

COMMONWEALTH OF PENNSYLVANIA

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DEPARTMENT OF ENVIRONMENTAL RESOURCES

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OPERATION SCARLIFT

LOYALSOCK CREEK

MINE DRAINAGE ABATEMENT MEASURES SULLIVAN COUNTY, PENNSYLVANIA

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REPORT ABSTRACT

I. INTRODUCTION

This report presents the findings of an acid mine drainage study, for a portion of the Loyalsock Creek Watershed, Sullivan County, Pennsylvania. Essentially, acid mine drainage is a product of those areas once affected by deep mine or strip mine operations. Drainage from such areas has a detrimental affect on water quality. The purpose of the study is to identify areas of pollution potential and make recommendations for abatement measures.

II. STUDY AREA

The study area is located primarily in Sullivan County, Pennsylvania and extends from the village of Forksville to the Loyalsock Creek headwaters, with the major area of concentration being in the vicinity of Birch Creek. Although the watershed is composed of some 30 tributaries of Loyalsock Creek, Birch Creek and to a lesser extent the watershed of Pigeon Creek are the most significant to the mine drainage problem.

Most of the land in the study area is forest, being either State owned or belonging to private land associations. The White Ash Land Association owns the surface right to much of the land where mining has taken place, while Joan and Michael Comerford, Scranton, Pennsylvania own an important part of the mineral rights.

III. GEOLOGY

Statigraphically, the coal reserves of the Bernic Basin belong to the Pottsville Formation. These coals cannot be correlated with the coal fields of western or northeastern Pennsylvania. The coal veins have been designated as A vein, (lowest), B vein, C vein and D vein. The structure of the coal basin is a shallow syncline being irregular in detail. The basin is broken into four parts by cross faults.

IV. MINING HISTORY

The history of mining activity in the basin goes back to the early 1900's, in which various companies were involved in deep mine operations, the largest being the Connell Anthracite Mining Co. Two discharge tunnels were and still are responsible for draining the workings of the Connell Deep Mine Complex. In addition to the deep mines, strip mining became prevalent in the 1950's and the scars of this period are still visible. Presently, there are only two active strip mining operations in the basin.

V. HYDROGEOLOGY

Rainfall data for the time period in which the study took place was obtained from the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce. Annual rainfall averages about 40 inches per year as measured at the station at Dushore, Pa. From field measurements, a water table contour map indicates the groundwater gradient and limits of groundwater drainage basin. From these investigations it appears the aforementioned discharge tunnels drains an area from the Bernice Fault to the abandoned strips at the eastern end of the basin, plus an additional area west of the Bernice Fault.

VI. STUDY ANALYSIS

Phase I of the project was concerned with monitoring all tributaries of Loyalsock Creek to ascertain those watersheds which are associated with mining activity. This monitoring included flow measurements and chemical analysis. Upon completion of this phase, those areas designated as pollution sources were monitored for a 12 month period. A summary for each sampling point, listing the minimum, maximum, and average values for the parameters measured under chemical analysis is presented.

VII. ABATEMENT PROGRAM

Various abatement measures are applicable for minimizing the impact of acid mine drainage. These include deep mine sealing, strip mine reclamation, surface water diversion, refuse pile removal, and neutralization treatment. Project areas were designated for specific abatement measures, with the discharge tunnels from the Connell Deep Mine Complex being the most important. Deep mine sealing of the C Vein and B Vein tunnels would entail raising the water table to an elevation of 1865 feet, at which point new discharge points would most likely develop. However, the permeability of the underlying rocks below the coals is not known, and therefore, the hydraulic equilibrium point attainable in the deep mines is not certain. Acid mine drainage treatment can be accomplished by various means utilizing one or several different neutralizing agents, the most prominent being limestone and hydrated lime. Treatment can be accomplished by the use of rotating drums or reactors using limestone, or by more extensive systems including influent chemical analysis, lime feeders, flocculation tanks, clarifiers, and sludge dewatering and removal.

Other Project Areas are defined and abatement proposals listed. The majority of these areas are abandoned strip mines located on the periphery of the Connell Deep Mine Complex. These strippings act to funnel surface water into the deep mines and hence contribute to the discharge from the drainage tunnels. Abatement for these areas entails backfilling, grading, soil treatment, and revegetation. Additional discharge points are located on the north side of the coal basin and eventually drain to Birch Creek, where their impact does not appear to be critical.

Cost for the various projects are listed, including operating costs for the treatment systems.

VIII. CONCLUSIONS AND RECOMMENDATIONS

First priority for abatement measures should center around the two discharge tunnels. The alternatives for abatement are deep mine sealing and treatment. The selection of the optimum abatement measure is dependent upon the inherent legal and financial implications of each approach. Based on the extent of the active strip mining, it is recommended that sealing not be used at this point in time. Treatment utilizing rotating drums and limestone is the most economical approach for accomplishing neutralization and should be given the most consideration.

The next priority for pollution abatement encompasses the abandoned strip mine areas, in order to curtail the amount of water recharge to the deep mine complex.

Finally, other project areas listed in the report have a lesser detrimental impact on the water quality and are not as pressing in terms of their pollution load.