(1) Industrial Activities. The industrial activities at dredging facilities include excavation of ore from underwater deposits (e.g., in stream beds of perennial or ephemeral streams) by dredges. Processing operations may occur on the dredge barges or at adjacent facilities. On-board processing activities may include: screening; crushing of oversized material; washing; sand classification with hydraulic classifying tanks; gravel sizing; heavy media separation; and product loading/unloading.

Dredges that do not perform on-board processing operations load raw material on a tow-barge for transport to a land-based processing facility. Processing at land facilities typically includes washing to remove clay and other impurities; screening; sizing; crushing; classifying; and heavy media separation.

(2) Significant Materials. Significant materials generated at dredging facilities include ore material piles, waste material piles of oversized, or otherwise unusable materials, and float waste from heavy media separation. Clays and undersized fines are dredging waste by-products that may be returned to the water but may also be stored in piles. Sand fines from gravel crushing operations that cannot be sold, are a major source of exposed waste material at land-based processing facilities. In addition, land-based facilities may also manage dredged sediments removed from onsite settling ponds. Haul roads, storage piles, on-land waste piles, processing operations, and loading/unloading operations are other potential sources of storm water pollutants at these facilities.

(3) Materials Management Practices. Hydraulic dredging operations in open pits or quarries, or land-based processing facilities, use settling ponds for the removal of clay particles, fines, and impurities from process wastewaters. These ponds may also be used to manage contaminated storm water runoff. Water from the settling ponds or basins may be returned to the wet pit to maintain water levels in the pit, or may be discharged offsite. Worked out pits may also be used to contain solid wastes such as fines and oversized materials. These pits are another potential source of storm water contamination in the event of heavy precipitation and subsequent overflow.

Dredging operations in open waters typically discharge process wastewater containing fines to the water body without treatment under the operator's Clean Water Act Section 404 permit.

c. Solution Mining. Solution mining extracts minerals from hard rock mineral or natural brine sources by underground injection of a lixiviant into the ore zone. Minerals are recovered from solution, after the solution is brought to the surface, through evaporation or flotation. Since most solution mining extraction activities occur underground using water to extract values, the potential for these mineral deposits to be exposed to storm water is minimal. However, at the surface of solution mining operations, industrial activities and significant materials, such as haul roads, chemical storage areas, and raw material piles, are common to most sites. These industrial activities and significant materials are all susceptible to storm water exposure and require appropriate storm water management controls.

Descriptions of industrial activities performed by each type of solution mining are provided below. Since the mineral deposits are not exposed to storm water for this type of mining, ''industrial activities'' describes the type of extraction method used to obtain minerals, not activities susceptible to storm water exposure. Significant materials, and materials management practices do refer to those materials exposed to storm water, and to the subsequent management practices used to control storm water.

Some of the minerals extracted using solution mining include: potash; soda; rock salt; borate minerals; chemical and fertilizer minerals such as barite, fluorspar, salines from lake brines; lithium; and mineral pigments. Many of these minerals may also be recovered using surface and/or underground extraction methods.

(1) Solution Mining—Injection.

(a) Industrial Activities—Rock salt and potash minerals may be recovered by injecting water into subsurface deposits and removing minerals in solution. Water is injected through a cased pipe drilled into a deposit. Saturated solution is then pumped to the surface for processing or storage. Processing may include evaporation, and/or flotation to separate the final product.

(b) Significant Materials—Significant materials at an injection solution mining site may include product storage piles, chemical storage areas, and haul roads. Very little extracted solution remains onsite, since it is often re-injected into the formation.

(c) Materials Management Practices—Solution mining facilities typically operate in arid regions, and are able to use solar evaporation ponds to recover minerals from solution. Due to typically low precipitation and high evaporation rates in these areas, storm water materials management practices may not be prevalent.

(2) Solution Mining—Frasch Sulfur.

(a) Industrial Activities—Sulfur is recovered from deposits using the Frasch sulfur process, which injects hot, purified, water into the subsurface to melt the mineral. Molten sulfur is pumped directly to heated tanks at the surface to maintain a saleable product in liquid form.

(b) Significant Materials—Significant materials generated from Frasch sulfur mining include elemental sulfur, scrap sulfur, tank bottoms, water treatment sludge, bleedwater produced from bleed wells used to remove excess injection water, and drilling wastes such as muds, acidizing fluids and well workover fluids. Since molten sulfur product is piped directly from underground to enclosed storage tanks on the surface, it is not exposed to storm water.

(c) Materials Management Practices—Solid wastes such as elemental and scrap sulfur, tank bottoms, and water treatment sludge may be disposed of in onsite piles. Liquid wastes such as bleedwater, drilling muds, acidizing fluids and workover fluids are typically disposed of in reserve pits and/or workover pits. At the completion of drilling, pit contents may be dried prior to being covered by a liner and buried. Accumulated solids from these pits may also be mixed with clay for use as an additive in drilling muds.

Rainfall runoff and boiler blowdown may be discharged offsite without treatment. Other waste generated at these facilities include power plant wastes and wastewaters, wastewater from sealing wells, sanitary wastes, and miscellaneous other wastewaters collected in drips and drains.

(3) Solution Mining—Evaporation.

(a) Industrial Activities—Another form of solution mining uses evaporation and crystallization of saline waters to produce minerals. Potash, soda, borate, and other minerals, are produced from naturally occurring fluids such as sea water, or from evaporite mineral deposits such as western lake brines. Brines are typically pumped from beneath the crystallized surface of a lake and processed by evaporation and crystallization. Recovered salts are washed, dried and packaged for shipment.

(b) Significant Materials/Materials Management Practices—Significant materials associated with these facilities include raw material piles, evaporation ponds, and residual brines consisting of salts and end liquors, including various added process wastewaters. Residual brines generated may be left in solar