Chapter 3: WASTE DUMPS, SPENT ORE DUMPS, AND ORE STOCKPILES

Decisions on how to protect water quality should be based on overall practicability while at the same time weighing factors such as economic feasibility, local conditions, and maintenance requirements. The operator must plan to control or eliminate toxic substances in the dump material.

WASTE DUMPS AND/OR SPENT ORE DUMPS:

LOCATION:

1. Locate waste dumps or spent ore dumps away from surface waters, springs, seeps, and wetlands. If this is not feasible, water should be diverted around the dump and/or a drain field should be installed under the dump. The drain field or diversion dike should discharge into a settling pond. Refer to the following BMP's:

III.1 Diversion Dike/Ditch
III.7 Drain Fields
V.6 Sediment Ponds

2. Enhance the long term mass stability of a dump by locating and constructing it so that the potential for failure is minimized. This can be done by evaluating the geologic nature of the material to be placed in the dump and locating the dump in a geologically stable area. Avoid faults, dense joint systems, and landslide areas. Particle size distribution of the waste and the presence or absence of clay can also affect the stability of the dump depending on how the dump is constructed. Locating dumps on flat topography is preferable to sloped terrain. When material is placed on a slope greater than 3:1 (20°), foundation preparation requirements are critical to dump construction.

3. Where acid mine drainage may be generated by oxidation of sulfides, prevention measures should be taken. These measures may include impermeable caps and liners, surface water diversions, and/or blending acid consumption materials such as limestone with wastes. Where preventive measures are impractical, water treatment will be necessary until acidic discharge meets water quality standards. Note: Some knowledge of mineralogy, hydrology and physical characteristics of an area can help prevent potential acid water problems caused by mining.

4. Any water that runs off the surface of a dump should be diverted behind siltation berms, into catch basins, into sediment ponds, or through silt fences. Refer to the following BMP's:

V.1 Straw Bale Barriers
V.2 Sediment Traps
V.4 Silt Fence
V.5 Brush Sediment Barriers
V.6 Sediment Ponds
V.8 Log and Brush Check Dams

CONSTRUCTION AND LOADING CHARACTERISTICS:

1. Remove topsoil from the dump construction area; store, and stabilize for future use.

2. If necessary, construct a drain field at the proposed dump site.

3. Construct the dump in successive lifts, starting at the toe. A single lift should not exceed fifty (50) feet in height.

4. Some material, such as sulfitic waste, should be segregated when placed on the dump so it does not come in contact with surface water or leach toxic substances into the ground water. Other materials, such as those with a high clay content, should be mixed with rocks and debris. This should help prevent failure planes from forming in the dump.

5. Artificial supports, such as retaining walls, could be used when building waste or spent ore dumps. Retaining walls installed in conjunction with a drainage system (as shown in Figure 3-1) may be used to help support the toe of the dump while draining excess water from within the dump, which helps relieve pore pressure. Bracing piling and wire mesh can also be used to help control rock spall (rock breaking off in layers parallel to the surface).

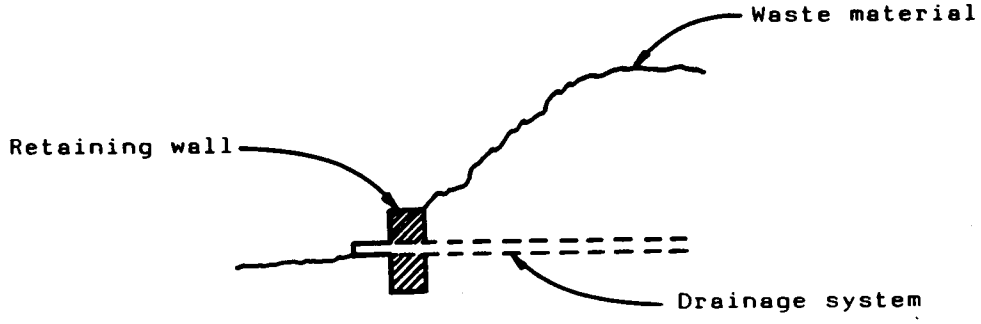

FIGURE 3-1

RECLAMATION:

The dump should be reclaimed upon completion of the mining operation or concurrently if sections of the dump are no longer in use.

Reclamation efforts should include grading and recontouring of the dump surface to a 3:1 slope or flatter, placing topsoil on the sides and top of the dump and applying seed, fertilizer and mulch. At a minimum, all exposed soil should be seeded with grasses and/or shrubs to increase long term stability and reduce wind and water erosion. Refer to the following BMP's:

I.3	Mulch-Straw	II.3	General Seeding and Planting
I.4	Mulch-Wood Chips	II.4	Broadcast Seeding
		II.5	Drill Seeding
		II.6	Vegetative Planting
II.1	Topsoiling	II.8	Fertilizer Use
II.2	Seedbed Preparation	II.9	Maintenance of Vegetated Areas

If the waste material is highly acidic and if there is not enough topsoil available to establish vegetative growth, lime may need to be applied to the dump surface to adjust the pH of the waste material so that vegetation will grow. More than one lime treatment may be required to established a self-sustaining vegetative cover.

TOPSOIL AND ORE STOCKPILES:

DESIGN CRITERIA:

1. Locate stockpiles as far from surface waters, springs, seeps, and wetlands as possible.

2. Place the stockpile on a geologically stable surface.

3. Stockpiles, which are not scheduled to be processed within a reasonable length of time, should be stabilized as soon as possible after construction, to prevent unnecessary erosion by wind and water. If the stockpile contains sulfitic ore, measures should be taken to prevent the formation and runoff of acidic water. These measures may include placing an impermeable cover over the stockpile and/or constructing settling ponds below the stockpile to catch and contain runoff water. Seeding topsoil stockpiles will help to keep the topsoil biologically active and retain its value as a plant growth medium. Refer to the following BMP's:

III.1	Diversion Dike/Ditch	V.2	Sediment Traps
III.2	Interceptor Trench	V.4	Silt Fence
III.4	Siltation Berm	V.5	Brush Sediment Barrier
		V.6	Sediment Ponds
V.1	Straw Bale Barrier	V.7	Slash Filter Windrow