

I. INTRODUCTION

1. Content and Purpose of This Manual

The Surface Mining Control and Reclamation Act of 1977 (SMCRA 1977), requires the inclusion of ground-water information with any mining-permit application, on aquifers above and below the coalbeds (or seams) to be mined. With this information, the regulatory authority can evaluate the potential effect of the proposed mine on the aquifer system(s), and assess the cumulative hydrologic effects of the proposed mines, on the adjoining properties.

The titles of sections of the Code of Federal Regulations (30OTR), Mineral Resources (30CPR) parts 778, 779, and 780 for surface-mine-activities information, and parts 782, 783, and 784 for underground-mine activities, that pertain to the information requirements on environmental resources and reclamation and operation plans are:

- Description of hydrology and geology
- Description of geology
- Ground-water information
- Surface-water information
- Alternative water-supply information
- Maps
- Cross sections, maps, and plans
- Hydrologic balance
- Reclamation plan
- Protection of hydrologic balance
- Operation plan

The heading of each chapter in this manual is followed by a list of terms from the above group to which information in that chapter is applicable. In this manual, the ground-water information is organized such that many of the sections apply to several specifications within the regulations. Examples of maps, tables, graphs, and diagrams such as required for each term listed above are given throughout the text and specifically in the last chapter (XIX).

The purpose of this manual is to assist applicants for coal-mining permits in (1) describing the ground-water conditions in the vicinity of a permit area, and (2) assessing the potential impacts of mining on the ground-water resources in the area adjacent to the proposed site.

This manual is directed at a moderately technical audience. The applicant, or the consultant for the applicant is assumed to have (1) a basic background in science, including mathematics, chemistry, and physics and (2) a bachelor's degree in hydrology, engineering, or geology.

This manual defines the type of geohydrologic information to be included by the applicant to help ensure that the data are adequate for the regulatory authority to: (1) understand the physical (geologic and hydrologic) settings of the aquifers likely to be affected by mining, (2) judge the adequacy of the impact analysis as presented in the application, and (3) apply the information in the cumulative assessment process.

This manual addresses four principal subjects: (1) the geologic setting of the bedrock units containing the coal to be mined, (2) the hydrologic setting (primarily ground water), but including low-flow surface water to the extent of the relationship with ground water (or lack thereof); (3) the potential impacts of mining on the ground-water resources; and, (4) the data requirements and monitoring plan needed for an environmental impact analysis.

The terminology in parts of this manual was requested by the OEM to conform to regulatory requirements and is not necessarily that used by the U.S. Geological Survey.

2. Examples of Ground-Water Elements for Coal-Mine Permit Applications

A description and examples of ground-water information required for surface- and underground-permit applications are given at the end of this manual (chapter XDC). These examples incorporate the geologic- and hydrologic-setting classification systems and the components of ground-water hydrology explained herein, as they apply to coal mining. The examples are taken with little or no modification from published reports of geohydrologic investigations done in the various coal provinces in the conterminous United States.

The purpose of the chapter referred to above is to provide examples of tables, cross sections, maps, graphs, diagrams, and calculations used in data presentation and analyses. From these examples, the applicant can plan the tasks necessary for collecting, compiling, and analyzing ground-water data for the permit application and can develop appropriate documentation. The products from the investigation can parallel the examples presented herein.

3. Ground-Water Studies

In a companion volume, there are eleven ground-water studies compiled. These are the result of geohydrologic investigations performed cooperatively with other state and federal agencies, in the various coal provinces in the United States (figure 1-1). These studies include the geologic- and hydrologic-settings and other hydrologic information units. In preparing the permit application, the applicant can use these studies as examples for his/her presentation of ground-water information. However, these studies are not comprehensive in presenting the ground-water situations for all geologic- and hydrologic-settings. Also, some studies do not contain sufficient hydrologic information to the levels of detail to satisfy all the requirements of all regulatory agencies.

4. Acknowledgments

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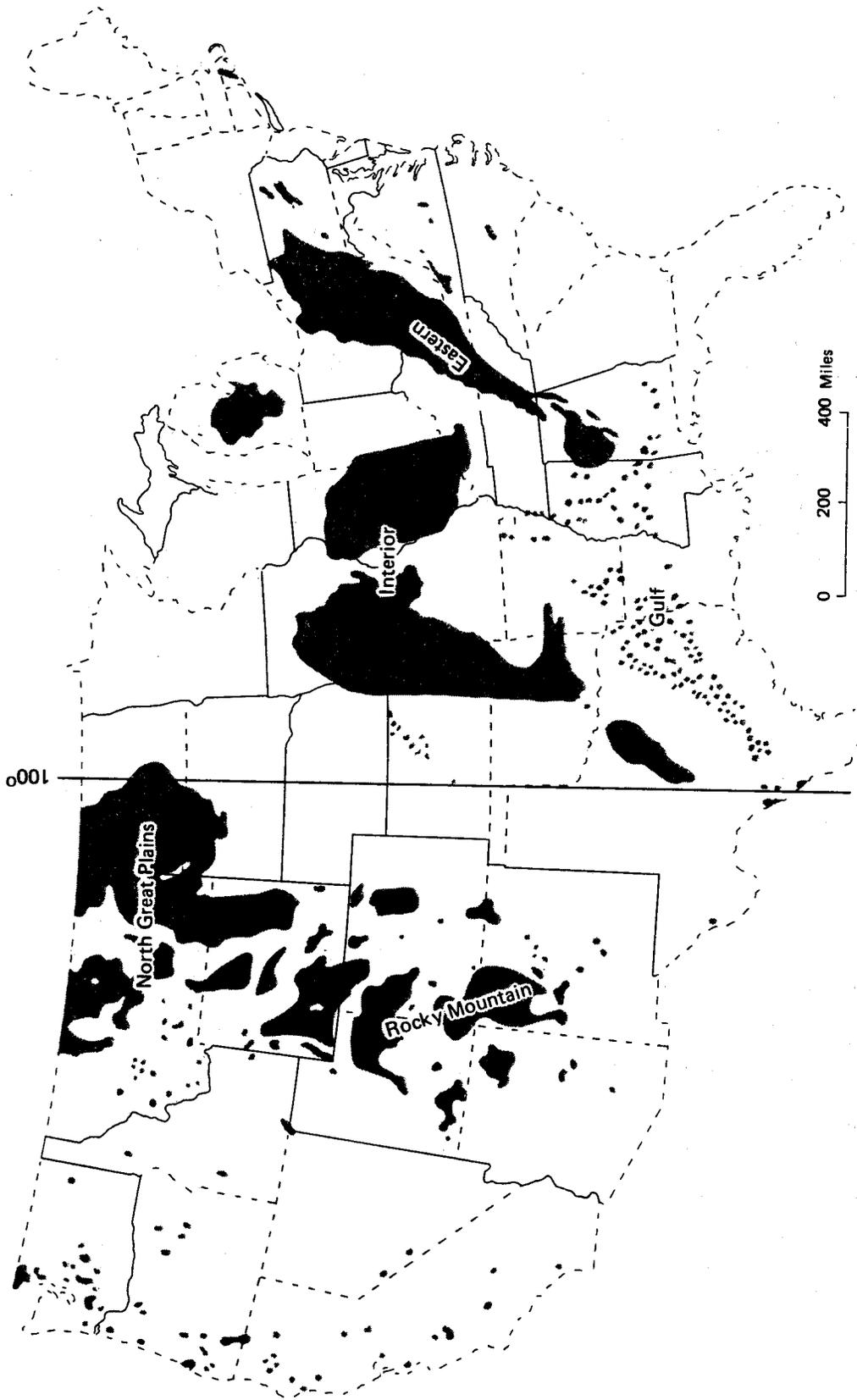


Figure I-1 — Location of coal provinces in conterminous United States
 (Modified for Trumbull, 1960 sheet 1)