SCI – WATER POLLUTION AND POLLUTANTS

Water pollutants originate from a host of human activities and reach surface water or groundwater through an equally diverse host of pathways. For purposes of regulation, it is customary to distinguish between point sources and nonpoint source of pollutants. Point sources involve the discharge of substances from factories, sewage system, power plants, underground coal mines, and oil wells. These sources are relatively easy to identify and therefore are easier to monitor and regulate than nonpoint sources, which are poorly defined and scattered over broad areas. Pollution occurs as rainfall and snowmelt move over and through the ground picking up pollutants as they go. Some of the most prominent nonpoint sources of pollution are agricultural runoff (from farm animals and croplands), storm-water drainage (from streets, parking lots, and lawns), and atmospheric deposition (from air pollutants washed to earth or deposited as dry particles).

Two basic strategies are employed in attempting to bring water pollution under control: (1) Reduce or remove the sources and, (2) treat the water before it is released so as to remove pollutants or convert them to harmless forms. Water treatment is the best option for point sources. Source reduction can be employed for both kind of sources and is the best option for nonpoint sources.

Pathogens

The most serious water pollutants are the infectious agents that cause sickness and death. The excrement from humans and other animals infected with certain pathogens (disease-causing microorganisms) contains large numbers of these organisms or their eggs. They cause disease. Even after symptoms of disease disappear, an infected person or animal may still harbour low populations of the pathogen, thus continuing to act as a carrier of disease. If wastes from carriers contaminate drinking water, food or water used for swimming or bathing, the pathogen can gain access to, and infect other individuals.

Organic Wastes

Along with pathogens, human and animal wastes contain organic matter that creates serious problems if it enters bodies of water untreated. Other kinds of organic matter (leaves, grass, clippings, trash and so forth) can enter bodies of water as a consequence of runoff and, in the case of recessive aquatic plant

growth, can grow within the water. With the exception of plastics and some human made chemicals, these wastes are biodegradable.

Chemical Pollutants

Because water is such an excellent solvent, it is able to hold any chemical substances in solution that have undesirable effects. Water-soluble inorganic constitute an important class of pollutants that include heavy metals (lead, mercury, arsenic, nickel, and so forth), acids from mine drainage (sulphuric acid) and acid precipitation (sulphuric and nitric acids), and road salts employed to melt snow and ice in colder climates (sodium and calcium chlorides). The organic chemicals are another group of substances found in polluted waters. Petroleum products pollute many bodies of water, from the major oil spills in the ocean to small streams receiving runoff from parking lots. Other organic substances with serious impacts are the pesticides that drift down from aerial spraying or that run off from land areas and the various industrial chemical, such as polychlorinated biphenyls (PCBs), cleaning solvents, and detergents.