

tary Coral Reef Foundation, constructed a wetland for the CEA dormitories.. Since this system functioned very well, CEA has promoted the use of constructed wetlands to prevent contamination of our coastal waters. These wetlands are large, concrete-lined, impermeable planters that contain three-and-one-half square meters for each person to be served. Slotted pipe from the septic tank is laid across the bottom and covered with one-half meter or more of gravel. Sand and soil are added on top and the surface is planted with water-loving plants. The plants take up nutrients that otherwise would feed algae on the reefs and in the lagoons, and bacteria in the gravel consume the bacteria which could be harmful to humans. With the proper plants, the toxics will also be retained in the vegetation. Water quality studies carried out at Akumal have demonstrated that the coliform content of the final effluent from the wetlands have been reduced by over 99 percent. This small residue can be safely released into a natural wetland, which completes the job.

It is urgently recommended that SEMARNAP promote the use of wetlands in coastal areas and that the issuing of permits for deep disposal wells be stopped.

Centro Ecológico
Apartado Postal #2
Akumal, Quintana Roo,
Phone: 987-5-9095 Fax: 987-
Email: cea94@caribe.net.mx



<http://www.ceakumal>

Akumal
México, 77760
5-9092

RESEARCH SHOWS THAT DEEP WELLS FOR SEWAGE DISPOSAL SHOULD BE PROHIBITED

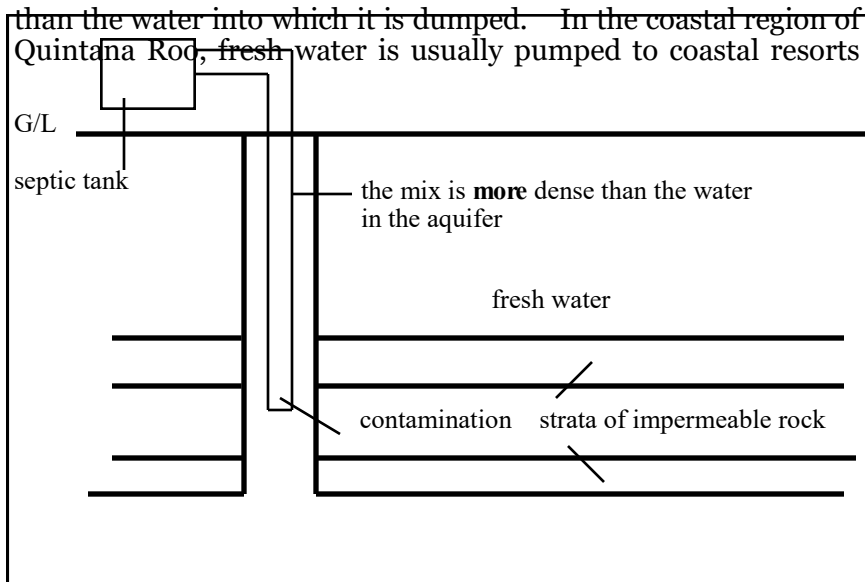
Dr. Charles Shaw, Geologist
Centro Ecológico Akumal

Study of ground water movement and application of basic physical laws shows that the use of deep wells for the disposal of sewage in the coastal zone results in widespread contamination of mangroves, bays and lagoons.

The concept of disposing of sewage via a deep well was developed for inland locations. The concept assumes fresh water in both the aquifer and as a medium for flushing the waste from the toilet. The mixture of human waste and fresh water will form a slurry that is heavier (more dense) than fresh water in the disposal aquifer. The dense slurry then sinks to the bottom of the well and finds its way into the surrounding rock aquifer. To prevent contamination of aquifers used for water supply, the deep wells are drilled into a deep aquifer that is separated from the water-supply aquifer by beds of impermeable rock strata, such as shale. When all these conditions are met, deep disposal wells can be used without contamination of the local environment.

None of the conditions described are met in the Yucatan Peninsula. The practice is particularly harmful in coastal areas. The chief failure is to meet the need for a slurry that is more dense

A Inland Locations



from a cenote or well field located inland from the coast. Fresh water has a density of 1.00 g/cc*, by definition. Sea water has a density of about 1.028 g/cc or more. The greater density of the sea water means that the fresh slurry will not sink, it will float near the surface of the well and shortly will displace the salt water and contaminate the entire column of water in the well. As there are no shale layers, or other confining strata, in the limestones that make up the Yucatan Peninsula, black water in the well will emerge at the bottom of the well and float to the surface where it will make its way into the bays and lagoons. The nutrients in the black water feed algae which destroy the coral and disease pathogens make lagoons and bays unsafe for swimming. Although it has been alleged that dangerous germs cannot survive in sea water, it takes several hours for them to die. With a continually replenished supply of pathogens, near shore waters close to the discharge point of contaminated water will pose a continuing health risk.

*grams per cubic centimeter

B Coastal Locations Alternative Technology for Sewage Disposal

At Akumal, Centro Ecologico Akumal, working with the Plane-

