

## Brookhaven Studies Chemical Characteristics of Radioactive Waste

# EPA FORCES LOW-LEVEL DISPOSAL SITE TO STOP ACCEPTING SCINTILLATION VIALS

**T**he low-level radioactive waste disposal site at the Hanford facility in Richland, WA, stopped accepting scintillation vials and liquids that contain toluene and xylene on October 28, 1985. US Ecology, Inc., which operates the site, took this action because it could not comply with conflicting regulations of the US Environmental Protection Agency (EPA) and the US Nuclear Regulatory Commission (NRC), explained Helen E. Burnett, assistant director for public affairs.

US Ecology notified the EPA in 1980 about chemical constituents in radioactive waste and requested guidance for complying with conflicting EPA and NRC regulations. When Congress passed the Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA) in 1984, however, some of the EPA regulations

that conflicted with NRC rules became mandated by law, forcing the issue to be resolved by Congress instead of the agencies.

The Hanford facility was the only commercial disposal site in the United States that accepted scintillation wastes as of October. According to Capt. William H. Briner, chairman of The Society of Nuclear Medicine's (SNM) Government Relations Committee, "If the determination is made that scintillation wastes are RCRA-controlled substances, it may open the door to the inclusion of more commonly used items, such as lead shielding, under RCRA regulations."

### Request for Congress to act

Representing the SNM and the American College of Nuclear Physicians (ACNP), Capt. Briner and Stanley J. Goldsmith, MD, director of nuclear medicine at the Mount Sinai Medical Center in New York, told two Senate subcommittees on October 8 that Congress needs to clarify the issue of overlapping and conflicting jurisdiction between the NRC and the EPA.

Dr. Goldsmith, who is also SNM president, testified on the importance of congressional approval for regional interstate low-level waste compacts. The nuclear medicine community has been concerned about the issue since Congress passed the Low-Level Radioactive Waste Policy Act of 1980 (see *Newsline*: Jan. 1985, pp. 1-6; Mar. 1985, p. 224; May 1985, pp. 453-454; June 1985, p. 563; Aug. 1985, pp. 845-847).

Also testifying before the Senate

subcommittees, Sherman Naymark, chairman and founder of the Quadrex Corp., said that his company offers a major solution to the disposal of scintillation wastes—decontamination and recycling.

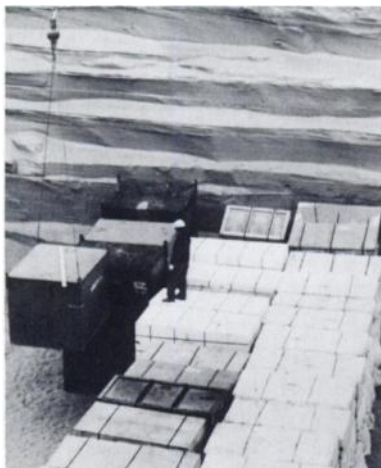
### Recycling scintillation wastes

Their operating facility, Quadrex HPS Inc., based in Gainesville, FL, handles approximately two-thirds of all the scintillation vials disposed in the United States, said Mr. Naymark. "Our decontamination and recycling methods are cost-competitive with current land burial methods, and significantly reduce the volume of waste sent to the commercial low-level waste disposal sites," he said.

(Quadrex also operates a recycling facility in Oak Ridge, TN, which handles radioactive metallic waste from nuclear power plants. "Had our Oak Ridge facility not been operating, over 800,000, instead of 600,000, cubic feet of metallics would have been buried in the United States in 1984," said Mr. Naymark.)

Local brokers, who handle packaging and labeling, deal directly with medical research facilities and ship scintillation wastes to Quadrex. "The medical facilities may not be aware of where many of the vials go, and may think that they are sent to Richland for burial," said Mr. Naymark.

"In the last few weeks, we have seen an increase in truck shipments from across the country through brokers. We are now handling over 1,000 35-gallon barrels of vials a month, or approximately 8,000 cubic feet," he added.



*Low-level waste being lowered into a trench at the Richland disposal site. (Courtesy of US Ecology)*

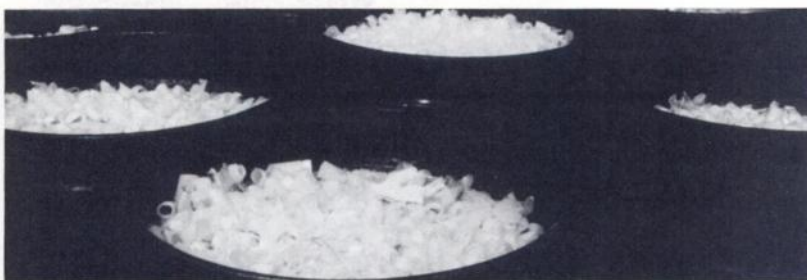
Bernhardt C. Warren, a health physicist at Quadrex's Gainesville plant, explained that the vials are shredded and the scintillation liquids extracted. "The solids, either glass or plastic, are treated according to EPA specifications to remove the adhering contaminants and then discarded in a sanitary landfill," said Mr. Warren.

The scintillation fluids are collected, tested for specific radioactivity, and then transported to another facility which uses the liquid as fuel for a large rotary kiln, explained Mr. Warren. The kiln produces concrete aggregate material from clay.

Scintillation vials are generated primarily by biomedical research facilities. The waste products are contaminated with carbon-14 (half-life = 5,730 years) and tritium (half-life = 12 years), which "comprise about 90 percent of the isotopes used in research," said Mr. Warren.

Mr. Naymark recommended that Congress encourage decontamination and recycling facilities to operate on a national scale. "Unrestricted flow of low-level radioactive waste to and from decontamination facilities, regardless of regional interstate compact boundaries, is a necessary condition to sustain the economic viability of such facilities," he said.

Last February under a contract



*Barrels filled with scintillation vials after shredding and treatment phase of recycling. (Courtesy of Quadrex HPS)*

with the NRC, Brookhaven National Laboratory in Upton, NY, surveyed over 200 radioactive waste generators to determine the chemical characteristics of low-level waste.

#### Brookhaven survey

Organic liquids appear to be the primary hazardous chemical constituent in low-level waste, and scintillation liquids and vials comprise the majority of these organic liquids.

Academic licensees produced the greatest volume of scintillation wastes, which accounted for 2.4 percent of all low-level waste reported in the survey. Questionnaires were sent to radiation safety officers at 195 non-fuel cycle generators and 44 nuclear power plants with a 36 percent response rate. Nonfuel cycle licensees included medical, academic, and nonutility industrial facilities.

Survey respondents accounted for 26.3 percent of the total volume of commercial low-level waste shipped for disposal in the United States in 1983, according to Stephen A. Romano of the NRC's division of waste management, who reported the preliminary findings at the Hazardous Materials Management Conference in Philadelphia last June.

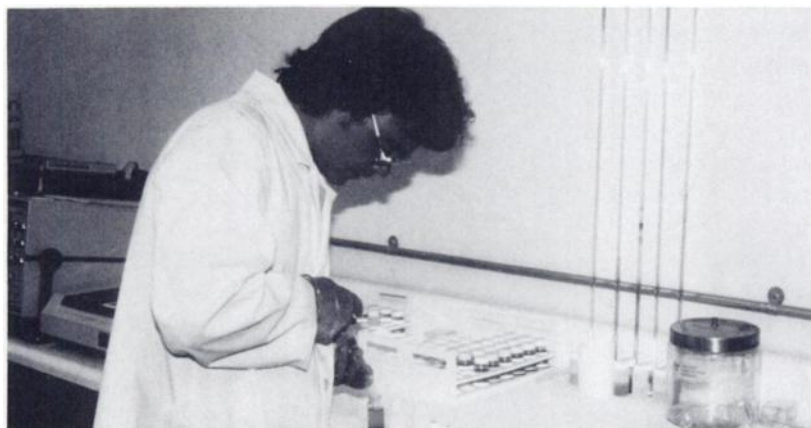
"The survey results are a reasonable representation of low-level wastes nationally," said Mr. Romano. "We were satisfied with the response rate for each group surveyed with the exception of the medical community," he added. To obtain more data from this group, the survey managers plan follow-up contacts.

The next step for the NRC, explained Mr. Romano, is to conduct tests to verify "whether or not the candidate wastes identified are hazardous in the RCRA sense" and to determine the concentrations of these hazardous chemical constituents.

#### Segregated waste

"One option under study by NRC staff is to require segregation of hazardous low-level wastes from other low-level wastes," said Mr. Romano. "Restriction of RCRA waste might be implemented through generator procedural controls and certification to the disposal site operator. Such restrictions, in our view, may be the clearest way to resolve uncertainties in regulatory and permit requirements," he added.

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*A sample of the recycled scintillation liquid is prepared for radiologic analysis, one step in the quality assurance program, before being shipped to the kiln operation. (Courtesy of Quadrex HPS)*