TEXAS APPROACH TO THE MANAGEMENT OF LOW LEVEL RADIOACTIVE WASTE AFTER 1992

Lawrence R. Jacobi, Jr., P.E.
General Manager
Texas Low Level Radioactive Waste Disposal Authority

ABSTRACT

The storage of low level radioactive waste at the site of generation or at a central storage site is becoming more important in Texas as the 1993 milestone date approaches. In addition to the practical considerations of waste form, the need for shielding, protection of the waste from natural elements, and architectural and structural aspects of the warehousing structure, other considerations include the regulatory process in Texas and the element of time. The Authority has alerted all Texas licensees that they should begin planning for long-term storage, should seek secure storage methods, or should seek alternatives to the use of radionuclides altogether. For many, it is too late to do anything reasonable.

THE SOURCE TERM

By 1993, Texas licensees will be producing about 52,000 cubic feet of radioactive waste containing 11,000 Curies of radioactivity. The two operating nuclear utilities in Texas will produce 63% of the total waste volume and well over 90% of the radioactivity. While the majority of the waste is solid, low-level radioactive waste, some, such as liquid scintillation vials and bulk liquid from research facilities and hospitals, is mixed waste. Most of this waste is shipped out-of-state and incinerated, but about 60 cubic feet of lead contaminated waste from nuclear power plants and other industrial plants requires disposal.

Fully 9,700 Curies of the projected radioactivity is contained in ion exchange resins and non-fuel reactor components from the operating nuclear power plants. Another 1,100 Curies is encapsulated in sealed sources. Although biological wastes such as animal carcasses contain less than 1 Curie of radioactivity, the physical form is problematic.

Large quantities of naturally occurring radioactive material, commonly called NORM, waste is produced in Texas by the oil and gas industry and by industrial plants such as the Rhone Poulenc chemical plant at Freeport. Although the total amount of radioactivity, primarily Ra-226, is small, the total physical volume is quite large. One estimate puts the total volume in excess of 1,300,000 cubic feet.

THE REGULATORY ENVIRONMENT

Texas is an Agreement State. As such, the Texas Department of Health has the responsibility for regulating the possession, storage and disposal of radioactive material. The Department's Bureau of Radiation Control is the designated radiation control agency.

The management of radioactive waste is spelled out in various parts of the Bureau's radiation control regulations. Part 21 sets out the general rules for occupational radiation exposure limits. This part also gives the process to follow for disposing of and the Curie amounts of selected radioisotopes that may be disposed of in a municipal landfill. Part 41 contains the rules for possession of radioactive materials, including the rules for transferring material to another licensee or to another location. Part 44 establishes a stringent process for any licensee who proposes to take radioactive waste from another for the purpose of storage or processing.

Nuclear power reactors are licensed by the U.S. Nuclear Regulatory Commission. Long term storage of low-level radioactive waste on site can be accomplished through a 10 CFR 50.59 analysis, or might require a 10 CFR 50.90 license amendment, depending on a variety of factors too lengthy to discuss here. Texas state law also requires nuclear power reactors to have at least five years of onsite storage capacity for low-level radioactive waste. A nuclear power utility that desired to share costs and liabilities by constructing a common waste storage facility on site would be required to obtain either a specific license from the U.S. Nuclear Regulatory Commission under 10 CFR 30, or a similar license from the Bureau of Radiation Control under Part 44 of their rules, depending on just exactly where the storage facility might be located.

Mixed waste is regulated by both the Environmental Protection Agency and the Texas Water Commission under the Resource Conservation and Recovery Act and various state laws and regulations, and by either the Texas Department of Health as an Agreement State or the U.S. Nuclear Regulatory Commission under the Atomic Energy Act, and related state laws and regulations.

Both the Bureau of Radiation Control and the Texas Water Commission impose limits on the time that waste can be stored onsite. The Texas Water Commission follows the lead of the Environmental Protection Agency in limiting onsite storage of hazardous chemicals to 90 days in the absence of complicated permit hearings. While the U.S. Nuclear Regulatory Commission allows onsite storage of radioactive waste for up to 5 years, the Bureau of Radiation Control has usually taken a more conservative road allowing storage for only up to 2 years. Storage for longer periods of time is possible, but the permit requirements are complicated and the process is lengthy.

PROPOSED STORAGE METHODS

The impending crisis in low level radioactive waste management has left Texas licensees scrambling for solutions to their waste management problems. What appears to be a simple matter of storing wastes for a few years until a long-term solution is worked out, is actually very complicated. Waste generators have to cope with interrelated considerations of waste form, lack of space, regulatory headaches, costs, public concern and media interactions.

Most dry active waste such as paper, towels, plastics and other common materials can be easily stored in conventional 55 gallon drums. If properly placed in a covered warehouse with some environmental controls, these wastes can be safely stored for decades. On the other hand, physically unstable waste such as animal carcasses, organic liquids and corrosive or pathogenic materials must be stabilized before they can be stored for any period of time. This means that wastes that are

usually quickly and inexpensively sent for immediate disposal must now be processed to increase their physical stability. Such processing methods include absorption of liquids in a solid matrix such as vermiculite or cement, incineration of biological wastes such as animal carcasses, and treatment of pathogenic, corrosive or organic waste to decrease its relative hazard.

After the waste has been treated to ensure its stability, it can be stored in a warehouse facility. Many licensees have given much thought to the type of storage facility that will be required. Large institutional licensees have begun the arduous process of designing special warehouses for storage of waste. Smaller licensees that don't have such resources have begun to search for companies that can provide such storage capability, or have commenced an orderly phaseout of their radioisotope operations.

Construction of storage warehouses requires consideration of health physics requirements such as curbed slabs to contain spills, monitored sumps, coatings to facilitate decontamination, fire suppression systems, ease of access, and shielding. Many of these features are mandated by the requirements of Part 44, but no comparable design guidance is provided for licensees who will be storing waste onsite. For persons who propose to store or process waste received from others, Part 44 requires a site suitability analysis of the regional geology and hydrology that rivals the requirements for a radioactive waste disposal site.

The University of Texas has proposed building a waste storage warehouse on one of its considerable land holdings in Texas. While the university has the expertise and the funds to build such a facility, the idea has been held up by the peculiarities of the licensing process. Because each school in the system has an individual license, the regulators have determined that a transfer of waste from one school to another would constitute "receiving waste from another" and would thus require that the institution apply for and be granted a part 44 license. The time and expense of securing such a license, or the difficulty of amending the individual licenses of each institution, has brought this proposal to a halt.

At least one commercial operation, Nuclear Sources and Services, Incorporated, in Houston has already built one warehouse specially designed for the long term storage of dry, active waste, and has secured adjacent property to build several more, if warranted. Costs for storing wastes at the NSSI facility have been quoted at $6.00 to $8.00 per drum per day.

Another well known waste processing firm has made inquiries about the possibility of building storage facilities and an incinerator in Texas near the site of the proposed low level radioactive waste disposal facility at Sierra Blanca. However, a state statutory requirement that prohibits importation of waste for storage or processing 24 months prior to the operation of the state's low level radioactive waste disposal site has confounded this proposal to the extent that it is not financially feasible.

At the nuclear reactor sites, planning for onsite storage has been ongoing for at least two years. The method of choice seems to be a combination of onsite storage modules and warehousing. Concerns about the storage of potentially unstable waste such as ion exchange resins or mixed wastes have been researched and proper analyses have been prepared to ensure the long term safety.

Nonreactor facilities such as universities, radiopharmaceutical manufacturers, and hospitals have some unique problems. Some universities have considered building large freezers to store animal carcasses indefinitely. Others have attempted to license small incinerators at individual campuses to incinerate most combustible materials. However, licensing complications and adverse public and media reaction have stalled these proposals to the extent that they are now either too expensive or too late. By using compaction, waste sorting, evaporation of liquids, storage for decay and careful preplanning to minimize waste generation, university and hospital licensees have been able to hold the line during a time of sharply rising costs. However, these methods will not completely erase the need for long term storage if disposal options are completely eliminated. Some will be forced to return to the storage methods of the late 1970's such as storage under tarps in parking lots of hospitals, storage on the roofs of buildings, and construction of portable buildings adjacent to manufacturing buildings for waste storage. These were judged by the local media and local officials to be unacceptable then, and opinions probably have not changed in this decade.

Some industries such as radiopharmaceutical labs, hospitals and universities will be able to take advantage of the Texas BRC, or below regulatory concern, rule set out in section 21.307 of the Bureau of Radiation Control rules. This rule allows persons to dispose of certain radioisotopes with a half of under 300 days in municipal landfills. Despite the potential to save considerable costs in disposal, some eligible licensees have not taken advantage of the rule. When 1993 arrives, and other disposal options are not available, there should be much more interest.

At least one chemical plant operator has suggested that he will seek to move his operations elsewhere. He plans to move by the end of 1992 to either a state that can provide for disposal of his NORM waste, or to a foreign country where environmental regulations are more reasonable. The net effect of such a move will be a loss of several hundred jobs and a payroll in the millions. In the medical industry, alternatives to the use of radioisotopes such as ultrasound, magnetic resonance imaging, or machine produced x-ray procedures have been urged.

CONCLUSION

As the 1993 milestone rapidly approaches, licensees in Texas are scrambling to cope with the technical, regulatory and public interest aspects of onsite storage. Consolidation of waste at central facilities is not a reasonable option because it is too late to obtain all the permits needed to complete construction by the end of 1992. Onsite storage will be complicated by the difficulties of ensuring physical stability of the waste. Expensive options such as the construction and operation of freezers for animal carcasses and other biological wastes will hurt already strapped research budgets. The potential for incidents such as the failure of a freezer's refrigeration unit at a major university medical school, an explosion of a waste container due to the buildup of explosive gases, or a leak caused by corrosive wastes will be ammunition for the media to point to the failures and the insanity of the "nuclear option."

There is the possibility that the regulators will move to promulgate emergency rules or orders to deal with the impending crisis. And, there is the possibility that the operating waste disposal sites will voluntarily remain open to receive out-of-state waste for disposal.

But, for now, the future is bleak.