 cosponsored 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.