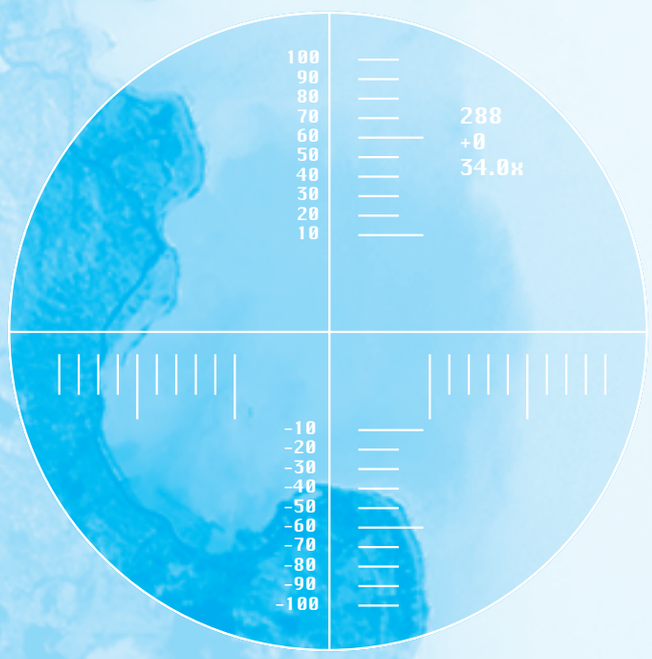
STD TOOLKIT



Submarine Tailings Disposal

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GLOSSARY OF TERMS

Acid Mine Drainage: Mine tailings, waste rock, and the exposed sides of an open pit, commonly contain sulfides, as well as various metals such as cadmium, copper, iron, lead, manganese, mercury, silver, and zinc that occur naturally in the area of the mine. When sulfides in the tailings are exposed to air they oxidize. When oxidized tailings are exposed to fresh water they produce sulfuric acid. This drainage has a pH lower than 7, which is neutral. The sulfuric acid accelerates the **metal leaching** out of tailings, waste rock, and exposed sides of the pit.

Anoxic: Lacking oxygen

Benthic organisms: Benthic Organisms are organisms that live on the bottom of a body of water, such as on the seafloor, or on the bottom of a lake or river.

De-aerate: The removal of oxygen.

Density Current: A coherent flow of tailings where the particles stay together because they are denser than surrounding water. This has been described as looking like toothpaste when it is squeezed out of the tube.

Effluent: Fluid waste from the mine site including mine fluids, mill process fluids, tailings impoundment fluids, treatment pond and facility fluids, seepage and surface drainage.

Euphotic Zone: The upper zone in the ocean that is penetrated by light where marine plants such as seagrass and corals can grow. The euphotic zone has a high density of marine animals. Depending on the degree of **turbidity** of the water, this zone usually extends to between 10-100 meters depth below the surface. Clearer, less turbid waters, tend to have a deeper euphotic zone.

Impoundment: A contained location used to confine tailings, waste rock, or overburden. Usually an impoundment has dams or dykes that are supposed to hold the mine waste material in and stop toxic seepage of acids and metals into the environment.

Laterite Ore Body: A red residual soil in humid tropical and subtropical regions that is leached of soluble minerals, aluminum hydroxides, and silica but still contains deposits of insoluble ferric and aluminum oxides.

Metal Leaching: The extraction of soluble metals from solid materials such as tailings, waste rock, pit walls.

Mitigating measures: These are actions aimed at avoiding, controlling or reducing the severity of adverse physical, chemical, biological and/or socio-economic impacts.

Mixed surface layers: These are the upper layers of the sea that are considered unsuitable for tailings because they are oxygenated, which could promote leaching of toxic metals from tailings.

Mixing Zone: A mixing zone is quite simply an area in which pollutants, in this case metals and chemicals and the solids in tailings, waste rock or overburden, are allowed to mix with the natural environment to cause a dilution of unacceptably high pollutants to levels that meet regulatory standards.

Oxic: Containing oxygen

Monitoring Systems: These are systems put in place to measure impacts on a regular or ongoing basis, so that if impacts become greater than acceptable, operators will be warned and can take action to mitigate the negative effects.

Oxidation: The process of decomposition in which electrons that hold matter together are transferred to an oxidant. An example of oxidation is when iron oxidizes it decomposes or rusts.

Precautionary Principal: The Precautionary Principal means that if it is known that an action may cause harm, it should not be done, until it can be satisfactorily proven not to cause harm.

Plume Shearing: When a tailings do not stay together in a **density current** they shear off and form a plume in the ocean.

Reagents: Reagents are chemicals used to separate desired metal(s) from crushed rock.

Submarine Tailings Disposal: Dumping of mine tailings into the sea through a submerged pipe.

Sulphide Mineral: A mineral compound characterized by the linkage of the element sulphur with a metal.

Tailings: Tailings are an end product of mining and are considered waste. In hard rock metal mining, rocks are taken out of the earth. They are crushed down to very small pieces. Then the target metals are removed using chemicals. Tailings are the fine ground up rock that is left over after the target metals have been removed. In addition to ground up rock, tailings frequently contain the chemicals that were used to remove the target metal, such as sulphuric acid, or cyanide in gold mining, or ammonia in nickel mining. Tailings also may contain detergents and frothing agents that are used to make the metals float to the surface. These agents can also be environmentally toxic. Finally, tailings contain the other metals that were in the rocks, metals the miners did not remove. These metals, such as lead, cadmium and arsenic may also be toxic to the environment and to human health.

Thermocline: A layer in the ocean where temperature changes rapidly. The water above and below the thermocline will differ significantly in both temperature and density. The thermocline acts as a natural barrier between two layers in the ocean.

Total Metal Analysis: An analysis of the total of metals that are in the tailings which includes dissolved and non-dissolved metals.

Total Suspended Solids: This refers to the solid particles that are part of the liquid effluent waste from a mine. In many countries the amount of Total Suspended Solids that are allowed to be discharged into the environment is regulated.

Tsunamigenic: Has the potential to generate a tsunami (a massive tidal wave in the ocean).

Turbidity: "Cloudiness" of water caused by floating particles that block sunlight.

Upwelling: In this context, upwelling means when sources of energy at work in the sea push deeper water layers up to higher water layers or even to the surface. Such energy sources can be surface winds, internal waves, bottom currents on a sloping seabed, tidal flows, earthquakes or tsunamis.

Note: All the terms defined in this glossary are in relation to the topic of Submarine Tailings Disposal

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