RECLAMATION

Strip mining, probably the oldest recorded method of extracting coal, completely alters the topography of the earth's surface, resulting in an area of more or less parallel ridges of waste material and numerous abandoned pits. In addition to destroying all original vegetation, strip mining creates material for new types of soils. Complicating destruction produced by strip mines is underground mining, with its associated refuse piles. The waste material from underground mines usually is left on the land surface since it is not feasible to return this waste rock to its original positions in the mines.

The cast overburden resulting from these operations does not resemble any type of soil, previously classified by the Agricultural Experiment Stations (12). There are no soil horizons or soil structures which soils usually contain. This waste material consists of an unorganized mass of slate and shale, sandstone, conglomerate and associated fines resulting from the processing of coal. Given enough time these new parent materials form completely new types of soil.

The great variations in material covering coal seams also results in a variation of materials in the refuse banks. In addition, a great variability in chemical content occurs in this material. Type and amount of iron sulfides and carbonates vary greatly between slates and other rock types. There is also a vertical change in chemical content within a rock layer as well as its proximity to a coal bed. The result of these variables is a range of pH values in the refuse banks from less than 4 to over 7.

Reclamation of a mined area depends on several factors which can determine the best use of the area. These factors include:

1. percentage of rock and size of rock in the waste material.

2. percentage of soil size particles.

3. amount of sulfides and other toxic materials present.

4. amount of nutrients available for plant growth.

Land use planning is also a factor in deciding the approach to reclaiming an area. Site requirements are different, for example, for agriculture, reforestation, recreation, commercial and industrial purposes. If waste material has a pH not less than 5.5 free of large rocks and enough nutrients to support plant growth, the land could be completely

regraded for crop growth. Where material is too large, flattening of the ridges to provide rolling range land could be accomplished. Since grading reduces tree survival due primarily to compaction and lack of moisture, topping of ridges may only be needed while in some cases no grading at all would be required.

The purpose of this project is to provide a plan for abatement of all or at least part of the coal mine pollution which drains from coal mine shafts, access or drainage tunnels, and discharges from abandoned mine workings. Most of the mine water from these sources originates in the many open and abandoned strip mines in the watershed, especially in areas where stripping operations have been extensive. Underground mining is so extensive that the numerous access and drainage tunnels, slopes, drifts, air vents and barrier pillar breaches have made the use of mine seals, in most cases, impractical.

Prevention of the formation of coal mine drainage has been the approach taken in this report for the abatement plans. This is accomplished through reduction of the flow from the discharges where economically and physically possible. It is only after this consideration that treatment of the remaining discharges was considered. The major preventive measures recommended in the watershed are strip mine reclamation and surface water diversion. The reclamation of strip mines by backfilling, regrading, and planting operations reduces the volume of the discharges. Additional side effects include attraction of wildlife, the land becomes more aesthetically pleasing, may provide land for agricultural purposes, and reduction of the safety hazards that crop falls and other mining features present.

The abatement techniques evaluated in the Mahanoy Creek Watershed were deep mine sealing, strip mine reclamation (backfilling, regrading, planting), surface water diversion (diversion ditches, flumes), stream modification (channel improvement, removing adjacent silt piles), burial of refuse, and treatment methods.

This report does not recommend that all stripped areas are to be reclaimed. In some areas backfilling is not feasible due to the dimensions of the strip pits and cost. In others the amount of money expended does not justify the slight reduction in flow which results (cost effectiveness).

In addition to those given in the reclamation section, other decision variables in determining which areas are to be reclaimed follow:

1. Cost effectiveness including percent reduction in total pollution load, size of area affected (i.e. length of stream), size and distribution of strip pits, amount of surface runoff pits intercept and amount of fill required.

2. Accessibility

3. Actual cost

4. Property ownerships