

By Dr. Philip Roberts

Wastewaters, including brine from seawater desalination and domestic wastewater from treatment plants, can be safely disposed of with minimal environmental impacts if the mode of discharge is properly designed. Domestic wastewaters (and some industrial wastewaters), are usually discharged through an outfall and diffuser. The outfall discharges sufficiently far from shore that there is negligible probability of shoreline impact; the diffuser effects rapid mixing and dilution so that the concentrations of contaminants are rapidly reduced to safe levels. In this talk, we review some of the main environmental issues for ocean outfalls, including biochemical oxygen demand, toxics, bacteria, and the environmental regulations and criteria that are usually applied. For brine discharges, the main environmental impact is salinity, which must be reduced to safe levels to protect marine organisms. This can be accomplished in various ways. A common one is by co-disposal with power plant cooling water or domestic wastewater, which provides some dilution prior to discharge. Another is by means of a diffuser wherein the brine is ejected at high velocity from inclined jets that effect rapid initial mixing and dilution. This is the preferred method for disposal from many plants around the world, including several in Australia. In this talk we review recent research on mixing of dense jet brine diffusers and the work of the expert panel convened to update the California Ocean Plan to account for brine diffusers.