



STATE OF MICHIGAN  
 DEPARTMENT OF  
 ENVIRONMENT, GREAT LAKES, AND ENERGY  
 LANSING




GRETCHEN WHITMER  
 GOVERNOR

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VIA EMAIL

TO: Governor Gretchen Whitmer  
 Senate Environmental Quality Committee Members  
 Senate Natural Resources Committee Members  
 House Natural Resources and Outdoor Recreation Committee Members

FROM: Liesl Eichler Clark, Director 

DATE: October 24, 2022

SUBJECT: Report on the Low-Level Radioactive Waste 2021 Survey

In accordance with Section 18a of the Low-Level Radioactive Waste Authority Act, 1987 PA 204, as amended, following is the Department of Environment, Great Lakes, and Energy’s (EGLE) report on the Low-Level Radioactive Waste (LLRW) 2021 Survey. Generators of LLRW are required to report annually to EGLE’s Low-Level Radioactive Waste Authority certain information on the volume, type, and activity of the LLRW produced. This report is a summary of the information submitted by generators for LLRW generated in calendar year 2021.

Summary:

In the calendar year of 2021, 22 facilities reported the generation of waste requiring disposal in a licensed LLRW facility. Fifteen facilities reported the disposal of waste off-site during 2021. The following tables summarize the waste generated and disposed in 2021.

Table 1: Waste Generated and Disposed by Facility Type

| Type of Facility | Number of Reporting Facilities in 2021 Generator (Disposer) | Volume of LLRW Generated in 2021 (ft <sup>3</sup> ) | Volume of LLRW Disposed in 2021 (ft <sup>3</sup> ) |
|------------------|---|---|--|
| Utility          | 3 (3)   | 51,670  | 19,893   |
| Academic         | 9 (4)   | 662   | 740  |
| Industry         | 9 (7)   | 1,822   | 1,826  |
| Medical          | 1 (1)   | 20  | 1  |
| Government       | 0 (0)   | 0   | 0  |
| <b>TOTAL</b>     | <b>22 (15)</b>  | <b>54,174</b>                                       | <b>22,460</b>                                      |

Table 2: Waste Generated by Waste Classification

| Waste Class | Number of Reporting Generator Facilities in 2021 | Volume of LLRW Generated in 2021 (ft <sup>3</sup> ) |
|-------------|--|---|
| Class A     | 22   | 53,954  |
| Class B     | 4  | 204   |
| Class C     | 1  | 15  |

All waste-reporting facilities generated Class A waste, Class B waste was generated by utilities and industrial facilities, and all Class C waste was generated by utility companies.

LLRW is categorized by Classes A, B, and C in Title 10 of the Code of Federal Regulations, Part 61, Licensing Requirements for Land Disposal of Radioactive Waste, Subsection 61.55. The classification of LLRW is dependent upon the waste's isotopic composition and abundance, as well as the waste's chemical and physical stability. Class A waste is usually segregated from other waste classes at the disposal site. Class B waste is subjected to stricter requirements on waste packaging to ensure stability after disposal. Class C waste must not only meet more rigorous requirements on waste packaging to ensure stability, but also requires additional measures at the disposal facility to protect against inadvertent intrusion.

Challenges:

Many survey respondents cited challenges with the cost associated with disposal of LLRW. Others cited challenges in obtaining appropriate packing material, acceptance of certain sealed sources, and getting brokers to facilitate the transfer of material to disposal sites. The Palisades Nuclear Generating Station ended commercial operation in 2022, which will eventually lead to a large volume of waste generation. One method for dealing with large volumes involves monitoring waste by technicians using standard survey instruments or through automated monitoring and conveyance systems (e.g., Green Is Clean). Volumetric assay is performed on the waste, verifying it is free of contamination and can be released as non-radioactive.

The Green Is Clean Program was utilized in 2006 during the decommissioning of the Big Rock Point Nuclear Power Plant. By separating clean material and disposing of the non-impacted material in a Type II solid waste landfill, capacity at LLRW landfills is preserved for the waste that only they are designed to handle. This same program was utilized by D.C. Cook Nuclear Power Plant in 2018. The volume of LLRW was reduced from 19,851 cubic feet to 4,369 cubic feet. There are currently only four licensed LLRW landfills in the United States; only three accept waste from Michigan.

Waste Streams:

Survey respondents were asked to provide the volume and activity for the different types of wastes that were generated in 2021. Table 3 displays the volume and activity for the various waste types or “streams.”

Table 3: Generated Volumes and Activities by Waste Stream

| Waste Stream                          | Volume (ft <sup>3</sup> ) | Percent of Total Volume | Activity (millicuries) | Percent of Total Activity |
|---------------------------------------|---------------------------|-------------------------|------------------------|---------------------------|
| Dry Active Waste                      | 50,920                    | 94.0%                   | 842,876                | 77.8%                     |
| Medical Generators                    | 0                         | 0.0%                    | 0                      | 0.0%                      |
| Aqueous Liquids                       | 1,381                     | 2.6%                    | 296                    | <0.1%                     |
| Organic Liquids (Not Oils)            | 15                        | <0.1%                   | 168                    | <0.1%                     |
| Oils                                  | 100                       | 0.2%                    | 397                    | <0.1%                     |
| Animal Carcasses                      | 5                         | <0.1%                   | 3                      | <0.1%                     |
| Biological Waste (Excludes Carcasses) | 100                       | 0.2%                    | 78                     | <0.1%                     |
| Ash                                   | 0                         | 0.0%                    | 0                      | 0.0%                      |
| Activated Equipment or Shielding      | 1,174                     | 2.2%                    | 9                      | <0.1%                     |
| Contaminated Hazardous Material       | 20                        | <0.1%                   | 32                     | <0.1%                     |
| Rubble, Sand, Soil, Etc.              | 10                        | <0.1%                   | 3                      | <0.1%                     |
| Sludge                                | 0                         | 0.0%                    | 0                      | 0.0%                      |
| Evaporator Concentrates               | 0                         | 0.0%                    | 0                      | 0.0%                      |
| Air Filter Media, Cartridges          | 0                         | 0.0%                    | 0                      | 0.0%                      |
| Liquid Filter Media, Cartridges       | 6                         | <0.1%                   | 1,829                  | 0.2%                      |
| Ion Exchange Resins                   | 403                       | 0.7%                    | 236,660                | 21.8%                     |
| Sealed Sources                        | 39                        | 0.1%                    | 1,250                  | 0.1%                      |
| TOTAL                                 | 54,173                    | 100%                    | 1,083,601              | 100%                      |

Historical Trends:

Figures 1 through 3 show the changes in disposal of LLRW over time.

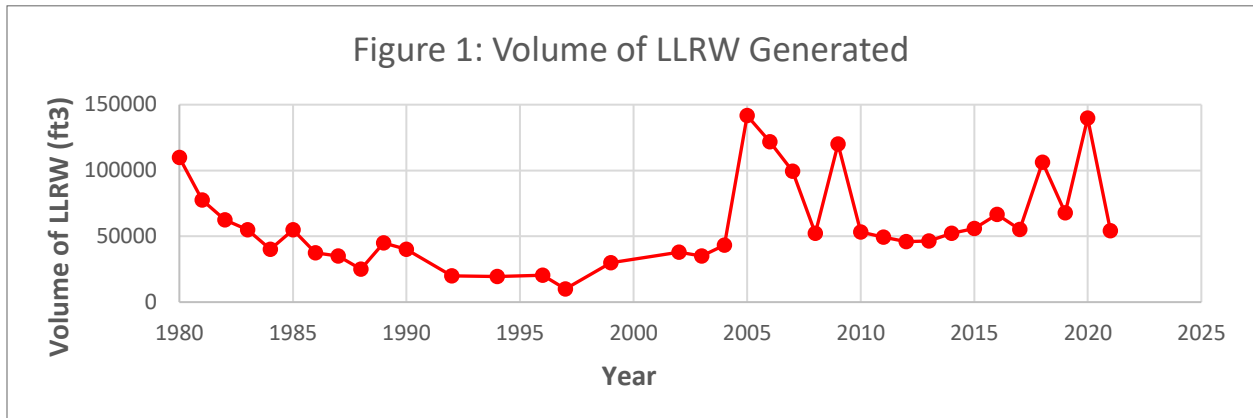


Figure 1 shows the annual volume of LLRW generated since 1980. The spikes in LLRW generation are from the decommissioning activities at Consumers Energy’s Big Rock Point Nuclear Power Plant from 2005 to 2007 and refurbishing the torus at DTE Energy’s Enrico Fermi Unit 1 Nuclear Generating Station in 2009. The primary generators of LLRW are utilities operating nuclear power plants.

Previous LLRW reports have shown charts of historical trends in the volume of material generated and disposed. Upon review of previous reports and submitted data, it was determined that some of the charts were reported erroneously. Therefore, Figure 2 has been added to this year’s report to demonstrate the trends and differences between waste volumes generated and disposed.

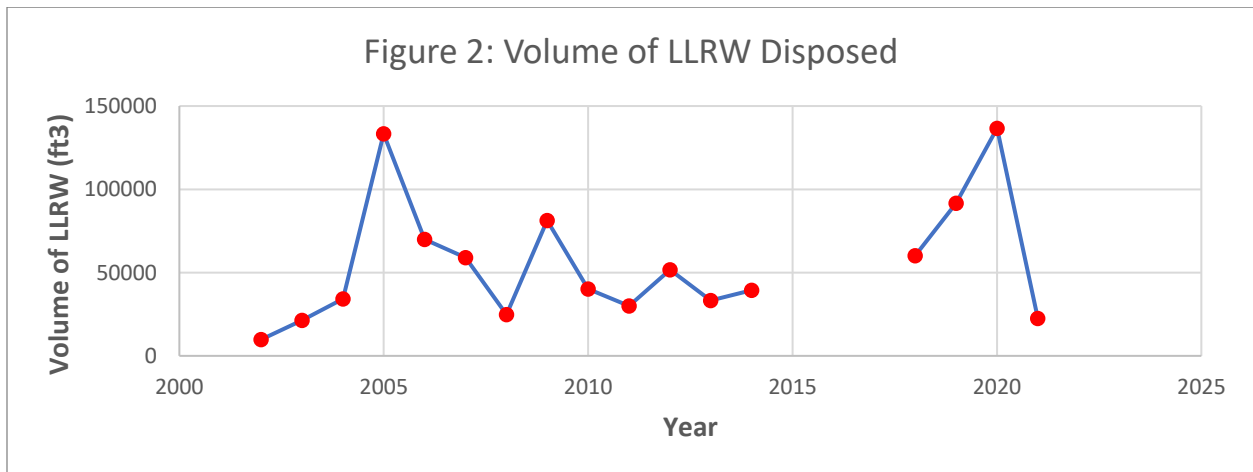
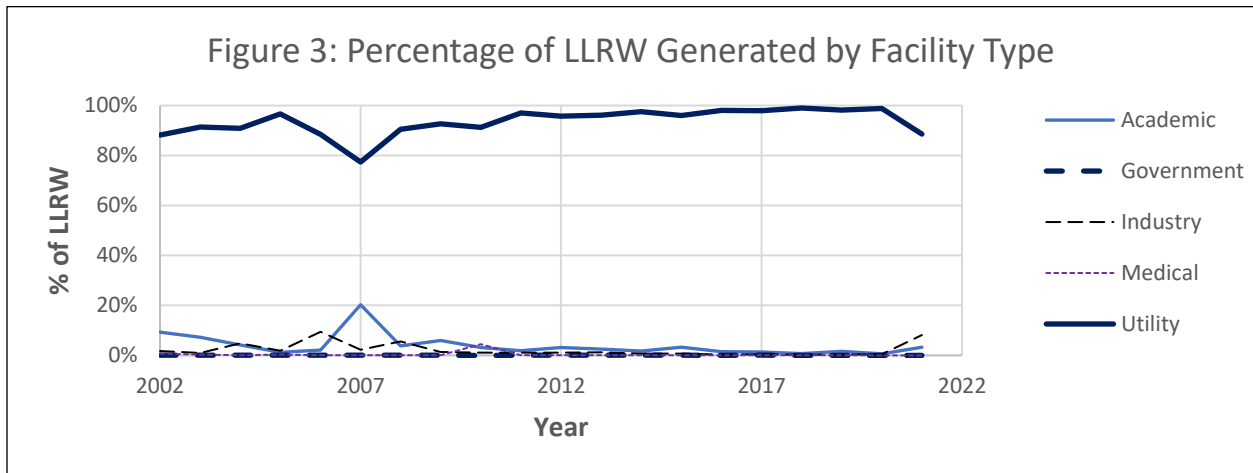


Figure 2 displays the amount of LLRW that survey respondents have reported from 2002-2021. Disposal volumes were not surveyed for from 2015-2017.



As shown in Figure 3, utilities have accounted for greater than 90 percent of the volume generated in 18 of the last 20 years. Utilities accounted for approximately 89 percent of the volume of LLRW generated in 2021. The remainder is from facilities that routinely dispose of small amounts of waste and facilities needing a one-time disposal. The academic spike in 2007 was due to the decommissioning of the University of Michigan’s Ford Reactor.

If you need further information, please contact T.R. Wentworth II, Manager, Radiological Protection Section, Materials Management Division, at 517-915-8881; or you may contact me at 517-512-5992.

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