(v) Mulch-straw or Wood Chips— Mulches and wood chips are useful temporary covers for bare or seeded soils, with an erosion control effectiveness rating of 75 to 98 percent.⁵² Like matting, mulch-straw or wood chips help soils retain moisture and warmth to promote vegetative growth.

(vi) Compaction—Soil compaction using a roller or other heavy equipment increases soil "strength" by increasing its density. More dense soil is less prone to erosion and long-term soil settlement.

(3) Capping. In some cases, the elimination of a pollution source through capping contaminant sources may be the most cost effective control measure for discharges from inactive ore mining and dressing facilities. 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.

EPA has identified a wide variety of best management practices (BMPs) that may be used to mitigate discharges of contaminants at active and inactive metal mines. Many of the practices focus on sediment and erosion control and are similar to BMPs used in the construction industry. These controls to prevent erosion and control sedimentation are the most effective if they are installed at the inception of operations and maintained throughout active operations and reclamation of the site. 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.53 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.

(4) Treatment. Treatment practices are those methods of control which normally are thought of as being applied at the "end of the pipe" 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 other BMPs are insufficient to meet discharge goals. These practices are usually the most resource intensive, as they often require significant construction costs, and monitoring and maintenance on a frequent and regular basis. Treatment options may range from high maintenance controls to low maintenance controls. High maintenance treatment techniques require manpower to operate and maintain the BMP. Low maintenance cost techniques have initial capital costs but operate with low long-term maintenance after being implemented. At a few sites, treatment measures other than high maintenance measures may be appropriate to address specific pollutants.

(a) Chemical/Physical Treatment—An example of a high maintenance technology that is found at many active metal mining facilities is chemical/ physical treatment. The most common type of chemical/physical treatment involves the addition of lime or other such caustics to neutralize the discharges and/or precipitate metals. Metals may be removed from wastewater by raising the pH of the wastewater to precipitate them out as hydroxides.

(b) Oil/Water Separators—Another example of a high maintenance treatment technology is an oil/water separator. An American Petroleum Institute (API) oil/water separator or similar type of treatment device which acts to skim oil and settle sludge can be used to remove oil from water.

(c) Artificial Wetlands—This type of BMP system can be an effective system for improving water quality either alone or in conjunction with other treatment practices. Wetland processes are able to filter sediments, and absorb and retain chemical and heavy metal pollutants through biological degradation, transformation, and plant uptake.

Natural wetlands should not be considered as part of the treatment system because they are considered to be waters of the United States. The necessary controls, or BMPs, must be provided prior to discharging the storm water runoff to natural wetlands or other receiving waters.

In summary, a wide variety of BMPs are available for use at active and inactive metallic mining and milling facilities. These measures range from simple low cost, low maintenance source reduction practices such as diversion structures to high cost, maintenance intensive practices such as wetlands treatment. Clearly, the selection of a practice or group of practices will be site-specific depending on conditions and potential impacts as well as the resources available at each site. A specific best available technology (or technologies) cannot be determined because of the differences between sites and the quantities and characteristics of their discharges.

(4) Discharges Covered Under This Section

Coverage under this section of today's permit is limited to all storm water discharges from inactive metal mining facilities and storm water discharges from the following areas of active metal mining facilities: topsoil piles; offsite haul/access roads if off active area; onsite haul roads if not constructed of waste rock or spent ore, and mine water is not used for dust control; runoff from tailings dams/dikes when not constructed of waste rock/tailings and no process fluids are present; concentration building, if no contact with material piles; mill site, if no contact with material piles; chemical storage area; docking facility, if no excessive contact with waste product; explosive storage; reclaimed areas released from reclamation bonds prior to December 17, 1990; and partially/ inadequately reclaimed areas or areas not released from reclamation bonds.

Storm water discharges, or mine drainage discharges, which are subject to existing effluent limitations guidelines addressing storm water (or a combination of storm water and nonstorm water) cannot be covered by this section. The effluent limitations guidelines that apply to active metal mining operations are contained in 40 CFR Part 440, Ore Mining and Dressing Point Source Category. These effluent guidelines include specific numeric limitations for mine drainage and discharges from mills, or "no discharge" requirements. Table G-4 identifies the discharge and source of the discharge from active metal mining facilities, that are subject to process wastewater limitations, mine drainage limitations, and storm water reporting requirements. Storm water discharges that are eligible

⁵² "Sediment and Erosion Control: An Inventory of Current Practices—Draft," EPA, April 20, 1990.

⁵³ "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.