

## Bioassay Capabilities

Toxicological studies utilizing methods in bioassay have become a vital interest in waste site assessments. Bioassays can be used at waste sites for monitoring treatment system effluents, measuring synergistic effects of chemical mixing, or determining a "zone of influence" on affected water bodies from a toxic spill. Due to the nature of waste site investigation which often demands rapid determinations, the ERT has developed a scheme for conducting bioassays on site.

Two recently developed bioassay capabilities have been promising results in assessing relative toxicity. The first capability utilizes the Microtox System. The second is a newly designed Portable Bioassay Diluter System (see separate Factsheet).

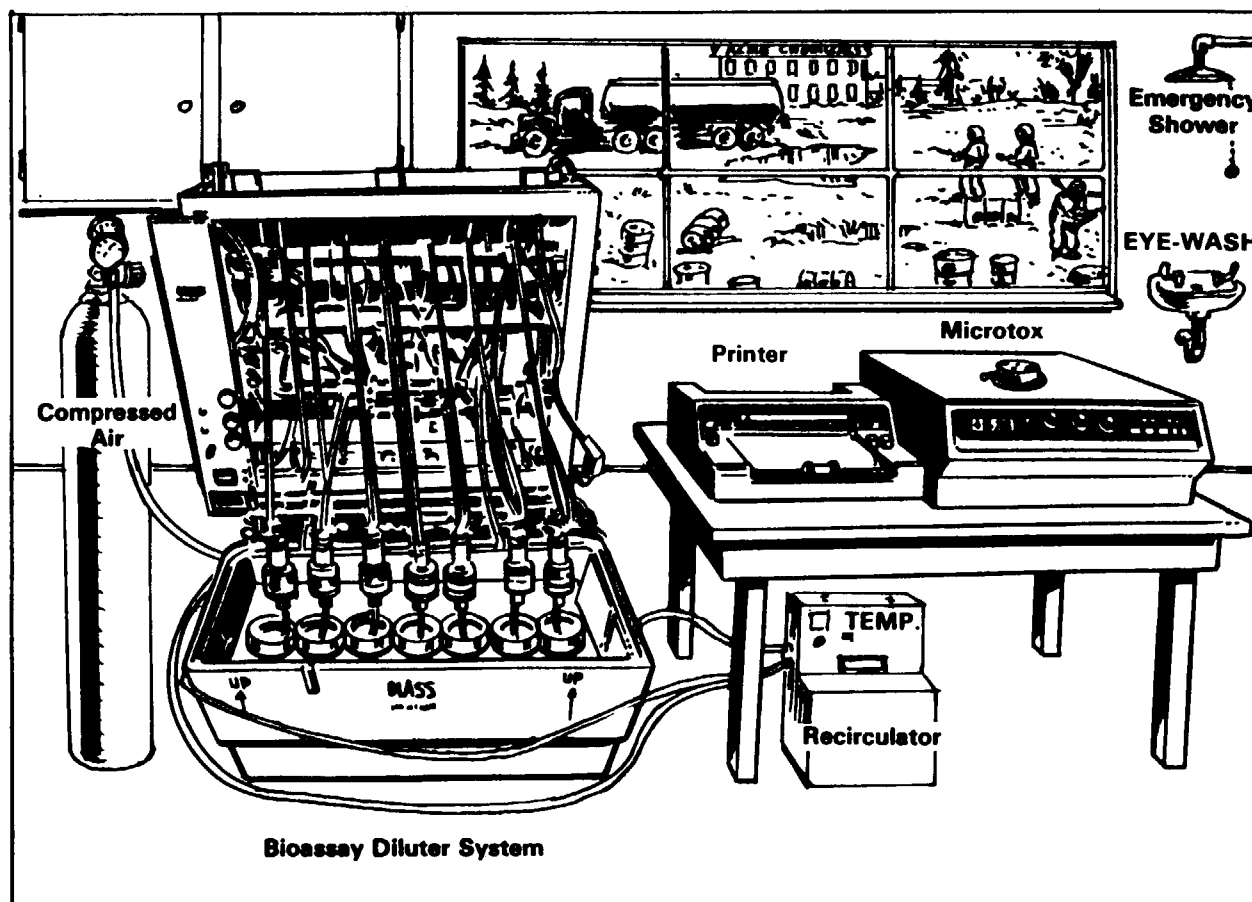
The application of these two systems is an attempt to achieve a more comprehensive determination of toxicological effects in site and spill related situations.

**Microtox System.** The Microtox is intended for use in determining acute toxicity in aqueous samples. Freeze dried bioluminescent bacteria are reconstituted, placed into cuvettes, and acclimated to optimal metabolic temperature inside the instrument's incubation chamber. Proportionate dilutions of toxic samples are prepared and transferred to the cuvettes containing bacteria. Just prior to the addition of the toxicant, luminescent light is measured by a photo multiplier-detector and recorded on a printer as well as displayed by an LED readout. After the toxicant is added, luminescent light measurements are recorded again usually after a five, then fifteen minute reaction period. Toxic responses are determined by a decrease in luminescent light.

Use of the Microtox is convenient due to its counter top size, simplicity of use and fast turn around time for results. The data obtained from this system is only a relative indicator of toxic effects upon a specific bacterial species. However, these results can be correlated to determine concentrations of the same toxicant to be used in bioassays conducted on higher aquatic organisms; a range finder in effect.

**Portable Bioassay Diluter System.** This diluter is comprised of two parallel series of volumetric glass vessels, one series of vessels which fills with toxicant, the other with dilution water. Upon filling, the system automatically mixes calibrated volumes of toxicant and diluent and delivers seven concentrations to respective acclimated chambers holding test organisms, i.e. juvenile fish, zooplankton.

The diluter system is designed to run continuously for up to 96 hours to provide statistical data from which EC50's can be determined. All components of the diluter system are compact for accessible transport.



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