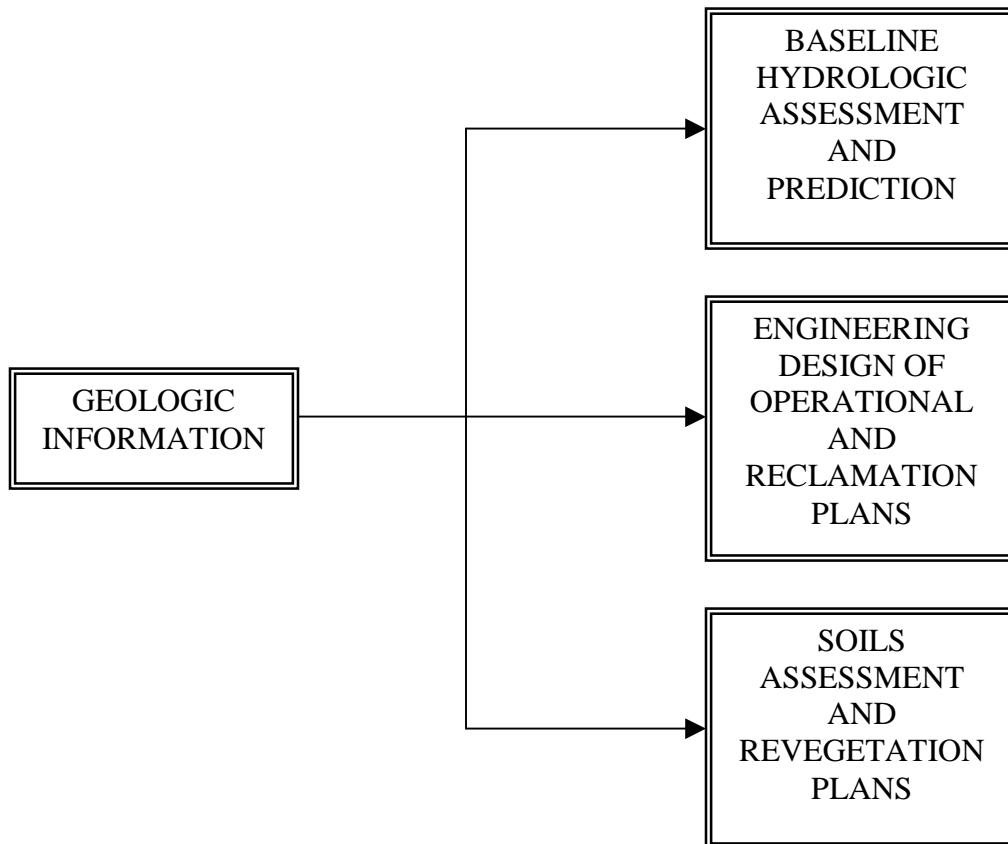


## CHAPTER I

### INTRODUCTION

The geologic information requirements, as promulgated under the West Virginia Surface Coal Mining and Reclamation Act, are designed to solicit information necessary to develop an environmentally sound mining plan and determine the potential environmental impacts arising from the plan. The need for good geologic information is often under-emphasized because the use of the data is misunderstood. Figure I-1 shows the relationship of geologic information to virtually all aspects of the mining and reclamation process.



*Figure I-1: Flow Diagram Showing Relationship of Geologic Information to Other Parts of the Permitting Process*

Geologic information is first needed to determine the existing hydrologic balance of the proposed permit area. Geologic information can reveal the location, thickness, and areal extent of aquifers that might be affected by an operation. The use of this knowledge can then be directly applied to the collection of baseline ground and surface water data and for the design of during-mining monitoring plans. Geochemical analyses of rock materials and coal can help identify acid- and toxic-forming zones that need special

handling to prevent water quality and revegetation problems. It also identifies zones that may be useful in neutralizing acid-forming materials.

Site geology must also be considered in the development of an actual mining plan. Underground operations require geologic information for the prediction of subsidence and in the development of appropriate roof control measures. Rock durability information is needed to determine stability of rock fills and to identify competent material suitable for rock underdrains and chimney drains. The handling of acid- and toxic-forming material can affect the entire backfilling and grading operation.

Once the existing hydrologic conditions have been established and a mining plan developed, geologic information is still needed to assist in determining the probable hydrologic consequences (PHC). A review of the geologic information should determine the potential for acid mine drainage and ground water resource diminution or contamination. For underground mining operations, geologic information can be used to determine the potential for gravity discharges and seepage along the outcrop barrier. Based on the findings of the PHC, geologic information is again needed to develop the hydrologic reclamation plan (HRP) that is designed to minimize impacts to the hydrologic balance of the area.

While the use of this handbook is not required by the West Virginia Surface Mining Reclamation rules, its use should satisfy most geologic requirements and provide information needed in most mine plan designs. Complex and variable sites may require more geologic information to properly characterize the nature of the area. Likewise, for areas where significant geologic, hydrologic, and engineering characterization of materials have already been established, it may be justifiable to require less geologic information. However, the surface mining rules allow for such flexibility. This handbook was designed primarily to ensure consistency in the technical review of permit applications and provide guidance for coal industry representatives in the preparation of these permits. It is written using a logical progression of data collection, information manipulation, and data interpretation and only assumes a minimal exposure to geologic techniques and analytical methods.

Because of the complexities and site-specific nature of geologic permitting a geologic pre-meeting with a WVDEP geologist is always recommended prior to submitting any new surface mine application.