

retention of sediments in surface water runoff. Plastic sheeting is typically used to cover the berm. The berm and the plastic sheeting may require periodic maintenance and repair.

Brush Sediment Barriers—Brush barriers are temporary sediment barriers composed of tree limbs, weeds, vines, root mat, soil, rock and other cleared materials placed at the toe of a slope. A brush barrier is effective only for small drainage areas, usually less than ¼ acre, where the slope is minimal.

Brush barriers do not function as permanent barriers since over time the barrier itself will degrade. This BMP is most effective when located at the toe of a slope of an area in which vegetation is being grown or during temporary operations. The brush barriers remove any excessive sediment which is generated by erosion prior to the establishment of vegetation.

e. Vegetation Practices. Vegetation practices involve establishing a sustainable ground cover by permanent seeding, mulching, sodding, and other such practices. A vegetative cover reduces the potential for erosion of a site by: absorbing the kinetic energy of raindrops which would otherwise impact soil; intercepting water so it can infiltrate into the ground instead of running off and carrying contaminated discharges; and by slowing the velocity of runoff to promote onsite deposition of sediment. Vegetative controls are often the most important measures taken to prevent offsite sediment movement, and can provide a six-fold reduction in the discharge of suspended sediment levels.⁶⁷ Permanent seeding has been found to be 99 percent effective in controlling erosion for disturbed land areas.⁶⁸

Typically, the costs of vegetative controls are low relative to other discharge mitigation practices. Given the limited capacity to accept large volumes of runoff, and potential erosion problems associated with large concentrated flows, vegetative controls should typically be used in combination with other management practices. These measures have been documented as particularly appropriate for mining sites.

Topsoiling, Seedbed Preparation—The addition of a layer of topsoil or plant growth material provides an improved soil medium for plant growth. Seedbed preparation may include the

addition of topsoil ingredients to be mixed in with soils used for seedbed preparation. Ripping, dicing, and mixing soils promotes weed control and aerates the soil, encouraging seedling growth.

Broadcast Seeding and Drill Seeding—Seeding and vegetative planting are methods used to revegetate an area. Broadcast seeding spreads seeds uniformly, by hand or machine, to steep sloped or rocky areas, flat surfaces, and areas with limited access. Drill seeding is performed using a rangeland drill seeder and may not be used on rocky surfaces. Drill seeding is more suitably performed on flat, nonrocky surfaces, where the machine can insert seeds into the soil.

Willow Cutting Establishment—Willow cutting establishment describes a method of soil stabilization useful for stream banks and other areas located adjacent to water. Similar to biotechnical stabilization, willow cuttings are used to promote growth in an area needing stabilization. Willow cuttings are typically used to reinforce a streambank or other moist area. Willow cuttings require a great deal of moisture and must be planted in areas that remain moist for long periods in order to take hold and grow.

F. Capping. In some cases, the elimination of a pollution source through capping contaminant sources may be the most cost effective control measure for some discharges from inactive coal mines. Depending on the type of management practices chosen the cost to eliminate the pollutant source may be very high. Once completed, however, maintenance costs will range from low to nonexistent.

Capping or sealing of waste materials is designed to prevent infiltration, as well as to limit contact between discharges and potential sources of contamination. Ultimately, capping should reduce or eliminate the contaminants in discharges. In addition, by reducing infiltration, the potential for seepage and leachate generation may also be lessened.

The use of this practice depends on the level of control desired, the materials available, and cost considerations. Many common liners may be effective including common soil, clay, and/or synthetic liners. Generally, soil liners will provide appreciable control for the lowest cost. Synthetic or clay liners may be appropriate to cover materials known to have a significant potential to impact water quality.

EPA has identified a wide variety of best management practices (BMPs) that may be used to mitigate discharges of contaminants at coal mines. Many of the

practices focus on sediment and erosion control and are similar to BMPs used in the construction industry. For more details on the use and implementation of these practices the reader is encouraged to obtain a copy of one or more of the many good sediment and erosion control books available on the market.⁶⁹ In some cases (e.g., low pH and/or high metals concentrations), BMPs, and sediment and erosion controls may not be adequate to produce an acceptable quality of storm water discharge. Under those circumstances additional physical or chemical treatment systems may be necessary to protect the receiving waters.

g. Treatment. Treatment practices are those methods of control which are normally used to reduce the concentration of pollutants in water before it is discharged. This is in contrast to many BMPs where the emphasis is on keeping the water from becoming contaminated. Treatment practices may be required where flows are currently being affected by exposed materials and where other BMPs are insufficient to meet discharge goals. These practices are usually the most resource intensive as they often entail significant construction costs and require monitoring and maintenance on a frequent and regular basis. Treatment options may range from high maintenance controls to low maintenance. High maintenance treatment techniques require periodic manpower to operate and maintain the BMP. Low maintenance cost techniques have initial capital costs but operate with little long-term maintenance after they are implemented. At a few sites, treatment measures other than high maintenance measures may be appropriate to address specific pollutants.

Chemical/Physical Treatment—An example of a high maintenance technology that is found at coal mining facilities is chemical/physical treatment. The most common type of chemical/physical treatment involves the addition of limestone to reduce the acidity of the discharge and/or precipitate metals. Metals may be removed from wastewater by raising the pH of the wastewater to precipitate them out as hydroxides. Typically, the pH of the wastewater must be raised to 9 to 12 standard units in order to achieve the

⁶⁷ "Performance of Current Sediment Control Measures at Maryland Construction Sites," January 1990, Metropolitan Washington Council of Governments, page X.

⁶⁸ "Sediment and Erosion Control: An Inventory of Current Practices—Draft," EPA, April 20, 1990, page IV-4.

⁶⁹ "Best Management Practices for Mining in Idaho," Idaho Department of State Lands, November 1992; "Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices," EPA, September 1992, (EPA 832-R-92-005); and "Erosion & Sediment Control Handbook," Goldman et al., McGraw-Hill Book Company, 1986.