

## Good Practices for Using Liquid Scintillation Counters

### Liquid Scintillation Fluids

Liquid scintillation fluids that are considered environmentally safe are now commercially available. These fluids when used with radioactive material do not create a mixed waste as do toluene and xylene based scintillation fluids. The use of environmentally safe biodegradable scintillation fluid is required by EHS.

Although these liquid scintillation fluids are considered to be "biodegradable" and "environmentally safe", they may still present an environmental disposal concern and a contact hazard. Wear gloves and laboratory coats when handling these solvents. Unused hazardous scintillation fluid should be disposed of through the EHS Hazardous waste disposal program.

### Cerenkov Counting --- An Alternative to Liquid Scintillation Fluids

Some high energy beta emitting isotopes can be analyzed in an LSC without using any cocktail. The literature of several manufacturer's discusses counting high energy ( $E_{max} > 800$  keV) beta emitters without any fluid or only with a little water. This technique is called Cerenkov counting. When high energy beta particles travel faster than the speed of light relative to the medium they are traversing (e.g., water, etc.) Cerenkov radiation (i.e., light) is produced. Cerenkov radiation is the blue light that you see when you look into a reactor pool. Cerenkov radiation allows high energy beta emitting radionuclides to be analyzed with a liquid scintillation counter without using any cocktail. Phosphorus-32 is the only radionuclide in common use at PSU that can be analyzed using this method.

The links in the *RESOURCES* section of the radioactive material web page will take you to discussions on the theory of liquid scintillation operation and theory. A third file provides instructions on preparing your own quench curves to improve the accuracy of your data.