INTRODUCTION

This report contains the results of an engineering survey performed by Berger Associates, Incorporated. The purpose of the study was to locate the sources of. pollution, determine the amount of pollution, recommend measures by which acid mine drainage (AMD) could be abated, and estimate the corresponding costs for abatement. The area of the study is a portion of the Upper Swatara Creek Watershed comprising Good Spring Creek and Middle Creek in Frailey and Reilly Townships, Schuylkill County.

Designated Project SL-126-2 by the Department of Environmental Resources it is one of the areas scheduled for remedial action under the "Operation Scarlift" program. This is a comprehensive program to begin the tremendous task of restoring the more than 3,000 miles of Pennsylvania streams containing acid mine drainage.

This engineering survey was specifically authorized under the terms and conditions of Agreement Number 68-159, dated July 9, 1969.

A. ACKNOWLEDGEMENTS

Numerous individuals were consulted and/or provided information helpful in the analysis of the data collected and the preparation of this report. For obvious reasons it is impossible to mention all those individuals and the omission of any does not reflect upon the importance of their contribution.

Dr. David R. Maneval, former Deputy Secretary and Director of Coal Research and Development, and John Buscavage, Sanitary Engineer, have provided continuous liaison on behalf of the Department of Environmental Resources during the development of the various phases of the project.

The entire Pottsville Regional Office staff were always available and most helpful.

Special mention must be given to Mr. George R. Sterling, former Chief Underground Mine Inspector for Anthracite, and his Mine Inspectors assigned to this area. Mr. Sterling's cooperation and advice were invaluable.

We wish also to express our thanks to all of the mine operators, mining engineers and property owners within our study area who were completely cooperative.

B. STATEMENT OF PROBLEM

Swatara Creek drains an area of approximately 576 square miles northeast of Harrisburg and on an average day will discharge in excess of 630 million gallons of water into the Susquehanna River at Middletown.

Previous studies by others indicate that at high and medium stages of flow in the Swatara Creek Basin the chemical character of water is suitable for public and private use.However, during lower stages of flow, depending upon the area and the extent of contamination by sewage pollution and acid mine drainage, it is obvious that the natural flow requires various remedial measures to effect an improvement in water quality. This is particularly true of Swatara Creek north of Pine Grove.

Below this point the stream is generally not acidic due to the neutralizing effect of Little Swatara Creek which is an alkaline stream. This stream joins Swatara Creek at Pine Grove. Occasionally acidic water may be detected down as far as Hummelstown.

The upper reaches of Swatara Creek originate in the Southern Anthracite Coal Field. Streams in the headwaters are acidic, devoid of fish life and generally are of such poor quality as to be unsuitable for recreational purposes.

The area investigated consists of the sub-watersheds drained by Gebhard Run, Coal Run, Middle Creek, Bailey Run, Martins Run and Good Spring Creek. Good Spring Creek has two, small tributaries, Poplar Creek and Hollenbach Run. The total area investigated is drained by Good Spring Creek which then enters Swatara Creek some 3,000 feet south of the Borough of Tremont.

During periods of high flow acid loads in excess of 50,000 lbs/day have been measured in Good Spring Creek above its confluence with Swatara Creek.

Act 394 of the General Assembly of the Commonwealth of Pennsylvania, the "Clean Streams Law" as amended, provides for the preservation and improvement of the purity of the water of the Commonwealth.

In consideration of the problems existing in this area the project was authorized by the Department of Environmental Resources in accordance with the provisions for such action as contained in Act 443, "The Land and Water Conservation and Reclamation Act" of 1968. It is one of three such studies being completed on the upper Swatara Creek Watershed.

We have reviewed Section VI (Tremont Study Area) of the Federal Water Pollution Control Administration (now Environmental Protection Agency) report titled "Acid Mine Drainage Abatement Measures for

Selected Areas Within the Susquehanna River Basin and have made use of the information contained therein in preparing the field sampling program and in formulating some of the recommended abatement measures contained in this report.

C. SCOPE OF STUDY

The study was performed in accordance with the general guidelines established in the Engineering Agreement - Appendix A - Scope of Work.

Basically, the work was divided into four general phases, as follows:

1. Preparation and completion of a program of field work consisting of water quality sampling and flow measurements.

2. A thorough study of all available information regarding geology, mining, hydrology, etc.

3.The analysis of all accumulated data.

4. Preparation of this report containing recommendations for remedial action.

D. DESCRIPTION OF PROJECT AREA

The study area, 14.9 square miles in size, is located in southwestern Schuylkill County, some 45 miles to the northeast of Harrisburg, Pennsylvania.

This is a rather sparsely populated area with the Borough of Tremont, population 1833 (1970 census), containing a majority of the populace. Three small villages, Donaldson and Good Spring to the west, and Newtown to the east contain most of the balance of the population.

The population of Tremont, as well as Schuylkill County, has steadily declined in recent years. The following Census Counts are for the Borough of Tremont:

1940	- 2314
1950	- 2102
1960	- 1893
1970	- 1833

Four highways traverse the study area. Obviously the major route is Interstate 81, the "Anthracite Expressway", followed in order of volume of traffic by U.S. Route 209 and Pennsylvania Route Nos.125 and 25.

With the exception of the populated areas mentioned above, representing 5 percent of the total area, the land area consists of the following:

TYPE	PERCENT
Forested lands	63
Lands disturbed by mining	32

None of the land area is presently used for agricultural purposes nor is there any significant public use. Its largest potential in addition to mining appears to be timber, hunting and other recreational uses.

Most of the extensive stripping in the area was performed during World War II and the period directly thereafter. No strip mines were active in the study area from 1967, when stripping was completed in the upper reaches of Middle Creek (Otto Stripping), to August 1970 when stripping operations were started in a limited area south of Good Spring. This operation consisted of 3.0 acres east of Legislative Route 53027 in the Skidmore through Orchard Veins performed by the Leon E. Kocher Coal Company. This same company at the time of this report was stripping 8.2 acres west of L.R.53027 in the Holmes, Primrose, Orchard, Little Diamond and Diamond Veins.

Only small active deep mine operations remain in the area. Nine small active deep mines employed a total of 69 persons within the project area during 1970. Employees per mine ranged from 3 to 19.

With the gradual cessation of the large deep mine operations between the 1930's and mid-1960's, these large mine complexes began to fill with water as pumping operations ceased. This eventually resulted in the formation of five large mine water pools in the study area, varying in estimated volume of water from 471,000,000 gallons to 915,000,000 gallons. These mine water pools and the significant acid discharges overflowing from them will be discussed further in other sections of the report.

In addition to mining the largest industrial employer in the area is the Richmond Screw Anchor Company, a Division of the Shattuck Penn Mining Company, located in Tremont.

E. SURVEY PROCEDURES

The watershed survey was accomplished by completing comprehensive programs of field sampling and measurement, laboratory testing and office-field studies of this data along with available data published.

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