

10. What Is Low-Level Radioactive Waste?

In the United States, radioactive waste is divided into five categories:

- high-level radioactive waste;
- uranium milling residues;
- radioactive waste with greater than specified quantities of elements heavier than uranium;
- naturally occurring radioactive materials, or radioactive materials produced in an accelerator; and
- low-level radioactive waste.

This Fact Sheet defines low-level radioactive waste, gives examples of low-level waste, discusses classes of low-level waste, and provides information on low-level waste that need to be disposed of.

► Definition of Low-Level Radioactive Waste

Low-level radioactive waste is **NOT** high-level radioactive waste, which is spent nuclear fuel or highly radioactive waste produced if spent fuel is reprocessed. Spent nuclear fuel is used fuel from nuclear power plants. If the spent fuel is reprocessed, everything left over after the reusable material has been recovered is classified as high-level radioactive waste. The United States is not presently reprocessing spent nuclear fuel.

Low-level radioactive waste is **NOT** uranium mill residues, or tailings that remain after uranium has been removed from the ore that was mined from the earth.

Low-level radioactive waste is **NOT** radioactive waste that contains more than specified concentrations of elements heavier than uranium, which are known as transuranics.

Nor is low-level radioactive waste naturally occurring radioactive material or radioactive material produced in an accelerator. These materials are not under the jurisdiction of the

federal Nuclear Regulatory Commission (NRC) and cannot and will not be handled by New Jersey's radioactive waste disposal facility. The Department of Environmental Protection has the jurisdiction for these materials in New Jersey.

Low-level radioactive waste is defined as any radioactive waste that does not belong in any of the above categories. As a result, low-level waste is a very broad category containing many different types of waste and a wide range of radioactive content.

► Some Examples of Low-Level Radioactive Waste

Low-level radioactive waste is generated at facilities such as nuclear power plants, hospitals, and research institutions. It includes radioactive materials used in various processes as well as supplies and equipment that have been contaminated with radioactive materials. Low-level waste can include:

- ion exchange resins and filter materials used to clean water at a nuclear power plant;
- contaminated hand tools, components, piping, and other equipment from nuclear power plants and other industries;
- research equipment from laboratories where radioactive materials are used;
- shoe covers, lab coats, cleaning cloths, paper towels and other supplies used in an area where radioactive material is present;
- containers, cloth, paper, fluids, and equipment which came in contact with radioactive materials used in hospitals to diagnose or treat disease;
- filters from sampling devices used to test for airborne radioactive contamination; and
- carcasses of animals treated with radioac-

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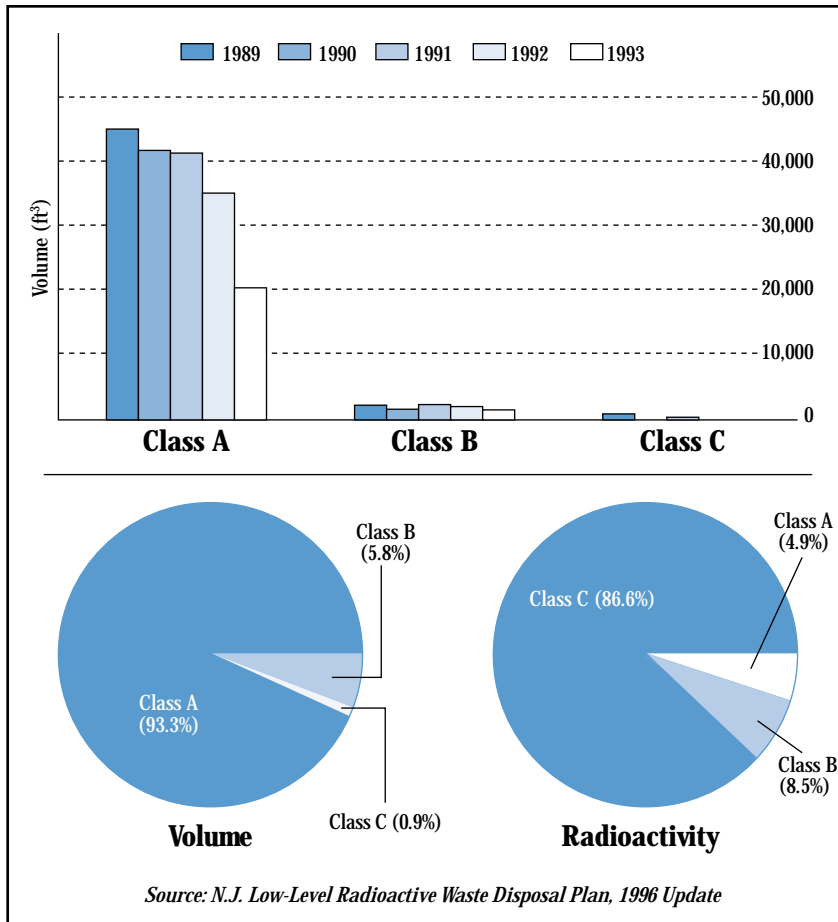


Figure 1. Low-Level Radioactive Waste Disposed by New Jersey Generators from 1989-1993, by Waste Class.

radioactive materials used in medical or pharmaceutical research.

It should be noted that no liquid waste will be accepted at New Jersey's low-level radioactive waste disposal facility.

The federal government is responsible for disposal of low-level waste generated by the U.S. Department of Energy. This includes wastes from the atomic weapons program and from the decommissioning of nuclear reactors which power many naval vessels. The states are responsible for disposal of low-level waste from nuclear power plants, industries, hospitals, research institutions, veterans' hospitals and non-weapons related government facilities.

The concentration of radioactive material in low-level radioactive waste can vary. Precautions that must be taken when handling low-level waste depend on the radionuclides present and their concentra-

tions. Because of this, low-level waste is divided into four classes with specific regulations for each class.

► **Classes of Low-Level Radioactive Waste**

The four classes of low-level radioactive waste are Class A, Class B, Class C, and Greater Than Class C. The first three are classes of low-level radioactive waste generally acceptable for near-surface disposal and are defined in the Code of Federal Regulations, Title 10, Part 61 (10CFR61). Section 10CFR61.55 lists the radioactivity concentration limits of specific radioactive materials allowed in each low-level waste class. Radioactive waste not meeting the criteria for these three classes is not considered low-level radioactive waste generally acceptable for near-surface disposal and is known as Greater Than Class C.

Class A low-level radioactive waste contains the lowest radioactive concentration and constitutes the vast bulk of waste, as can be seen in Figure 1. Class B contains the next lowest radioactive concentration. Class C waste has the highest radioactive concentration allowed to be disposed of in a low-level waste disposal facility. Because the radioactive concentration in Greater Than Class C material exceeds the limits for Class C waste specified in 10 CFR 61.55, all Greater Than Class C waste is the responsibility of the federal government and must be disposed of in a geologic repository such as the one planned for Yucca Mountain, Nevada. No Greater Than Class C waste can be accepted in New Jersey's disposal facility.

► **Amount of Low-Level Radioactive Waste Disposed of**

The amount of low-level radioactive waste is usually described in one of two ways. One is to give the volume of the waste in cubic feet or cubic meters; the other is to specify the radioactivity, which is a measure of the rate at which radiation is given off by the material in the waste. Radioactivity is measured in curies.

The volumes and activities of New Jersey low-level waste disposed of in New Jersey for 1989 through 1993 are illustrated in Figure 2, by generator category.

The vast majority of commercial low-level radioactive waste, by volume, is Class A; this large volume contains a small fraction of the radioactivity. Class C waste, on the other hand, is generally less than a few percent of the volume but contains the majority of the radioactivity. The volumes of Class A, B and C low-level waste disposed of by New Jersey generators from 1989-1993 is represented in Figure 1. The bar graph shows the volume each year, in each category. The pie chart shows that overall, 93 percent of the volume is Class A, while 87 percent of the radioactivity is Class C.

It is important to note that the volume and activity of low-level radioactive waste generated and shipped in New Jersey and in the United States each year can vary significantly, depending upon the operations conducted by the waste generators during that year.

► For More Information

If you would like to read more about low-level radioactive waste, some of the references listed below may be helpful.

- 1995 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites, DOE/LLW-224, National Low-Level Radioactive Waste Management Program, EG&G Idaho, Inc., Idaho Falls, 1996. (Similar volumes are available for 1986-1994 data.)

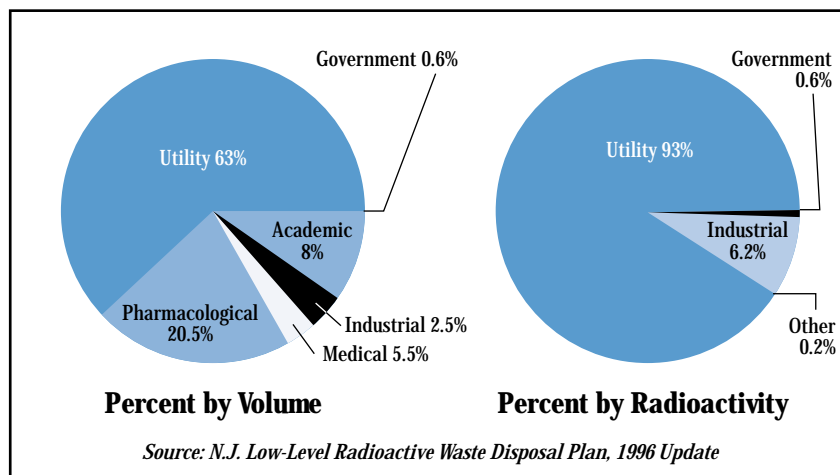


Figure 2. Volume and Activity of Commercial Low-Level Radioactive Waste for 1989-1993, by Generator Capacity

- Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste", 1992.
- Edward L. Gershey et.al., *Low-Level Radioactive Waste From Cradle to Grave*, Van Nostrand Reinhold, New York, 1990.
- Isabelle P. Weber and Susan D. Wiltshire, *The Nuclear Waste Primer: A Handbook for Citizens*, The League of Women Voters Education Fund, Nick Lyons Books, New York, 1985.
- Michael E. Burns, ed., *Low-Level Radioactive Waste Regulation: Science, Politics and Fear*, Lewis Publishers, Inc., Chelsea, Michigan, 1988.
- Public Law 99-240, "Low-Level Radioactive Waste Policy Amendments Act", 1985.
- New Jersey Low-Level Radioactive Waste Disposal Plan Update, April 1996.
- Raymond L. Murray, *Understanding Radioactive Waste*, Batelle Press, Fourth Edition, 1994.

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