

CHAPTER I

INTRODUCTION

This mine drainage pollution survey of the headwaters area of the West Branch of the Susquehanna (headwaters to Cherry Tree, Pa.) was made during the period September, 1970 to September, 1972 by Gwin, Dobson & Foreman, Inc., consulting engineers, for the Pennsylvania Department of Environmental Resources under the authority of the Land and Water Conservation and Reclamation Act (Act 443).

NEED FOR THE STUDY

The immediate need for the study (which has been discussed in detail in earlier preliminary reports (9) (10)) was to establish as accurately as possible a basis for evaluating the conditions and events in the Watkins area leading to the serious breakout of mine drainage during the summer of 1970 which caused major fish kills in Curwensville Reservoir and in the West Branch below Clearfield. This breakout required large scale emergency in-stream neutralization treatment over a period of several months, the total cost of which was greater than \$1.5 million dollars.

The long range need was to make a thorough study of all mine drainage sources and their interrelationships so that their generation mechanisms could be fully understood. With this basic information, ways and means for instituting mine drainage control could be devised to insure that future costly breakouts would not occur and that the water feeding into Curwensville Reservoir would be neutral and of constant quality sufficient to support aquatic life systems.

STUDY OBJECTIVES

The major objectives of the survey were:

- (1) To carry out a thorough examination of all sources of coal mine and refuse pile drainage in the study area, and to record flow data and chemical analyses for all significant pollutant sources during the year 1971.

- (2) To monitor flows and stream water quality at several locations on the West Branch and its tributaries within the study area watershed, and to evaluate all interactions and net pollution effects of the mine drainage sources upon the receiving streams involved.
- (3) To make a detailed study of the water flows and hydraulic relationships existing between Lancashire No. 15 deep mine pool and the several other pools in geological proximity, with the objectives of (a) establishing the causes for the serious breakout of 1970, and (b) acquiring a fundamental hydrologic knowledge of the water flows and qualities in the deep mine systems that would permit the development of sound water flow management for preventing future breakouts at the lowest deep mine water pollution control costs.
- (4) To monitor the performance of the Duman treatment plant in order to assess its initial operational effectiveness and to determine new ways and means for obtaining maximum improvement in effluent quality at the lowest treatment costs.
- (5) To assess the impact of the Duman treatment plant effluent on its receiving stream, Elk Creek in the Allegheny watershed.
- (6) To recommend methods, techniques, and costs for realistic pollution abatement projects which would insure that water quality in the West Branch study area would not have an adverse effect on the recreational water quality in the Curwensville Reservoir.

As this study progressed and the true nature of the pollution problem was more clearly delineated, it became apparent that a complete study of the watershed pollution problems should include an evaluation of the potential for conjoint treatment of mine drainage and sewage generated by communities in the study area which are presently discharging sewage directly into the West Branch and its tributaries. Another possibility that arose was that of converting a minor parallel tributary (Moss Creek) into a larger flow, high quality fishing and recreational stream (by diversion techniques) to compensate for the logical utilization of the upper reaches of the West Branch as a natural neutralization plant. The potential

of both of these approaches has been studied and preliminary findings and recommendations have been included.

The data compiled is presented on a strictly factual, unbiased basis to reflect the actual conditions as we determined them to be during 1971. Subsequent recommendations for abatement procedures are based upon the most logical engineering approaches to attain the maximum practical degree of pollution control at the least cost to industry, community, and the Commonwealth.