



## ***Low-Level Radioactive Waste Management—A Primer***

January 10, 2023

### **Introduction**

Advocates for Responsible Disposal in Texas (ARDT) has developed this primer to be an introduction to the issue of low-level radioactive waste (LLRW) management. This document is intended to clarify what LLRW is, and, just as importantly, what it is *not*. It also identifies key regulatory players and attempts to answer common questions. In developing this information, ARDT relied on decades of experience, as well as publicly available documents developed by federal and state agencies, such as the Nuclear Regulatory Commission (NRC) and the Texas Commission on Environmental Quality (TCEQ). ARDT hopes that this information clarifies these issues and supports the development of sound policy for the management of LLRW.

### **Why are radioisotopes important?**

Radioisotopes are used in medicine, prescription drug tests, medical instrument sterilization, and disease treatment. Radioisotopes are also important in industrial applications such as food processing, manufacturing and oil and gas exploration. No matter the source, once these radioisotopes have served their purpose, they become LLRW.

### **What is radioactive waste?**

Radioactive waste is divided into several categories, including:

- *High-level radioactive waste*, which is the highly radioactive materials produced as a by-product of the reactions inside nuclear reactors. It includes spent nuclear fuel. Such waste can take hundreds to thousands of years to decay to safe levels.
- *Uranium mining and milling residues*, which are generated during uranium processing.

- *Waste incidental to reprocessing* refers to less radioactive waste byproducts that result from reprocessing spent nuclear fuel, which the U.S. Department of Energy distinguishes from high-level radioactive waste.
- *Transuranics*, which are radioactive elements that are heavier than the element uranium.
- *Byproduct material*, which includes the tailings or wastes produced by the fabrication of nuclear fuel, as well as material that has been made radioactive.
- *Naturally occurring radioactive materials (NORM)*, which are radioactive elements that are naturally present in the Earth's crust.
- *Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)*, which are naturally occurring radioactive materials (NORM) that have been concentrated by a technological process.

*Low-Level Radioactive Waste (LLRW)* is not any of the forms of waste described above. This makes it an extremely broad category of wastes that is best illustrated through examples. These include:

- materials known as ion exchange resins and filter materials used to clean water at a nuclear power plant;
- sealed radioactive sources used in industrial and medical facilities for such diverse things as manufacturing control, cancer treatment, or oil and gas exploration and production;
- contaminated hand tools, components, piping, and other equipment from nuclear power plants and other industries;

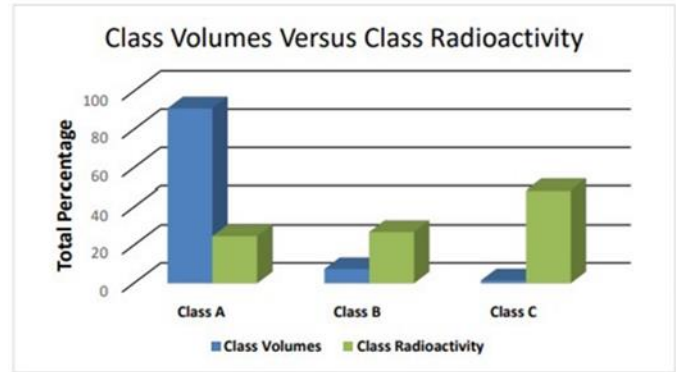
- research equipment and animals from laboratories where radioactive materials are used;
- shoe covers, lab coats, cleaning cloths, paper towels, and other supplies used in an area where radioactive material is present; and
- containers, cloth, paper, fluids, and equipment that came in contact with radioactive materials used in hospitals to diagnose or treat disease.

### What are the Classes of LLRW?

You will frequently hear about the different “classes” of LLRW. The NRC Nuclear Regulatory Commission has classified LLRW according to its hazard. There are four classes based on the concentrations of radioactive material:

- Class A contains the lowest radioactive concentration and constitutes about 91 percent of the volume of LLRW generated in the United States, but comparatively little in the way of radioactivity.
- Classes B and C make up the remaining 9 percent of the volume of LLRW, but are more radioactive, accounting for 75 percent of the total radioactivity of all LLRW.
- Greater Than Class C, or GTCC, Waste, which is more radioactive than Class C waste and must be handled differently. GTCC makes up less than one percent of the volume. Currently, there are no facilities in the United States authorized to accept GTCC LLRW for disposal. GTCC Waste is being stored at various facilities in the United States awaiting a disposal pathway. GTCC makes up less than one percent of the total LLRW volume nationally.

For reference, the following figure is from a TCEQ report to the 87th Legislature and shows the relative volumes and radioactivity of Classes A, B, and C waste.



### How is LLRW Disposal Regulated in Texas?

Texas is referred to as an “Agreement State,” meaning the NRC has discontinued its regulatory authority in Texas with respect to LLRW Waste and has authorized Texas to license the processing and disposal of LLRW in Texas, provided the state maintains rules that are compatible with the NRC’s rules. The TCEQ is the Texas agency that has primary responsibility for regulating the processing and disposal of LLRW. The Texas Department of State Health Services also plays a regulatory role, overseeing the processing and storage of LLRW generated by its licensees, while the waste is located at the site where it is generated. Examples would include medical or industrial facilities.

### Who Controls the Flow of LLRW Into Texas?

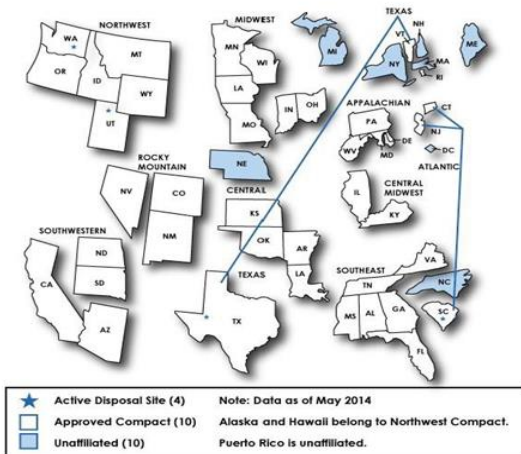
The Texas Low-Level Radioactive Waste Disposal Compact Commission (TLLRWDC) regulates the importation into the Texas Compact for disposal of certain LLRW from states other than Vermont and Texas (more on that below). The Commission also regulates exports of LLRW generated in Texas or Vermont that will not be disposed of at the Texas Compact facility. TLLRWDC is also responsible for contingency planning in the event the Compact Waste Facility (CWF) is closed. LLRW originating outside the United States or its territories may not be imported into the State of Texas for disposal. Waste originating in Texas may be exported to foreign countries in accordance with the rules of the NRC.

## What is the Texas Low-Level Radioactive Waste Disposal Compact?

Beginning in the 1980s, the United States Congress determined that the most effective way to manage LLRW among the states was through the development of cooperative agreements, called interstate compacts. The States of Texas, Maine, and Vermont created one such compact, though Maine later withdrew.

Today, the Texas/Vermont compact is one of 10 such interstate compacts in the United States (see NRC figure below). Texas, in turn, hosts the compact’s disposal facility (CWF), which is located in Andrews County, northwest of Midland and Odessa. LLRW generated from those two states can be disposed of in the CWF. Additionally, as noted above, other states and compacts can obtain permission from TLLRWDC to import their LLRW for disposal in the CWF. The TLLRWDC closely monitors imports to ensure adequate capacity remains for Texas and Vermont generators.

### Low-Level Waste Compacts



## Who Operates Texas’ Compact Waste Facility?

The CWF is operated by Waste Control Specialists (WCS). The CWF is licensed by the TCEQ under License Number R04100. The license authorizes treatment, processing, and near-surface land disposal of LLRW, and TENORM produced by the oil and gas industry. The current license expires September 10, 2024 and can be renewed. WCS can accept only Class A, B, and C LLRW.

WCS also operates other facilities at the site you may hear about. For example, they are also permitted by TCEQ to operate an industrial and hazardous waste disposal cell under the Federal Resource Conservation and Recovery Act, or RCRA. Some Class A LLRW can qualify for disposal in the RCRA facility after careful analysis by WCS. WCS also operates a “Federal Facility,” for waste produced by certain agencies of the federal government and a “Byproduct Facility” for waste produced by the decommissioning of the Ohio-based Fernald Feed Materials Production Center.

## Are there other LLRW Disposal Facilities in the United States?

There is a total of four (4) operating LLRW disposal facilities in the United States—WCS; Energy Solutions’ Barnwell LLRW disposal facility in Barnwell, South Carolina; U.S. Ecology in Richland, Washington; and Energy Solutions’ disposal facility in Clive, Utah. WCS can accept all three Classes of waste from all over the country, subject to the review and approval of the TLLRWDC. The other sites are limited either by the Class of waste they can accept and/or from where it is generated.

### Locations of Low-Level Waste Disposal Facilities

The four active, licensed low-level waste disposal facilities are located in Agreement States (see map). Additional information about the facilities may be found at the Web sites maintained by the respective Agreement States.

- EnergySolutions Barnwell Operations, located in Barnwell, South Carolina  
Currently, Barnwell accepts waste from the Atlantic compact states (Connecticut, New Jersey, and South Carolina). Barnwell is licensed by the State of South Carolina to dispose of Class A, B, and C waste.
- U.S. Ecology, located in Richland, Washington  
Richland accepts waste from the Northwest and Rocky Mountain compacts. Richland is licensed by the State of Washington to dispose of Class A, B, and C waste.
- EnergySolutions Clive Operations, located in Clive, Utah  
Clive accepts waste from all regions of the United States. Clive is licensed by the State of Utah for Class A waste only.
- Waste Control Specialists (WCS), LLC, located near Andrews, Texas  
WCS accepts waste from the Texas Compact generators and outside generators with permission from the Compact. WCS is licensed by the State of Texas to dispose of Class A, B, and C waste.



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**What is ARDT?**

Advocates for Responsible Disposal in Texas, otherwise known as ARDT, is an organization representing the generators of LLRW. ARDT is supported by Texas' two nuclear power plants—Comanche Peak Nuclear Power Plant in Glen Rose, and the STP Nuclear Operating Company near Bay City—as well as by the health physics, medical, and university (primarily The University of Texas at Austin and Texas A&M University) research communities.

ARDT's overarching mission, consistent with the policy of the State of Texas, is to help LLRW generators ensure the safe and economical disposal of low-level radioactive waste; and reduce regulatory uncertainty. To those ends, ARDT and the generators work closely and collaboratively with the state's leadership, the Legislature, and local stakeholders.

We also work with WCS. The WCS site is well-suited for the safe disposal of LLRW and is the first choice for generators in the State of Texas.

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