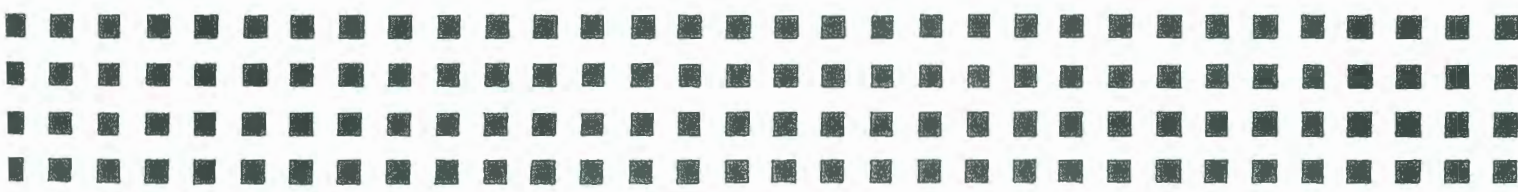


SEPTEMBER 6, 7 AND 8, 1978
BLACKSBURG, VIRGINIA

NINTH ANNUAL INSTITUTE
ON
COAL MINING HEALTH
SAFETY & RESEARCH

PROCEEDINGS 1978



CENTER FOR CONTINUING EDUCATION
VIRGINIA POLYTECHNIC INSTITUTE &
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INTRODUCTION

These proceedings contain the presentations made during the program of the Ninth 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 September 6, 7 and 8, 1978. The papers given herein are reproduced from author-edited manuscripts, or from transcriptions of tape recordings.

The Ninth 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 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 a forum for coal operators, mining managers, superintendents, safety directors, engineers, inspectors, researchers, teachers, and personnel from academia, research organizations, state agencies, the mineral industry in general, and others with a responsible interest in the important field of coal mining health, safety, and research.

In particular, the Institute is designed to assist mining operating personnel in obtaining a broader knowledge and understanding of the various aspects of coal mining health and safety, together with acceptable methods of control and solutions through research. A program of topics dealing with some of the most immediate concerns of coal mining health, safety, and research was presented by individuals from the coal producing industry, equipment manufacturers, federal and state governments, unions, and academic institutions among others.