equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials and intermediate and finished materials; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water'' (40 CFR 122.26(b)(14)). The most common industrial activities at metallic mine sites include extraction of the metal, material crushing, and product separation. While all of these industrial activities can occur at metal mines, storm water discharges from some of the areas listed cannot be covered by this permit (see Part VIII.G.4. Discharges Covered Under This Section).

Significant materials include, "... but [are] not limited to: raw materials, fuels, materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; . . . hazardous substances designated under Section 101(14) of CERCLA; any chemical facilities required to report pursuant to Section 313 of title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharge" (40 CFR 122.26(b)(12)). Significant materials commonly found at mining facilities include: overburden; waste rock; subore piles; tailings; petroleum-based products; solvents and detergents; manufactured products; and other waste materials.

Materials management practices are defined as those practices employed to diminish contact by significant materials with precipitation and storm water runon, or practices utilized to reduce the offsite discharge of contaminants. To this end, sediment ponds, discharge diversion techniques, as well as methods of dispersion, are used to minimize impacts of significant materials on storm water. For mine sites requiring additional sources of water for processing operations, rainfall events as well as storm water runon will be managed for use in dust suppression, processing, and washing activities. Many mine sites are already equipped with sedimentation ponds and other established process wastewater treatment methods in order to meet effluent limitation guidelines. Additional storm water management practices used at mineral mining facilities include: discharge diversions; drainage/storm water conveyances; runoff dispersion; sediment control and collection practices; vegetation/soil stabilization; capping contaminated sources; and treatment.

Metals are recovered by three basic extraction techniques: surface mining; underground mining; and placer mining. Each type of extraction method may be followed by varying methods of beneficiation and processing. Presented below are brief descriptions of the industrial activities, significant materials, and materials management practices associated with these four extraction processes and associated beneficiation activities. Due to similarities in mining operations for many of the minerals within this sector, industrial activities, significant materials, and materials management practices are fairly uniform across this sector. Unique practices are noted.

a. Surface Mining. Many mining facilities access metal deposits using surface extraction techniques such as strip mining, open-pit, open-cut, and open-cast. Surface mining is more economical than underground especially when the ore body is large and near the surface.

(1) Industrial Activities. Extraction activities include removal of overburden and waste rock to access metal deposits. These land-disturbing activities generate piles of topsoil and other overburden as well as waste rock, which are typically stored beside, or within, the pit or quarry. In addition, land disturbance, drilling, blasting, stripping, and materials handling activities create large amounts of dust that are either dispersed by local wind patterns or collected in air pollution control mechanisms. At closure, overburden and waste rock may or may not be used to reclaim the pit or quarry depending on Federal, State, and local requirements. In addition, access roads and rail spurs, and associated loading and unloading areas, are found onsite.

Following extraction, the mined materials may be transferred to a nearby beneficiation/processing facility. At an ore beneficiation facility, the valuable metals are separated from the less valuable rock to yield a product which is higher in metal content. To accomplish this, the ore must be crushed and ground small enough so that each particle contains mostly the mineral to be recovered or mostly the less valuable, or gangue, material. Valuable minerals are separated from the gangue by gravity concentration. magnetic separation, electrostatic separation, flotation, and leaching.

(2) Significant Materials. Significant materials generated by most extraction activities at surface mines include overburden piles, waste rock piles, ore and subore piles, and materials spilled from loading and unloading activities. Other exposed materials that can be generated at these types of operations (as well as other metal mines), include: tailings from flotation and other separation stages; soils impacted by fugitive dust emissions; settling ponds that receive process wastewaters; dredged sediment disposal areas; as well as raw material and product storage. Dust and particulate matter collected in air pollution control mechanisms may also be disposed of in onsite waste piles.

(3) Materials Management Practices. Materials management practices at surface mines are typically designed to control dust emissions and soil erosion from extraction activities, and offsite transport of significant materials. Settling ponds and impoundments are commonly used to reduce total suspended solids (TSS), total dissolved solids (TDS), and other contaminants in process generated wastewaters. These controls may also be used to manage storm water runoff and runon with potentially few alterations to onsite drainage systems. Few sampling facilities indicated the presence of traditional BMPs. Only 29 percent of the sampling facilities have ponds or impoundments as a storm water control.

Tailings impoundments are used to manage tailings generated at facilities engaged in flotation or heavy media separation operations. These impoundments are used to manage beneficiation/processing wastewaters generated at the facility and may also be used to manage storm water runoff.

b. Underground Mining. Underground mining techniques are used to access metals located too far underground to access economically from the surface. Though typically a more expensive form of extraction, advantages to underground mining operations include year-round operation, less noise (applicable to facilities located near residential areas), and less surface land disturbance. The two main underground mining methods are stoping and caving. Both of these methods can be used in several variations depending on the characteristics of the ore body. Common stoping methods include cut-and-fill, square cut (timbered), shrinkage, and open. Caving methods include undercut, block, and sub-level. Underground mining is usually independent of surface mining, but sometimes underground mining precedes or follows surface mining.

(1) Industrial Activities/Significant Materials. Industrial activities that may be associated with storm water discharges include: loading/unloading activities; haul roads; products and materials storage; waste piles; and processing activities. Exposed materials