Many states are requiring new RV parks and old RV parks in need of upgrading sewage treatment systems to install aerobic treatment plants instead of septic systems.

In my opinion, this is faulty thinking on the part of the state agencies and many private sector engineers because aerobic treatment plants are more easily shut down or inhibited by chemicals used by RVer's in their holding tanks than are septic tank systems. Maybe I better phrase that another way: septic systems do not visibly show how badly they have been inhibited or killed.

Since most aerobic systems route treated effluent directly into a storage pond or into a local stream, completely treating effluent before discharge is critical.

Workings of a sewage treatment facility
In all sewage treatment facilities, including city sewage treatment facilities, naturally occurring bacteria break down and digest solids and paper products that are put into the system.

In the process of breaking down and digesting solids, bacteria strip off the soluble solids from the wastes coming into the system. They turn them into soluble protein, soluble carbohydrates and fatty acids. As treatment progresses, these compounds are turned into carbon dioxide, methane, and other gases and indigestible solids.

Treatment systems receiving heavy loadings of sanitizing agents, holding tank chemicals, greases, fats, oil, paper and chemical cleaning compounds will experience diminished bacterial activity or complete bacterial kill.

A study done by the University of California at Berkeley indicated that the addition of 280 milligrams (mg)/liter of formaldehyde reduced digestion in septic tanks by 60%. Necessary septic tank retention time for wastewater containing 280 mg/liter of formaldehyde was found to be three times longer than for wastewater without the chemical. Thus much larger tanks are needed to treat preservative laden wastewater from RVs.

To make the quantities I'm talking about more vivid, I'll switch to ounces and quarts. An ounce is equivalent to about 30 to 32 grams, and a gram is equal to 1,000 milligrams. So, I'm talking about roughly one-quarter of 1/32 of an ounce - that is 1/128 of an ounce-per quart of wastewater inhibiting a treatment system. Most RVer's put far more formaldehyde than that into their holding tanks.

It was found that 90% of the formaldehyde in effluent was removed in a leach field if concentrations of formaldehyde were kept below 300 mg/liter. If concentrations of formaldehyde reached 1,000mg/liter, only 30% of the formaldehyde was removed by soil organisms.

Sewage treatment (package) plant tips
If you have an aerobic treatment system, here are some things you can do to keep the system running.

1) Limit the amount of chemicals your campers put into their holding tanks by encouraging them to use holding tank products that are enzyme or bacteria based. You'll also have to restrict the chemicals and bleach used by you and your staff for daily park maintenance.

2) Watch the treatment system carefully and add extra bacteria to the system to counter the effects of chemicals.

3) If the system stops working, check the pH (use a swimming pool test kit) and bring back the pH level into the 7.2 to 7.9 range with bicarbonate of soda. Dissolve two ounces of dry bacteria and 20 pounds of dry dog food in tepid water. Let the mixture soak for up to two hours to activate the bacteria. Add this mixture and a sack or more of dry dog food to the sewage treatment plant tank. Turn the blowers back on and the system should kick off again.
If you have a seasonal park where the system is shut down for several months during the off season, you will probably find the system has gone completely anaerobic. Because the system has been shut down for several months, the pH level will have dropped to 6.0 or lower and the atmosphere can be quite smelly when the blowers are turned back on. To start the system at the beginning of the season, dose it with the bacteria-dog food mixture and the dry dog food.

Dry bacteria is far more concentrated than bacteria in a liquid medium and far cheaper to use. In purchasing dry bacteria, be sure to compare bacteria counts and not just the price per pound. A quality count is 3 to 5 billion bacteria per gram or 110 to 150 billion per ounce. Insist on a written bacteria count and MSD sheets. When comparing products consider the recommended dosage and the cost of using the product for the season. In my opinion, the amount used shouldn't depend upon the size of the septic tank but upon the usage it receives.

4) If a system starts to form clumps on top of the primary treatment tank, you need to bring pH above 7.2 and add four to six ounces of bacteria for every 3,000 gallons of capacity. The clumps are caused by filamentous bacteria, an undesirable bacteria which can quickly take over a treatment system. If the filamentous bacteria is not quickly brought under control, the operator might have to shut down the system and have it pumped out. Filamentous bacteria have long spiral coils, are resistant to bleach used in the final sterilization stage and can trap E. Coli in their coils thereby protecting them from the final bleach stage.

5) A problem many parks experience is surge loading - large quantities of waste on the weekend and little if any during the week. (In some parks, the situation is reversed: lots of weekday waste and little on the weekend, but the effect is still the same.)

Since an aerobic system works on a much faster cycle (three to four times faster than a septic system,) the plant in a park with a large weekend loading will begin running out of waste to treat by Tuesday or Wednesday. The park operator might have to kick start it for the weekend.

An effective method of helping to even out the flow into the system is to add one or more surge tanks in front of the plant. These tanks should be capable of holding one or two days worth of sewage. When the system starts to run out of sewage to treat, pump more in from a surge tank. In order to keep these holding tanks from becoming anaerobic, add a small aerator.

Septic Tank tips
If you have a septic system, you will find that chemical holding tank products will kill the bacteria in the system. Although you might notice a build up of strong odors, a bacteria kill usually isn't apparent. The tank will continue to work as settling basin, allowing liquid to float out into the leach line.

However, with no bacterial activity, the leach line eventually will plug up, and, after a while, a heavy crust of toilet paper and soap curd will form at the surface of the wastewater in the tank.

If this happens, local water quality representatives might require you to completely replace the system if you consult them or if liquid surfaces and someone calls them. There are ways to avoid this and to bring a system back on line fairly quickly.

1) If liquid starts to surface, you have a major emergency brewing and need to take immediate action. There are several things you can do.

a) You can call in a plumber to Roto-Root or suck out the leach line, getting as much of the clumped solids as possible out of the line. This may help for a short while, but you will still have clumped solids in the gravel bed that block the flow of liquid into the soil. This is caused by heavy organic loading and lack of bacteria to digest wastes in the septic system. When this organic loading of the leach line becomes more than the naturally occurring soil organisms can handle, leach line failure occurs.

b) The best solution is to open the leach line at the distribution box, if you have one, and inject concentrated hydrogen peroxide into the leach line. I have found that the best way to do this is with a siphon pump. Caution is needed in using concentrated peroxide because it can burn your skin. While you
can call our company for exact instructions on accomplishing this, hiring a company that has experience in opening lines in this fashion is easier and safer than do-it-yourself approach.

If you do not have a distribution box, you'll need to dig down to the leach line and break into it. Prior to that, you'll need to pump the tank down to remove as much liquid as possible so that the hole you dig doesn't fill with wastewater.

2) Once you have performed the emergency procedure to open the leach line, you should put in a distribution box and add at least one more line to the system so you have a back up leach system. Most underground contractors can do this for you.

3) If you have problems with odors from sewer lines, adding bacteria to the system will help, but you also might find it useful to add a vent stack fitted with an activated charcoal filter. I recommend putting the vent stack close to the septic tank and keeping it as low to the ground as you safely can so that odors will vent through the vent stack fitted with the charcoal filter before escaping through other vent sources in the park.

4) Another thing that can be helpful is to add a small air pump to the first tank if you have a two-tank system. If you have two septic tanks end to end, the first one should have the baffle broken out so that it serves as one large treatment tank. By adding aeration to this tank, you turn your septic system into a modified aeration type system which will give better and faster treatment to the effluent.

Tips for lagoons or settling ponds.
Lagoon systems also can have problems created by chemicals stopping bacterial activity in the system. Generally, two types of lagoon systems are used. Some states require a septic tank to hold the solids with only the liquid discharging to a lagoon. Other states allow use of a lagoon for both digestion and disposal of liquids.

Both systems can have problems, which usually are indicated by excessive algae growth and/or odors. Two things are needed to stop both of these symptoms. First, proper bacterial activity to break down and digest waste is needed; and, second, you need to add aeration to most lagoons to help in digestion by adding oxygen to the water and help to evaporate liquid from the system.

General tips
In addition to limiting the amount of chemical holding tank products going into your waste treatment system, you must control the other places chemicals that kill bacteria are introduced into the system.

1) One of the biggest sources of problems is the laundry room where park guests use bleach and improper soaps. Old fashion soaps were based on lye and tallow and worked fairly well. They also did not affect the action of sewage treatment facilities. Promoting soaps that are environmentally friendly and eliminating the use of bleach in the laundry will go a long way toward making a system work better. Posting a sign in the laundry room that states: "Because this park is on a septic system (or has a sewage treatment plant), please do not use liquid bleach" is simple and helpful. Also not selling liquid bleach will go a long ways towards cutting the amount of bleach going into the sewage system.
There are a number of environmentally friendly soaps available today, and there are non-chlorine based bleaches available that use various dry forms of peroxide based products. Recently liquid versions of non-chlorine bleach have appeared on market shelves. You should stock them and require your campers to use them.

2) Limit the use of chemical cleaning products and start using more environmentally friendly cleaning products.
Do not use chemical toilet bowl cleaners nor "sanitary blocks" or deodorant blocks because they can kill beneficial bacteria. A number of heavily advertised products contain chemicals harmful to sewer systems.
Avoid cleansing powders, bleach, cleaning liquids, laundry soaps with bleach, toilet bowl cleaners and cleaners that contain quaternary ammonia.
Instead, use products like bicarbonate of soda, vinegar, Bon Ami, lemon juice and citric acid to do a variety of cleaning for you in an inexpensive and environmentally friendly fashion. Pumice stones also can be helpful.

You need to kill bacterial activity in only a couple of places. You need to sterilize toilet seats and shower floors in bathrooms. You also will need to sterilize any surface where someone has bled or vomited. You need to sterilize cutting surfaces and counter tops in food preparation areas.

I have found that one ounce of bleach in a pint of water does an excellent job of disinfecting and saves a great deal of money. Spray on the surfaces that need sterilizing and allow them to dry naturally.

Bactericides need at least two minutes of contact time to be effective so don't wipe surfaces dry after applying a bactericide. Allow the liquid to air dry for maximum effect. Don't use bleach on any surface that can be etched by the acid in bleach.

3) Nothing other than solid wastes, white toilet paper, urine and water should be put down a toilet. Cigarette butts, sanitary napkins, Tampons, condoms, disposable diapers, facial tissues and paper towels don't belong in a sewer system.

If your food preparation area has a sink with a garbage disposal, you should use it as little as possible and even consider removing the disposal unit. Raw foods which contain few, if any, bacteria are hard for waste systems to digest. Instead, compost vegetable peelings, egg shells and coffee grounds. Encourage campers to dispose of cooking grease in a coffee can or other container rather than flushing it down the sink. Grease is difficult for a treatment system to digest, and it can create real problems if the system is marginal.

4) Limit the amount of water flowing into the system by adding low flush toilets, water flow restrictors on shower heads and checking all water valves for leaks on a regular basis.