

Introduction

THREE ASTM STANDARDS are available for sampling coal: ASTM Practice for Collection of Channel Samples of Coal in the Mine (D 4596), ASTM Test Methods for Collection of a Gross Sample of Coal (D 2234), and ASTM Practice for Collection of Coal Samples from Core (D 5192). The first two standards are applicable only to existing mining operations, test pits, or transportation of coal. The last standard (approved in 1991) was written to aid in the sampling of drill cores of coal. (ASTM D 5192 is reprinted at the end of this manual.) Cores are widely used to supplement sampling coal, particularly in the exploration and development stages of coal assessments. The extraction of a representative vertical section of a coal seam by coring has proven to be an efficient method for obtaining data that can be used to describe and classify the physical and chemical characteristics of a coal reserve. Correlations of seams, determination of apparent rank, plans of mine and beneficiation plant design, estimations of reserve tonnage and environmental impacts, evaluation for coking and steam utilization, gasification, and liquefaction are some of the applications of the information generated from a drilling program.

A coal seam is difficult to sample representatively and analyze because of its variability in chemical and petrographic composition and physical properties. Although core drilling has been proven to be effective in evaluating coal deposits, the various equipment for drilling and coring as well as the various geologic and drilling conditions encountered in the drilling operations can further complicate the process of core drilling. Failure to recognize and fully understand all of the complexities of drilling and coring can result in the collection of insufficient, excessive, or, even more serious, misleading or erroneous data.

The key to a successful coring program is adequate planning. This planning should involve an interdisciplinary team that includes geologists, drillers, mining and coal utilization engineers, chemists, and financial and legal professionals. By developing an understanding of each discipline's needs, a coring program can be formulated that will provide optimum data within the project budget. Each program should have a set of clearly stated objectives and a contingency plan for unexpected situations.

Prior to a coring program, an evaluation of the region should be conducted to determine the feasibility of the proj-

ect. This evaluation will probably require the use of topographic and geologic maps, aerial photographs, geologic reports, water and oil well logs, and field reconnaissance data. In addition, applicable local, state, and federal safety and permitting regulations should be reviewed for compliance. Essentially all states have some form of exploration permit that must be filed prior to a drilling program; some states also require bonding. Sufficient time to secure these approvals should be allowed.

To help the coal industry normalize procedures in coal core sampling, ASTM Committee D-5 on Coal and Coke recommended the development of a standard practice for collection of coal samples from core (ASTM Practice D 5192). In preparing this standard, a number of concepts and terms were encountered that required explanations and definitions in greater detail than was practicable within the scope of the proposed standard. Because no individual publication could be used to reference all the necessary topics, it became apparent that a reference document needed to be compiled to facilitate the drafting of the core-sampling standard. This ASTM manual is a result of that need, one identified by the ASTM Committee D-5 Core Sampling Task Group, which was charged with developing the standard practice. The Standards Association of Australia's "Guide to the Evaluation of Hard Coal Deposits Using Borehole Techniques" (AS 2519-1982) [1,2] was used to help formulate this document.

Because of the heterogeneity of coal and coal deposits, it is impossible to address all aspects of sampling, processing, and analyses within a single set of standard instructions. Therefore this document serves as a compilation of general guidelines for drilling coal and includes a glossary of commonly used terms. Drilling technology and sampling have been primarily developed in petroleum exploration. It is not our intent that this manual be used independently as a guide to the drilling of coal and associated strata. Throughout this publication, references are made to specific authors who deal with the subject matter in much greater detail than can be managed here. It is the responsibility of the user to modify these general guidelines, as necessary, to fit specific needs. Ideally, each company or agency may utilize these guidelines to aid in the preparation of its own field manual to standardize exploration activities.