

COLIFORM COUNT

Coliform bacteria live in the human intestinal tract. Literally billions of these bacteria generally are present in a single human stool. The number of these bacteria present in 100 milliliters (a little less than $\frac{1}{2}$ cup) of water is used as a general indication of the probable hazard of dangerous bacteria in the water. The influence to municipal sewage plants may have typical counts of millions per 100 ml.

Water for swimming is generally kept under the range of 50 to 1000 per 100 ml. Drinking water is generally kept at an average less than one per 100 ml.

B.O.D.

Biochemical Oxygen Demand is a measure primarily of the amount of organic matter present. It is stated in terms of how much oxygen would be consumed in converting the organic matter to a more oxidized state by natural processes such as bacterial action. The hydrogen (H) and carbon (C) in organic matter is typically converted to water (H_2O) and carbon dioxide (CO_2) in these processes. The average sewage waste per person seems to have a B.O.D. in the neighborhood of .17 lbs. (about 77,000 milligrams) of oxygen per day. In most municipal systems the organic matter is diluted with about 100 gallons (378 liters) of water per person per day so that influents to municipal sewage systems are typically in the range of 200 mg. B.O.D./LITER.

Waste with a high B.O.D. dumped into a lake depletes the oxygen in the water of the lake, thereby suffocating fish and natural life in the water.

NUTRIENTS

The word "nutrients" has a particular meaning to waste treatment specialists. It means a group of chemicals, primarily various phosphates and nitrates, often the same chemicals widely used in fertilizers for farming. These "nutrients" are present in human waste. They become hazardous when dumped in natural waterways because they tend to over-stimulate the growth of algae in the waterway eventually filling the waterway with a green scum, and upsetting the balance of natural life in the water.

Most of the controversy regarding waste disposal from watercraft nowadays centers on the question of macerator-chlorinators which chop the waste, treat it chemically, and then dump it back into the water, vs. holding tanks which retain the waste until the boat arrives at a dock-side pump-out station which can transfer the waste to a municipal or other sewage system.

Both systems have disadvantages: Macerator-chlorinators require significant electrical power, and require that chemicals be added to the system periodically. Holding tanks require that the boat owner make periodic trips to special docks presently in sparse, if any existence, in order to empty his tank (and pay a pump-out fee) before it becomes too full or becomes too rancid to be tolerated on his boat.

Unfortunately, early models of macerator-chlorinators and some present models didn't chop waste particles fine enough nor treat them strongly enough and publicized information to this effect has left the wrong impression with many people.

There is at least one present-day model macerator-chlorinator (the Carlson Mark 6,) which not only does an excellent job of reducing coliform count to an acceptable level, but also obtains about $\frac{2}{3}$ reduction in B.O.D.!

This B.O.D. reduction is about twice as good as most sewage plants in existence. Why? Most sewage plants are presently only primary treatment systems, and they only reduce the influent B.O.D. by about $\frac{1}{3}$.

There are many secondary treatment systems in existence, which can obtain B.O.D. reductions of around 90%. Hopefully, over the next 5 to 10 years, more and more municipalities will convert to such systems. In the meantime, however, it seems only logical to make sure that local regulations take into account the type of municipal systems dumping into the waterways in question. If primary treatment sewage systems with only $\frac{1}{3}$ B.O.D. reduction are going to be dumping into a particular waterway for the next few years, then certainly it is folly to require the use of holding tanks and to prohibit macerator-chlorinators on that waterway for that period of time, because the waste from the holding tanks after pump-out will at best go through the municipal system and return to the waterway with its B.O.D. reduction by only $\frac{1}{3}$, whereas with a good macerator-chlorinator the B.O.D. could be reduced by $\frac{2}{3}$ right on the boat.