Turbidity is usually measured with a *nephelometer*, *Jackson candle apparatus*, or *Baylis turbidimeter*. Units can be NTU (nephelometer turbidity units) or JTU (Jackson turbidity units).

K. SUSPENDED AND DISSOLVED SOLIDS

Solids present in a sample of drinking water can be divided into several categories, not all of which are mutually exclusive.

- **Suspended solids**: Suspended solids, the same as *filterable solids*, are measured by filtering a sample of water and weighing the residue.
- **Dissolved solids**: Dissolved solids, same as *non-filterable solids*, are measured as the difference between total solids and suspended solids.
- **Total solids**: Total solids are made up of suspended and dissolved solids. They are measured by drying a sample of water and weighing the residue.
- **Volatile solids**: Volatile solids are measured as the decrease in weight of total solids which have been ignited in an electric furnace.
- **Fixed solids**: The fixed solids can be found as the difference between total solids and volatile solids.
- **Settleable solids**: The volume (ml/l) of settleable solids is measured by allowing a sample to stand for one hour in a graduated conical container (*Imhoff cone*).

An upper limit of 500 mg/l of total solids is recommended.

Table 7.8
Water-Borne Organisms

this organism	causes this disease
BACTERIA	
Salmonella typhosa	typhoid fever
Vibrio comma	cholera
Shigella dysenteriae	dysentery
Escherichia coli	enteric problems
fecal streptococci	enteric problems
VIRUSES	
Poliomyelitis	polio
Infectious hepatitis	hepatitis
PROTOZOA	
Entamoeba histolytica	dysentery
PARASITES	
flatworms	Schistosomiasis
flatworms	Bilharziasis

L. WATER-BORNE DISEASES

Organisms that are present in water consist of bacteria, fungi, viruses, algae, protozoa, and multicellular animals. Not all of these are dangerous, but some are. Important organisms are listed in table 7.8.

5 TRIHALOMETHANES

Trihalomethanes (THM's) are organic chemicals produced during the disinfection of water. The chemically active elements of chlorine, iodine, and bromine react with various organic precursors to produce THM's. However, iodine is seldom used in disinfection. Therefore, only four THM's are found in significant quantities:[5]

- $CHCl_3$ - trichloromethane (chloroform)
- $CHBr_3$ - tribromomethane (bromoform)
- $CHBrCl_2$ - bromodichloromethane
- $CHBr_2Cl$ - dibromochloromethane

The *organic precursors* which react with chlorine to produce THM's tend to be naturally occurring. For example, decaying vegetation produces humic and fulvic acids which are natural precursors. The precursors in themselves are not harmful, but the THM's produced from them have been shown to be carcinogenic.[6]

Table 7.9 lists the maximum contaminant level (MCL) for THM's in drinking water. Communities with populations of 10,000 and above are covered by the MCL if they add a disinfectant to their drinking water supply. The MCL reported in table 7.9 is for total THM (TTHM), not just chloroform. Precursors are not limited or monitored.

When THM levels need to be reduced, several options are available. These options fall into two categories, depending on whether the precursors are removed prior to chlorination, or a disinfectant is chosen that does not produce THM's. The first category includes the following options:

- Using *granular activated carbon* (GAC), other adsorbents, or filters, including weak-base resins, to remove precursors
- Selecting a water source with fewer precursors

[5] Bromine can be present in gaseous chlorine as an impurity. Bromine also results from reacting chlorine with the bromide present in high-salinity water.

[6] Actually, tests have shown that only chloroform in high doses is carcinogenic to rats and mice. The other THM's are considered carcinogenic by association.