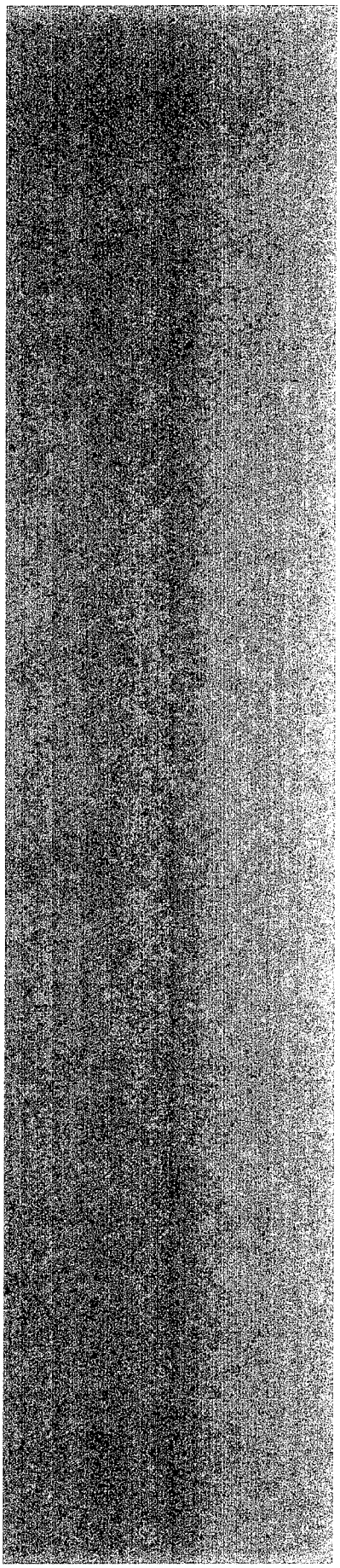

New York State Low-Level Radioactive Waste Status Report for 1999

June 2000

New York State Energy Research and Development Authority

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New York State Low-Level Radioactive Waste Status Report for 1999
New York State Energy Research and Development Authority - June 2000

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 2000	

4. TITLE AND SUBTITLE
New York State Low-Level Radioacitve Waste
Status Report for 1999

5. FUNDING NUMBERS

6. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
NYS Energy Research and Development Authority
Corporate Plaza West, 286 Washington Avenue Extension
Albany, NY 12203-6399
John P. Spath, Program Manager

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

13. ABSTRACT ***(Maximum 200 words)***

This report summarizes data on low-level radioactive waste (LLRW) generated in new York State. It is based on reports from generators that must be filed annually with the New York State Energy Research and Development Authority (NYSERDA) and on data from the U.S. Department of Energy (U.S. DOE).

The New York State Low-Level Radioactive Waste Management Act (State Act) requires LLRW generators in the State to submit annual reports detailing the classes and quantities of waste generated. This is the 14th year generators have been required to submit these reports to NYSERDA.

The data are summarized in a series of tables and figures. There are four sections in the report. Section 1 covers volume, activity, and other characteristics of waste shipped for disposal in 1999. Section 2 summarizes volume, activity, and other characteristics of waste held for storage as of December 31, 1999. Section 3 shows historical LLRW generation and includes generators' projections for the next five years. Section 4 provides a list, by county, of all facilities from which 1999 LLRW reports were received.

14. SUBJECT TERMS			15. NUMBER OF PAGES 16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

New York State Low-Level Radioactive Waste Status Report for 1999

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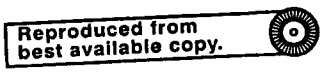

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New York State Low-Level Radioactive Waste Status Report for 1999
New York State Energy Research and Development Authority - June 2000

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INTRODUCTION

This report summarizes data on low-level radioactive waste (LLRW)[1] generated in New York State.[2] It is based on reports from generators that must be filed annually with the New York State Energy Research and Development Authority (NYSERDA) and on data from the U.S. Department of Energy (U.S. DOE).

The New York State Low-Level Radioactive Waste Management Act (State Act) requires LLRW generators in the State to submit annual reports detailing the classes and quantities of waste generated. This is the 14th year generators have been required to submit these reports to NYSERDA.

The data are summarized in a series of tables and figures. There are four sections in the report. Section 1 covers volume, activity, and other characteristics of waste shipped for disposal in 1999. (Activity is the measure of a material's radioactivity, or the number of radiation-emitting events occurring each second.) Section 2 summarizes volume, activity, and other characteristics of waste held for storage as of December 31, 1999. Section 3 shows historical LLRW generation and includes generators' projections for the next five years. Section 4 provides a list, by county, of all facilities from which 1999 LLRW reports were received.

Volume is presented in cubic meters, and activity is presented in gigabecquerels (GBq) or megabecquerels (MBq). These units have been adopted to be consistent with U.S. Nuclear Regulatory Commission uniform national LLRW manifest requirements. The Conversions for Units table [see p. 39] and footnotes to the relevant tables provide information for converting the data to the previously used units of cubic feet and curies.

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[1] Low-level radioactive waste is one category of waste produced through processes that use radioactive materials. In the U.S., radioactive wastes are classified according to a number of different categories by federal law and U.S. Nuclear Regulatory Commission regulations.

[2] Waste generated by certain federal installations or programs, such as the Brookhaven National Laboratory, the Knolls Atomic Power Laboratory, and the West Valley Demonstration Project, are not included in this report or in the requirements for generator reporting to NYSERDA. Under the federal Low-Level Radioactive Waste Policy Act as amended in 1985 (Public Law 99-240), the federal government, not the states, is responsible for disposal of LLRW owned or generated by the U.S. DOE, the U.S. Navy as a result of decommissioning vessels, or the federal government as a result of research, development, testing, or production of nuclear weapons.

Section 1

LOW-LEVEL RADIOACTIVE WASTE SHIPPED FOR DISPOSAL BY NEW YORK STATE GENERATORS IN 1999

This section summarizes data reported by LLRW generators in New York State on waste transferred to licensed LLRW disposal facilities in Barnwell, South Carolina (Chem-Nuclear); Clive, Utah (Envirocare); and Richland, Washington (U.S. Ecology), during 1999.

While the Barnwell facility will accept most types of LLRW, the Clive and Richland facilities are more restrictive. While the Clive facility can accept most Class A waste, it cannot accept Class B or C waste. The Clive facility can also accept, treat, and dispose of most solid, mixed waste (*i.e.*, LLRW that also contains hazardous chemicals) that meets the site's radioactivity concentration limits. The Richland facility is authorized to accept limited volumes of LLRW containing small quantities of naturally occurring radioactive material (*e.g.*, uranium, thorium) from New York State generators.

Volume is presented in cubic meters, and activity is presented in gigabecquerels (GBq) or megabecquerels (MBq). These units have been adopted to be consistent with U.S. Nuclear Regulatory Commission uniform national LLRW manifest requirements. The Conversions for Units table [see p. 39] and footnotes to the relevant tables provide information for converting the data to the previously used units of cubic feet and curies.

In 1999, generators in New York State reported disposing of 747 cubic meters (26,370 cubic feet) of LLRW containing 235,306 GBq (6,360 curies) of radioactivity. About 41% of the volume of LLRW, containing less than 1% of the radioactivity, was shipped to the Clive, Utah, facility. The Barnwell, South Carolina, facility received 55% of the volume and more than 99% of the radioactivity.

Individual entries in the following tables have been rounded using standard procedures. Because the totals shown represent the sum of the rounded entries, they may vary slightly from one table to another and may not always equal 100%. Waste volumes have been rounded to the nearest 10th of a cubic meter. In most cases, activity has been rounded to the nearest 10,000th of a GBq. Percentages have been rounded to the nearest 10th of a percent in the tables and figures.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-1: Generators Reporting and Shipping Waste for Disposal[1]

Generator Type	Number Reporting	Number[2] Shipping
MEDICAL		
Government	24	4
Private	188	8
College	15	8
Other	8	1
Total Medical	**235**	**21**
INDUSTRIAL		
Manufacturing	15	10
Research & Development	21	10
Other	4	1
Total Industrial	**40**	**21**
ACADEMIC (non-medical)		
College or University	35	4
Other	6	2
Total Academic	**41**	**6**
GOVERNMENT (non-medical)		
New York State	2	0
Other	3	1
Total Government	**5**	**1**
TOTAL NON-POWER PLANT	**321**	**49**
NUCLEAR POWER PLANT	**6**	**6**
TOTAL	**327**	**55**

[1] In addition to shipping LLRW for disposal, other waste management methods include storage of LLRW pending disposal and storage for decay. Section 2 provides information on stored LLRW.

[2] Refers to the number of generators who reported transferring LLRW either directly or via a broker or processor to one of the available licensed LLRW disposal facilities.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-2: Volume and Activity of Waste Shipped for Disposal[1]

Generator Type	Volume (m^3)[2]	% of Total	Activity (GBq)[2]	% of Total
MEDICAL				
Government	2.0		5.8282	
Private	3.3		2.3778	
College	32.5		11.7774	
Other	0.3		0.4158	
Total Medical	**38.1**	**5.1**	**20.3992**	*
INDUSTRIAL				
Manufacturing	6.5		75.3871	
Research & Development	17.5		195.6186	
Other	*		*	
Total Industrial	**24.0**	**3.2**	**271.0057**	**0.1**
ACADEMIC (non-medical)				
College or University	1.6		9.4175	
Other	0.3		2.1555	
Total Academic	**1.9**	**0.2**	**11.5730**	*
GOVERNMENT (non-medical)				
New York State	0.0		0.0000	
Other	39.0		0.0111	
Total Government	**39.0**	**5.2**	**0.0111**	*
TOTAL NON-POWER PLANT	**103.0**	**13.7**	**302.9890**	**0.1**
NUCLEAR POWER PLANT	**643.8**	**86.3**	**235,002.8137**	**99.9**
TOTAL	**746.8**	**100.0**	**235,305.8027**	**100.0**
	(26,370 ft^3)		**(6,359.6 curies)**	

[1] Refers to LLRW transferred either directly or via a broker or processor to one of the available licensed LLRW disposal facilities.

[2] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

* Less than 0.1%.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-3: Waste Shipped[1] for Disposal, by Class[2] and Generator Type

Generator Type	Class A		Class B		Class C	
	Volume (m^3)[3]	Activity (GBq)[3]	Volume (m^3)[3]	Activity (GBq)[3]	Volume (m^3)[3]	Activity (GBq)[3]
MEDICAL	38.1	19.6359	0.0	0.0000	*	0.7633
INDUSTRIAL	23.6	257.5642	*	0.0020	0.4	13.4400
ACADEMIC	1.9	11.5730	0.0	0.0000	0.0	0.0000
GOVERNMENT	39.0	0.0111	0.0	0.0000	0.0	0.0000
NUCLEAR POWER PLANT	587.1	212,955.8172	49.7	20,666.9965	7.1	1,380.0000
TOTAL	**689.7**	**213,244.6014**	**49.7**	**20,666.9985**	**7.5**	**1,394.2033**
	(24,360 ft^3)	**(5,763 curies)**	**(1,755 ft^3)**	**(559 curies)**	**(265 ft^3)**	**(38 curies)**

[1] Refers to LLRW transferred either directly or via a broker or processor to one of the available licensed LLRW disposal facilities.

[2] Classes A, B, and C are waste-classification categories established by the U.S. Nuclear Regulatory Commission (NRC) in Title 10 of the Code of Federal Regulations, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," and adopted by the New York State Department of Environmental Conservation in 6 NYCRR Part 382, "Regulations for Low-Level Radioactive Waste Disposal Facilities."

[3] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

* Less than 0.1 cubic meter.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-4: Distribution of Waste Among Disposal Facilities[1]

Disposal Facility	Volume (m^3)[2]	% of Total	Activity (GBq)[2]	% of Total
Barnwell, South Carolina	413.9	55.4	234,760.8419	99.8
Clive, Utah	307.2	41.1	534.4749	0.2
Richland, Washington	26.0	3.5	10.4865	*
TOTAL	**747.1**	**100.0**	**235,305.8033**	**100.0**
	(26,380 ft^3)		**(6,360 curies)**	

[1] Refers to LLRW transferred either directly or via a broker or processor to the respective disposal facility.

[2] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

* Less than 0.1%.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-5: Treatments[1] Reported for Waste Shipped for Disposal, by Generator Type

Generator Type	Number of Generators Shipping LLRW[2]	Number of Shipping Generators Reporting Waste Treatment and Predominant Treatments
MEDICAL	21	On Site: 11 • Compaction Off Site: 9 • Supercompaction • Incineration
INDUSTRIAL	21	On Site: 5 • Compaction Off Site: 10 • Supercompaction • Incineration
ACADEMIC	6	On Site: 6 • Compaction • Solidification Off Site: 6 • Supercompaction • Incineration
GOVERNMENT	1	On Site: 1 • Adsorption Off Site: None
NUCLEAR POWER PLANT	6	On Site: 3 • Dewatering Off Site: 6 • Supercompaction • Incineration • Decontamination

[1] Treatment refers to the processing of LLRW to reduce its volume or activity, or change its chemical or physical form, prior to transfer to a disposal facility. Some generators reported using both on-site and off-site waste treatment facilities.

[2] Refers to the number of generators who reported transferring LLRW either directly or via a broker or processor to one of the available licensed LLRW disposal facilities.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-6: Number of Facilities Shipping Various Waste Types for Disposal

Waste Type[1]	Medical	Industrial	Academic	Government	Nuclear Power Plants	Total
Aqueous Liquids	1	5	3	0	0	9
Biological Material (excluding animal carcasses)	2	1	0	0	0	3
Carcasses (animal)	4	1	0	0	0	5
Compacted Trash	18	13	3	0	6	40
Contaminated Equipment	1	0	0	0	1	2
Charcoal	0	1	0	0	1	2
Demolition Rubble	0	1	0	1	1	3
Evaporator Bottoms/Sludges	0	0	0	0	1	1
Filter Media	0	0	0	0	1	1
Filter (Mechanical)	0	1	0	0	1	2
Glassware/Labware	1	3	1	0	0	5
Ion Exchange Media	0	0	0	0	6	6
Material to be Incinerated	1	0	0	0	0	1
Non-Compacted Trash	2	3	2	0	3	10
Oil	1	1	0	0	2	4
Organic Liquids (excluding oil)	1	2	1	0	0	4
Sealed Source/Device	5	5	1	0	0	11
Soil	0	1	0	0	1	2
Other[2]	5	4	3	0	1	13

[1] Waste types listed are as defined by the U.S. Nuclear Regulatory Commission Uniform Manifest.

[2] In certain cases, generators reported shipping waste that did not fit into any of the categories listed. Those data are reported here.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-7: Waste Shipped for Disposal, by County of Origin[1]

County	Number of Generators Reporting	Number of Generators Shipping LLRW[2]	Volume (m^3)[3]	% of Total	Activity (GBq)[3]	% of Total
Albany	12	2	1.3	0.2	45.0336	*
Allegany	0	0	0.0	0.0	0.0000	0.0
Bronx	7	1	0.7	0.1	1.1503	*
Broome	4	0	0.0	0.0	0.0000	*
Cattaraugus	1	0	0.0	0.0	0.0000	*
Cayuga	0	0	0.0	0.0	0.0000	0.0
Chautauqua	2	0	0.0	0.0	0.0000	0.0
Chemung	3	0	0.0	0.0	0.0000	*
Chenango	2	1	0.8	0.1	13.2061	*
Clinton	4	0	0.0	0.0	0.0000	*
Columbia	1	1	3.3	0.4	0.6290	*
Cortland	1	0	0.0	0.0	0.0000	0.0
Delaware	1	0	0.0	0.0	0.0000	0.0
Dutchess	6	0	0.0	0.0	0.0000	*
Erie	25	5	39.2	5.3	4.0943	*
Essex	1	1	0.3	*	0.1377	*
Franklin	2	0	0.0	0.0	0.0000	0.0
Fulton	0	0	0.0	0.0	0.0000	0.0
Genesee	1	0	0.0	0.0	0.0000	0.0
Greene	0	0	0.0	0.0	0.0000	0.0
Hamilton	0	0	0.0	0.0	0.0000	0.0
Herkimer	1	0	0.0	0.0	0.0000	0.0
Jefferson	1	0	0.0	0.0	0.0000	0.0
Kings	16	3	0.5	*	0.1394	*
Lewis	0	0	0.0	0.0	0.0000	0.0
Livingston	1	0	0.0	0.0	0.0000	0.0
Madison	2	0	0.0	0.0	0.0000	0.0
Monroe	16	5	4.0	0.5	1.9893	*
Montgomery	2	0	0.0	0.0	0.0000	0.0
Nassau	40	6	3.0	0.4	11.0821	*
New York	26	7	6.6	0.9	3.6664	*
Niagara	6	1	0.4	*	13.4400	*
Oneida	4	0	0.0	0.0	0.0000	0.0
Onondaga	11	2	0.4	*	6.9543	*

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-7: Waste Shipped for Disposal, by County of Origin[1] (continued)

County	Number of Generators Reporting	Number of Generators Shipping LLRW[2]	Volume (m^3)[3]	% of Total	Activity (GBq)[3]	% of Total
Ontario	2	0	0.0	0.0	0.0000	0.0
Orange	8	1	*	*	0.0040	*
Orleans	1	0	0.0	0.0	0.0000	0.0
Oswego	4	3	472.7	63.4	219,982.5331	93.5
Otsego	1	0	0.0	0.0	0.0000	0.0
Putnam	3	0	0.0	0.0	0.0000	0.0
Queens	14	0	0.0	0.0	0.0000	0.0
Rensselaer	6	0	0.0	0.0	0.0000	0.0
Richmond	2	0	0.0	0.0	0.0000	0.0
Rockland	9	4	8.8	1.2	187.5409	*
St. Lawrence	5	1	0.2	*	0.1591	*
Saratoga	3	0	0.0	0.0	0.0000	0.0
Schenectady	5	1	3.6	0.5	0.0087	*
Schoharie	0	0	0.0	0.0	0.0000	0.0
Schuyler	0	0	0.0	0.0	0.0000	0.0
Seneca	0	0	0.0	0.0	0.0000	*
Steuben	2	0	0.0	0.0	0.0000	0.0
Suffolk	33	1	25.9	3.5	8.3318	*
Sullivan	0	0	0.0	0.0	0.0000	0.0
Tioga	0	0	0.0	0.0	0.0000	0.0
Tompkins	4	2	2.7	0.4	4.6331	*
Ulster	2	0	0.0	0.0	0.0000	0.0
Warren	1	0	0.0	0.0	0.0000	0.0
Washington	0	0	0.0	0.0	0.0000	0.0
Wayne	1	1	41.1	5.5	10,511.7290	4.5
Westchester	22	6	130.9	17.6	4,509.3106	1.9
Wyoming	0	0	0.0	0.0	0.0000	0.0
Yates	0	0	0.0	0.0	0.0000	0.0
TOTALS	**327**	**55**	**746.4 (23,356 ft^3)**	**100.0**	**235,305.7728 (6,360 curies)**	**99.9**

[1] Section 4 of this report identifies the individual facilities reporting and shipping waste for disposal.

[2] Refers to the number of generators that reported transferring LLRW either directly or via a broker or processor to one of the available licensed LLRW disposal facilities.

[3] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

* Less than 0.1 cubic meter or 0.1%

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-8: Radionuclide Content of Waste[1] Shipped for Disposal (in MBq)[2]

Radionuclide	Half-Life[3,4]	Academic	Government	Industrial	Medical	Nuclear Power Plants	Total
Ag-110	249.8 d					72.890	72.890
Ag-110m	21.8 y					392,449.092	392,449.092
Am-241	432.7 y	0.001		4.440		469.331	473.772
Am-243/244	7.4 E3 y					0.002	0.002
Ba-133	10.5 y				6.430		6.430
Be-7	53.3 d					1.388	1.388
Bi-210	3 E6 y			0.001			0.001
C-14	5730 y	792.123		161,996.716	4,457.636	148,577.646	315,824.121
Ca-45	162.7 d	2.590		0.070	21.200		23.860
Cd-109	462.0 d	0.004			5.997		6.001
Ce-141	32.5 d					115.000	115.000
Ce-144	284.6 d					474,062.084	474,062.084
Cl-36	3.01 E5 y	8.954		1.560	17.513		28.027
Cm-242	162.8 d					528.159	528.159
Cm-243	29.1y					64.010	64.010
Cm-243/244	29.1 y					191.640	191.640
Co-57	271.8 d	0.156		1,328.037	106.520	12,416.809	13,851.522
Co-58	70.9 d			1.666		624,734.775	624,736.441
Co-60	5.2 y	0.148		1.918	4.100	43,617,010.113	43,617,016.279
Cr-51	27.7 d	0.037		37.741	67.400	1,257,782.531	1,257,887.709
Cs-134	2.0 y	0.085			0.185	2,110,040.131	2,110,040.401
Cs-137	30.2 y	0.999		3,630.037	2,750.800	8,471,230.958	8,477,612.794
Fe-55	2.7 y					9,861,911.888	9,861,911.888
Fe-59	44.5 d	1.406				310,534.035	310,535.441
H-3	12.3 y	6,142.073		40,936.622	11,829.384	47,767.553	106,675.632
Hf-181	42.4 d			37.000			37.000
I-125	59.4 d	1.443		215.452	157.944		374.839
I-129	1.6 E7 y					139.000	139.000
In-114	49.5d	0.037					0.037
Kr-85	10.8 y			51,430.000			51,430.000
La-140	1.7 d			37.000			37.000
Mn-54	312.2 d	1,551.037		3.592		12,851,711.152	12,853,265.781
Na-22	2.6 y	62.885		0.037	0.358		63.280
Nb-94	2.0 E4 y					2,889.700	2,889.700
Nb-95	35.0 d					5,829.352	5,829.352
Ni-59	7.6 E4 y					1,595,276.580	1,595,276.580
Ni-63	100 y	2,374.290		2.960		3,027,740.728	3,030,117.978
Np-237	2.1 E6y					0.106	
P-32	14.3 d				8.200		8.200

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

P-33	25.3 d			88.800	0.026		88.826
Pb-210	22.6 y	0.037					0.037
Pm-147	2.6 y			159.100			159.100
Po-210	138.4 d	0.008					0.008
Pu-238	87.7 y					326.888	326.888
Pu-239	2.4 E4 y					158.360	158.360
Pu-239/240	2.4 E4 y					109.534	109.534
Pu-241	14.4 y				0.019	44,779.119	44,779.138
Ra-226	1.6 E3 y	1.186					1.186
Rb-86	18.7 d	593.500					593.500
Ru-103	39.3 d					500.000	500.000
Ru-106	1 y					15,300.000	15,300.000
S-35	87.2 d			0.370	189.300		189.670
Sb-124	60.2 d					1,985.285	1,985.285
Sb-125	2.8 y					32,755.927	32,755.927
Sc-46	83.8 d			37.000			37.000
Se-75	119.8 d				0.111		0.111
Sn-113	115.1 d	0.015				4,301.347	4,301.362
Sr-89	50.5 d					9,540.500	9,540.500
Sr-90	29.1 y	0.500		2,780.000	763.300	35,120.641	38,664.441
Tc-99	2.1 E5 y	19.600				20,518.709	20,538.309
Th-229	7.3 E3 y				0.019		0.019
Th-232	1.4 E10 y	7.964		8,273.654			8,281.618
Tl-204	3.8 y	0.037		0.001			0.038
U-235	7 E8 y	1.000					1.000
U-238	4.5 E9 y	10.916	11.100	1.887			23.903
Zn-65	243.8 d			0.004	12.785	150,020,298.621	150,020,311.410
Zr-95	64 d					3,572.100	3,572.100
Others[5]					1.000		1.000
Total		**11,573.031**	**11.100**	**271,005.665**	**20,399.227**	**235,002,813.684**	**235,305,802.707**

[1] Some generator facilities have reported radionuclides with half-lives of less than 90 days in LLRW shipped for disposal. In the majority of these cases, the shorter-lived radionuclides reported cannot be separated readily from longer-lived radionuclides in the waste.

[2] To obtain activity in curies, divide the number of MBq by 37,000.

[3] **Source:** Chart of the Nuclides, General Electric Company under the direction of Naval Reactors, U.S. DOE; 15th edition, revised to 1996. **NB**: y=years, m=months, d=days.

[4] Where scientific notation is used, multiply the number by 10 to the specified power. Example: For Ra-226, 1.6 E3 = 1.6×10^3 = 1.6x10x10x10 = 1.6x1,000 = 1,600. For this table, the whole number to which 10 is raised is equal to the number of places the decimal is moved to the right.

[5] In certain cases, LLRW generators are permitted by manifest regulations to report a single activity for a group of radionuclides without assigning a value to each; those data are reported here.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 1-9: Waste Shipped from Various States for Disposal in 1999[1]

State	Cubic Meters of Waste[2]	State	Cubic Meters of Waste
Tennessee	1,001.4	Nebraska	82.7
Montana	4.5	Colorado	52.5
Massachusetts	168.3	Hawaii	64.5
Ohio	393.8	Louisiana	58.5
Oregon	2,496.1	Wisconsin	55.8
Michigan	608.7	Minnesota	11.4
Illinois	254.8	Iowa	35.0
Pennsylvania	474.2	Kansas	7.5
Florida	88.2	Oklahoma	13.8
Washington	822.2	Mississippi	14.4
Virginia	344.5	New Mexico	66.1
Utah	282.0	Arkansas	6.6
Missouri	49.8	New Hampshire	30.6
Texas	837.2	District of Columbia	7.2
South Carolina	117.0	Delaware	1.4
California	229.3	Indiana	19.1
New York[3]	**502.2**	Alaska	1.7
Arizona	88.4	Idaho	0.4
Georgia	324.1	Nevada	2.9
New Jersey	121.5	Wyoming	2.0
Connecticut	56.9	West Virginia	4.4
North Carolina	22.1	Vermont	92.0
Maryland	111.7		
Alabama	83.4		
Maine	161.3		
Kentucky	42.6		
		Total	**10,316.8**

[1] This information is obtained from the U.S. DOE Manifest Information Management System (MIMS) database, as of April 30, 2000. The data represent LLRW shipped to the Richland, Washington; Clive, Utah; and Barnwell, South Carolina, disposal facilities.

[2] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31.

[3] These data indicate a lower 1999 disposal volume for New York State than the rest of the report. This difference may be caused, in part, by some generators reporting waste volumes measured before volume-reducing treatments.

Section 2

LOW-LEVEL RADIOACTIVE WASTE IN STORAGE (as of December 31, 1999)

This section provides information on LLRW being stored by generators.

Many generators store LLRW to allow its radioactivity to diminish to levels that permit disposal as non-radioactive waste (*i.e.*, **storage for decay**). In general, the cognizant regulatory agencies allow storage for decay only where the waste contains radionuclides with half-lives less than 90 days. LLRW in storage for decay is normally held for 10 half-lives, or until radioactivity has diminished to a level where it is indistinguishable from background radiation. Most generators hold LLRW in storage for decay at their own facilities, although approved off-site facilities may be used.

Generators regularly store waste pending transfer to a licensed LLRW disposal facility (*i.e.*, **storage pending disposal**). Storage pending disposal can occur for extended periods, as when the Barnwell LLRW disposal facility closed to generators in New York from June 30, 1994, until June 30, 1995. Such storage may also occur when the LLRW has a particular characteristic that makes it unacceptable at the available disposal facilities (*e.g.*, contains chemically hazardous components). For those cases where access to licensed disposal facilities is not available, most generators will store LLRW at their own facilities, although approved off-site storage facilities may be used. In addition, most generators routinely store LLRW at their facilities for short periods as a normal part of operation or staging while accumulating a sufficient quantity for transfer to a treatment or disposal facility.

Volume is presented in cubic meters, and activity is presented in gigabecquerels (GBq) or megabecquerels (MBq). These units have been adopted to be consistent with NRC uniform national LLRW manifest requirements. The Conversions for Units table [see p. 39] and footnotes to the relevant tables provide information for converting the data to the previously used units of cubic feet and curies.

Individual entries in the following tables have been rounded using standard procedures. Because the totals shown represent the sum of the rounded entries, they may vary slightly from one table to another and may not always equal 100%. Waste volumes have been rounded to the nearest 10th of a cubic meter. In most cases, activity has been rounded to the nearest 10,000th of a GBq. Percentages have been rounded to the nearest 10th of a percent in the tables and figures.

Table 2-1: Generators Reporting and Storing Waste Pending Disposal[1]

Generator Type	Number Reporting	Number Storing
MEDICAL		
Government	24	4
Private	188	10
College	15	4
Other	8	0
Total Medical	**235**	**18**
INDUSTRIAL		
Manufacturing	15	4
Research & Development	21	7
Other	4	0
Total Industrial	**40**	**11**
ACADEMIC (non-medical)		
College or University	35	13
Other	6	2
Total Academic	**41**	**15**
GOVERNMENT (non-medical)		
New York State	2	1
Other	3	1
Total Government	**5**	**2**
TOTAL NON-POWER PLANT	**321**	**46**
NUCLEAR POWER PLANT	**6**	**2**
TOTAL	**327**	**48**

[1] Includes LLRW in storage at generator sites or an approved off-site location pending transfer to a licensed LLRW facility, as of December 31, 1999. Does not include LLRW held in storage for decay.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 2-2: Volume and Activity of Waste Stored Pending Disposal[1]

Generator Type	Volume (m^3)[2]	% of Total	Activity (GBq)[2]	% of Total
MEDICAL				
Government	44.0		6.0686	
Private	22.5		26.6787	
College	2.1		19.9116	
Total Medical	**68.6**	**34.5**	**52.6589**	**0.3**
INDUSTRIAL				
Manufacturing	2.3		0.3202	
Research & Development	16.3		19.1801	
Total Industrial	**18.6**	**9.3**	**19.5003**	**0.1**
ACADEMIC (non-medical)				
College or University	25.9		9.5636	
Other	1.6		3.1170	
Total Academic	**27.5**	**13.8**	**12.6806**	**0.1**
GOVERNMENT (non-medical)				
New York State	45.6		456.9678	
Other	0.9		0.1295	
Total Government	**46.5**	**23.4**	**457.0973**	**2.9**
TOTAL NON-POWER PLANT	**161.2**	**81.0**	**541.9371**	**3.4**
NUCLEAR POWER PLANT	**37.8**	**19.0**	**15,363.0091**	**96.6**
TOTAL	**199.0**	**100.0**	**15,904.9462**	**100.0**
	(7,027 ft^3)		**(430 curies)**	

[1] Includes LLRW in storage at generator sites or an approved off-site location pending transfer to a licensed LLRW facility, as of December 31, 1999. Does not include LLRW held in storage for decay.

[2] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 2-3: Waste in Storage Pending Disposal, by Class[1] and Generator Type[2]

Generator Type	Class A		Class B		Class C	
	Volume $(m^3)^3$	Activity $(GBq)^3$	Volume $(m^3)^3$	Activity $(GBq)^3$	Volume $(m^3)^3$	Activity $(GBq)^3$
MEDICAL	68.6	52.6589	0.0	0.0000	0.0	0.0000
INDUSTRIAL	18.6	19.5002	0.0	0.0000	0.0	0.0000
ACADEMIC	27.3	12.6787	0.0	0.0000	0.2	0.0020
GOVERNMENT	46.5	457.0973	0.0	0.0000	0.0	0.0000
NUCLEAR POWER PLANT	37.7	15,363.0091	0.0	0.0000	0.0	0.0000
TOTAL	**198.7**	**15,904.9442**	**0.0**	**0.0000**	**0.2**	**0.0020**
	(7,016 ft^3)	**(430 curies)**	**(0 ft^3)**	**(0 curies)**	**(7.1 ft^3)**	**(* curies)**

[1] Classes A, B, and C are waste-classification categories established by the U.S. Nuclear Regulatory Commission in Title 10 of the Code of Federal Regulations, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," and adopted by the New York State Department of Environmental Conservation in 6 NYCRR Part 382, "Regulations for Low-Level Radioactive Waste Disposal Facilities."

[2] Refers to LLRW in storage at generator sites or an approved off-site location pending transfer to a licensed LLRW facility, as of December 31, 1999. Does not include LLRW held in storage for decay.

[3] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

* Less than 0.1 curies.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 2-4: Number of Facilities Reporting Various Waste Types in Storage Pending Disposal

Waste Type[1]	Medical	Industrial	Academic	Government	Nuclear Power Plants	Total
Aqueous Liquids	6	3	7	0	0	16
Biological Material (excluding carcasses)	1	0	0	0	0	1
Charcoal	0	1	0	0	0	1
Compacted Trash	5	2	6	0	0	13
Contaminated Equipment	0	1	0	0	0	1
Filter Media	0	0	0	0	1	1
Glassware/Labware	0	1	0	0	0	1
Mechanical Filter	0	0	0	0	1	1
Organic Liquids (excluding oil)	1	1	2	0	0	4
Soil	0	0	0	1	0	1
Other[2]	4	0	0	1	0	5

[1] Waste types listed are as defined by the U.S. Nuclear Regulatory Commission Uniform Manifest.

[2] In certain cases, generators reported storage of waste that did not fit into any of the categories listed. Those data are reported here.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 2-5: Waste in Storage[1] Pending Disposal, by County of Origin[2]

County	Number of Generators Reporting	Number of Generators Storing LLRW[3]	Volume (m^3)[4]	% of Total	Activity (GBq)[4]	% of Total
Albany	12	4	1.8	0.9	2.0928	*
Allegany	0	0	0.0	0.0	0.0000	0.0
Bronx	7	1	2.0	1.0	0.0007	0.0
Broome	4	1	0.4	0.2	0.1040	*
Cattaraugus	1	1	45.6	23.0	456.9678	2.8
Cayuga	0	0	0.0	0.0	0.0000	0.0
Chautauqua	2	0	0.0	0.0	0.0000	0.0
Chemung	3	1	0.4	0.2	0.0740	*
Chenango	2	1	3.4	1.7	15.4304	0.1
Clinton	4	1	0.2	0.1	0.3742	*
Columbia	1	0	0.0	0.0	0.0000	0.0
Cortland	1	0	0.0	0.0	0.0000	0.0
Delaware	1	0	0.0	0.0	0.0000	0.0
Dutchess	6	2	1.8	0.9	4.8470	*
Erie	25	3	4.9	2.5	0.1295	*
Essex	1	1	0.3	0.2	0.2960	*
Franklin	2	0	0.0	0.0	0.0000	0.0
Fulton	0	0	0.0	0.0	0.0000	0.0
Genesee	1	0	0.0	0.0	0.0000	0.0
Greene	0	0	0.0	0.0	0.0000	0.0
Hamilton	0	0	0.0	0.0	0.0000	0.0
Herkimer	1	0	0.0	0.0	0.0000	0.0
Jefferson	1	0	0.0	0.0	0.0000	0.0
Kings	16	1	0.2	0.1	*	*
Lewis	0	0	0.0	0.0	0.0000	0.0
Livingston	1	0	0.0	0.0	0.0000	0.0
Madison	2	0	0.0	0.0	0.0000	0.0
Monroe	16	2	0.2	0.1	18.6949	0.1
Montgomery	2	0	0.0	0.0	0.0000	0.0
Nassau	40	2	2.6	1.3	0.5978	*
New York	26	9	70.1	35.3	31.4993	0.2
Niagara	6	1	0.2	0.1	*	*
Oneida	4	1	*	*	*	*
Onondaga	11	1	0.1	*	0.0410	*

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 2-5: Waste in Storage[1] Pending Disposal, by County of Origin[2] (continued)

County	Number of Generators Reporting	Number of Generators Storing LLRW[3]	Volume (m^3)[4]	% of Total	Activity (GBq)[4]	% of Total
Ontario	2	0	0.0	0.0	0.0000	0.0
Orange	8	0	0.0	0.0	0.0000	0.0
Orleans	1	0	0.0	0.0	0.0000	0.0
Oswego	4	1	33.3	16.8	15,361.2790	96.7
Otsego	1	0	0.0	0.0	0.0000	0.0
Putnam	3	1	0.5	0.2	0.4549	*
Queens	14	1	1.2	0.6	0.0835	*
Rensselaer	6	3	19.0	9.5	3.8155	*
Richmond	2	0	0.0	0.0	0.0000	0.0
Rockland	9	1	1.7	0.8	0.1722	*
St. Lawrence	5	1	*	*	0.0002	*
Saratoga	3	0	0.0	0.0	0.0000	0.0
Schenectady	5	1	0.2	0.1	3.0081	*
Schoharie	0	0	0.0	0.0	0.0000	0.0
Schuyler	0	0	0.0	0.0	0.0000	0.0
Seneca	0	0	0.0	0.0	0.0000	0.0
Steuben	2	0	0.0	0.0	0.0000	0.0
Suffolk	33	2	2.4	1.2	0.8100	*
Sullivan	0	0	0.0	0.0	0.0000	0.0
Tioga	0	0	0.0	0.0	0.0000	0.0
Tompkins	4	1	0.5	0.3	2.4124	*
Ulster	2	0	0.0	0.0	0.0000	0.0
Warren	1	0	0.0	0.0	0.0000	0.0
Washington	0	0	0.0	0.0	0.0000	0.0
Wayne	1	1	4.4	2.2	1.7301	*
Westchester	22	2	1.3	0.7	0.0308	*
Wyoming	0	0	0.0	0.0	0.0000	0.0
Yates	0	0	0.0	0.0	0.0000	0.0
TOTALS	**327**	**48**	**198.7**	**100.0**	**15,904.9461**	**99.9**
			(7,016 ft^3)		**(430 curies)**	

[1] Includes LLRW in storage at generator sites or an approved off-site location pending transfer to a licensed LLRW facility, as of December 31, 1999. Does not include LLRW held in storage for decay.

[2] Section 4 of this report identifies the individual facilities reporting LLRW in storage pending disposal.

[3] Refers to the number of generators who reported LLRW in storage pending disposal as of December 31, 1999.

[4] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

* Less than 0.1 cubic meter or 0.1%.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 2-6: Radionuclide Content[1] of Waste in Storage Pending Disposal (in MBq)[2]

Radionuclide	Half-Life[3,4]	Academic	Government	Industrial	Medical	Nuclear Power Plants	Total
Ag-110m	21.8 y					33,924.000	33,924.000
Am-241	432.7 y				18,500.096	64.500	18,564.596
Ba-133	10.5 y	0.040					0.040
C-14	5730 y	1,345.600	7,510.000	9,776.520	4,730.382	116,000.000	139,362.502
Ca-45	162.7 d	0.370			0.925		1.295
Ce-141	32.5 d					0.300	0.300
Ce-144	284.6 d					19,007.000	19,007.000
Cm-242	162.8 d					101.500	101.500
Cm-243/244	29.1 y				50.000	0.200	50.200
Co-57	271.8 d	0.041		128.200	63.343		191.584
Co-58	70.9 d					33,986.000	33,986.000
Co-60	5.2 y	185.370		74.000		3,610,379.000	3,610,638.370
Cr-51	27.7 d				988.270		988.270
Cs-137	30.2 y	0.370	252.000			47,800.900	48,053.270
Eu-154	8.6 y				0.560		0.560
Eu-156	15.2 d				1.680		1.680
Fe-55	2.7 y					691,698.000	691,698.000
Fe-59	44.5 d					20,500.000	20,500.000
Gd-153	241.6 d				115.810		115.810
H-3	12.3 y	6,569.641	449,000.000	9,152.676	26,584.691	18,200.500	509,507.508
I-125	59.4 d			192.520	1,027.860		1,220.380
I-129	1.6 E7 y	0.004	0.197				0.201
I-131	8.02 d				3.700		3.700
Mn-54	312.2 d	0.037				1,490,024.200	1,490,024.237
Mo-99	67 h				109.055		109.055
Na-22	2.6 y	0.111			0.037		0.148
Ni-59	7.6 E4 y					49,303.500	49,303.500
Ni-63	100 y					151,145.000	151,145.000
P-32	14.3 d			35.150			35.150
P-33	25.3 d			64.750			64.750
Pb-210	22.6 y	0.370			18.000		18.370
Pu-238	87.7 y					72.500	72.500
Pu-239	2.4 E4 y					171.000	171.000
Pu-241	14.4 y					8,105.200	8,105.200
Ra-226	1.6 E3 y	0.370			112.000		112.370
S-35	87.2 d	2.263		56.100	341.140		399.503

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Sb-124	60.2 d					485.000	485.000
Sb-125	2.8 y					78.000	78.000
Sr-89	50.5 d					0.001	0.001
Sr-90	29.1 y	1,850.000	107.000			205.300	2,162.300
Tc-99	2.1 E5 y	37.000	98.600			1,780.000	1,915.600
Th-232	1.4 E10 y			2.102			2.102
U-238	4.5 E9 y	37.000	129.500	18.234	10.400		195.134
Zn-65	243.8 d					9,070,000.000	9,070,000.000
Zr-95	64 d					67.500	67.500
Others[5]		2,559.500					2,559.500
Total		**12,588.087**	**457,097.297**	**19,500.252**	**52,657.949**	**15,363,099.101**	**15,904,942.686**

[1] Some generator facilities have reported radionuclides with half-lives of less than 90 days in LLRW held for storage pending disposal. In the majority of these cases, the shorter-lived radionuclides reported cannot be separated readily from longer-lived radionuclides in the waste. Does not include LLRW in storage-for-decay.

[2] To obtain activity in curies, divide the number of MBq by 37,000.

[3] **Source:** Chart of the Nuclides, General Electric Company under the direction of Naval Reactors, U.S. DOE; 15th edition, revised to 1996. **NB**: y=years, d =days, h=hours.

[4] Where scientific notation is used, multiply the number by 10 to the specified power. Example: For Ra-226, 1.6 E3 = 1.6×10^3 = 1.6x10x10x10 = 1.6x1,000 = 1,600. For this table, the whole number to which 10 is raised is equal to the number of places the decimal is moved to the right.

[5] In certain cases, LLRW generators are permitted by manifest regulations to report a single activity for a group of radionuclides without assigning a value to each; those data are reported here.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 2-7: Waste Reported in Storage for Decay[1], by Generator Type

Generator Type	Number of Generators Reporting	Number of Generators Reporting Storage for Decay[2]	Number of Generators Reporting Only Storage for Decay	Estimated Maximum Volume in Storage for Decay at Any Time (m^3)[3]
MEDICAL	235	228	202	1,249
INDUSTRIAL	40	19	14	253
ACADEMIC	41	26	19	505
GOVERNMENT	5	2	1	0
NUCLEAR POWER PLANT	6	0	0	0
TOTAL	327	275	236	2,007
				(70,867 ft^3)

[1] Storage for decay means holding the LLRW until the level of radioactivity has diminished to the point where it can be disposed of as non-radioactive waste. Normally, such LLRW is held for 10 half-lives, or until the radioactivity has diminished to a level that is undetectable above background radiation.

Typical radionuclides held for decay, with their respective half-lives, include: Iodine-123 (13.1 hours), Iodine-125 (59.7 days), Iodine-131 (8.04 days), Technetium-99m (6.02 hours), Phosphorous-32 (14.3 days), Gallium-67 (3.26 days), and Sulfur-35 (89.9 days).

[2] Some generators who store for decay also may have transferred other LLRW to one of the licensed LLRW disposal facilities or may be storing LLRW pending disposal.

[3] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Section 3

HISTORIC DATA AND PROJECTIONS FOR LOW-LEVEL RADIOACTIVE WASTE GENERATION IN NEW YORK STATE

This section provides historic data on volume and activity of LLRW shipped for disposal, based on generator data reported to NYSERDA for calendar years 1991 through 1999.

This section also provides a summary, based on information supplied in the 1999 generator reports, of generator projections of the volume and activity of LLRW that will require disposal in a licensed LLRW facility for the years 2000 to 2004.

Volume is presented in cubic meters, and activity is presented in GBq. These units have been adopted to be consistent with NRC uniform national LLRW manifest requirements. The Conversions for Units table [see p. 39] and footnotes to the relevant tables provide information for converting the data to the previously used units of cubic feet and curies. Volume projections have been rounded to the nearest 10th of a cubic meter, and activity projections to the nearest GBq.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 3-1: Historic Overview of Waste Disposal, by Volume[1] (in m^3)[2]

Generator Type	1991	1992	1993	1994	1995	1996	1997	1998	1999
CINTICHEM, INC.[3]	270	736	468	2,539	4,855	1,005	1,146	0	0
TOTAL NON-POWER PLANT	812	1,297	1,165	2,767	4,915	2,074	1,295	81	103
NUCLEAR POWER PLANT	2,315	1,048	804	667	273	428	208	273	644
TOTAL	**3,127**	**2,345**	**1,969**	**3,434**	**5,188**	**2,502**	**1,503**	**354**	**747**

Table 3-2: Historic Overview of Waste Disposal, by Activity[1] (in GBq)[2]

Generator Type	1991	1992	1993	1994	1995	1996	1997	1998	1999
CINTICHEM, INC.[3]	30,229	21,756	21,127	1,443	37	51	2	0	0
TOTAL NON-POWER PLANT	37,077	32,338	157,472	15,392	481	22,330	748	233	303
NUCLEAR POWER PLANT	3,782,103	3,310,723	1,483,515	6,444,142	72,187	28,392	27,584	2,022,859	235,003
TOTAL	**3,819,180**	**3,343,061**	**1,640,987**	**6,459,534**	**72,668**	**50,722**	**28,332**	**2,023,092**	**235,306**

[1] Data are based on reports that must be filed annually with NYSERDA.

[2] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

[3] Cintichem, once a major supplier of radiopharmaceuticals, completed the decommissioning of its former radionuclide-production facility in 1997 and terminated its radioactive materials license in 1998. Cintichem data also are included in the total for all non-power plant sources. It is identified separately because of its significant contribution to the total State waste stream.

Figure 3-1: Historic Overview of Waste Disposal, by Volume

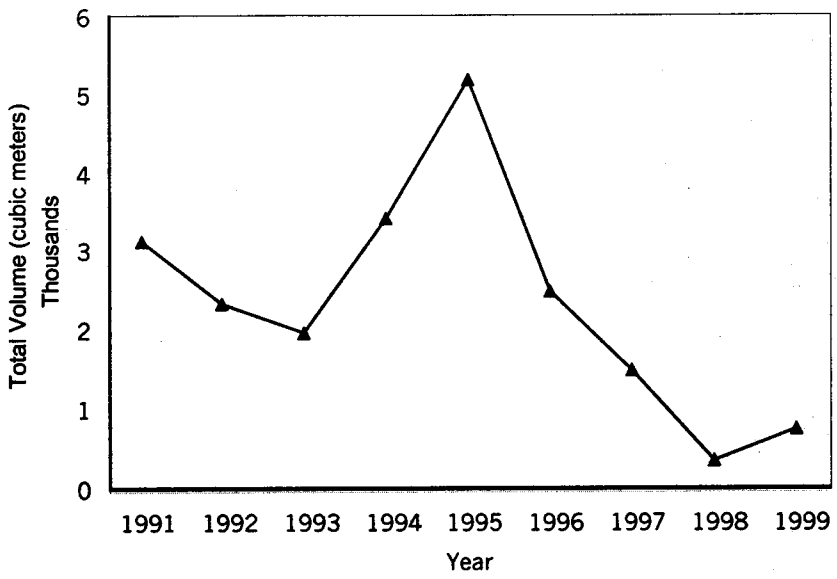
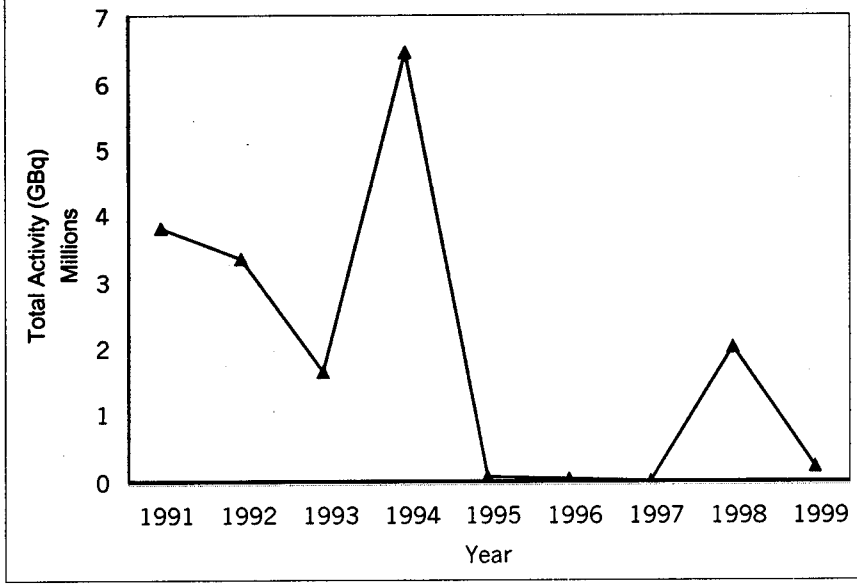


Figure 3-2: Historic Overview of Waste Disposal, by Activity



Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Table 3-3: Generators' Five-Year Projections of Waste[1], by Volume (in m^3)[2]

Generator Type	2000	2001	2002	2003	2004
MEDICAL	447.7	433.0	430.9	432.5	434.0
INDUSTRIAL	32.8	35.4	31.4	30.4	30.4
ACADEMIC	30.9	30.6	30.8	31.1	31.3
GOVERNMENT	3.4	2.1	2.1	2.5	2.1
TOTAL NON-POWER PLANT	**514.8**	**501.1**	**495.2**	**496.5**	**497.8**
NUCLEAR POWER PLANT[3]	934.8	326.4	323.7	323.2	296.9
TOTAL	**1,449.6**	**827.5**	**818.9**	**819.7**	**794.7**

Table 3-4: Generators' Five-Year Projections of Waste[1], by Activity (in GBq)[2]

Generator Type	2000	2001	2002	2003	2004
MEDICAL	21.2	17.8	16.0	16.1	16.2
INDUSTRIAL	191.1	226.4	225.7	225.7	225.7
ACADEMIC	27.0	26.8	27.0	27.1	33.8
GOVERNMENT	8.0	3.0	3.0	5.0	3.0
TOTAL NON-POWER PLANT	**247.3**	**274.0**	**271.7**	**273.9**	**278.7**
NUCLEAR POWER PLANT[3]	4.4 E+10	45,360.0	35,535.0	48,810.0	43,445.0
TOTAL	**4.4 E +10**	**45,634.0**	**35,806.7**	**49,083.9**	**43,723.7**

[1] Refers to LLRW projected by generators to require disposal in a licensed LLRW facility.

[2] To obtain volume in cubic feet, multiply the number of cubic meters by 35.31. To obtain activity in curies, divide the number of gigabecquerels (GBq) by 37.

[3] The relatively large volume and activity projections for the year 2000 are attributable, in part, to one nuclear power plant's plan to ship stored irradiated reactor components for disposal.

Section 4

GENERATORS FILING REPORTS

This section identifies those facilities that filed LLRW reports with NYSERDA for calendar year 1999 in accordance with the New York State LLRW Management Act (Ch. 673, L. 1986) and NYSERDA regulations (21 NYCRR Part 502).

Table 4-a lists the total volume and activity of LLRW reported by generators as having been shipped to LLRW disposal facilities in 1999 and the total volume and activity of LLRW reported by each generator as being held in storage pending disposal as of December 31, 1999.

Table 4-b lists the generators reporting LLRW held only in storage for decay during 1999.

Generator estimates of total storage capacity and the time that LLRW can continue to be produced and stored on site, absent access to disposal facilities, also are included. The table indicates where storage capacity includes both storage pending transfer to a LLRW disposal facility and storage for decay. The absence of data indicates that the generator reported no information in the particular category.

Volume is presented in cubic meters, and activity is presented in gigabecquerels (GBq). These units have been adopted to be consistent with new NRC uniform national LLRW manifest requirements. The Conversions for Units table [see p. 39] and footnotes to the relevant tables provide information for converting the data to the previously used units of cubic feet and curies.

The individual entries in this section have been rounded using standard procedures. Waste volumes have been rounded to the nearest 10th of a cubic meter. Activity has been rounded to the nearest 10,000th of a gigabecquerel. An asterisk (*) indicates an activity of less than a 10,000th of a GBq or a volume of less than a 10th of a cubic meter.

Table 4-a: Generators Reporting Disposal or Storage of Waste Pending Disposal

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

County	Facility & Location	Volume Disposed of (m^3)	Activity Disposed of (GBq)	Volume Stored (m^3)	Activity Stored (GBq)	Storage Capacity (m^3)†	Storage Time (months)
Albany	Albany International - U.S. Press	*	444.0000				
	Albany Medical Center	1.28	0.6336			210-b	72
	Samuel Stratton VA Medical Center, Albany			0.70	1.5887	59.4-b	120+
	Syncor International, Albany			0.05	0.0096	15-b	500
	SUNY-Albany			0.21	0.3950	10-b	60
	Watervliet Arsenal			0.85	0.1295	31.5	60
Bronx	Albert Einstein College of Medicine	0.66	1.1503			573-b	24
	Syncor International			1.98	0.715	7.6-b	118
Broome	SUNY-Binghamton			0.40	0.1040	1.9-b	>100
Cattaraugus	New York State Energy Research and Development Authority, West Valley			45.62	456.9676	210.2	>120
Chemung	Imaging & Sensing Technology Corporation, Elmira			0.42	0.0740	17	24
Chenango	Proctor & Gamble Pharmaceuticals, Norwich	0.84	13.2061	3.36	15.4304	8.4	48
Clinton	SUNY-Plattsburgh			0.21	0.3742	142-b	240
Columbia	Novartis Northeast Research Station, Hudson	3.30	0.6290			6.3-b	24
Dutchess	Institute of Ecosystem Studies, Millbrook			1.00	2.6270		
	Rockefeller University Field Research Center, Millbrook			0.84	2.2200	2.6-b	36
Erie	Alden Central School, Alden	0.10	0.0008				
	Roswell Park Cancer Institute, Buffalo	0.04	2.7340			15-b	120
	SUNY-Buffalo			4.88	*	300-b	24
	Syncor International, Cheektowaga			0.04	0.554	1.5-b	32
	Westwood Squibb Pharmaceuticals, Buffalo	0.06	1.3484				
	U.S. Army Corp of Engineers, Buffalo	38.99	0.0111				
	Zeptometrix Corporation, Buffalo	0	0	0.02	0.0740	0.2	60

† The letter "b" following an entry in the Storage Capacity column indicates storage capacity that includes both storage pending disposal in a licensed LLRW disposal facility and storage for decay. Entries without a "b" indicate capacity for storage pending disposal in a licensed LLRW disposal facility.

* Less than 0.1 cubic meter or 0.0001 GBq.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

County	Facility & Location	Volume Disposed of (m^3)	Activity Disposed of (GBq)	Volume Stored (m^3)	Activity Stored (GBq)	Storage Capacity (m^3)†	Storage Time (months)
Essex	Upstate Biotechnology, Inc., Lake Placid	0.33	0.1377	0.33	0.2960	22.8-b	180
Kings	49th Street Imaging	0.03	0.0519				
	Brookdale University Hospital	0.41	0.0875				
	Brooklyn Resource Recovery, Inc.[1]						
	VA New York Harbor Health Care System			0.21	0	249-b	69
Monroe	Bausch & Lomb Optics Center, Rochester	0.10	0.0015				
	Eastman Kodak Company, Rochester	0.84	0.4229			4.2	48
	Ortho-Clinical Diagnostic, Inc., Rochester	0.60	0.0016			80	1700
	Syncor International, Rochester			0.02	0.0045		
	University of Rochester	2.00	0.2653	0.21	18.6904	486-b	24
	Wyeth Lederle Vaccines & Pediatrics, West Henrietta	0.49	1.2981			28-b	84
Nassau	Cold Spring Harbor Laboratory	0.14	2.1547			90-b	120
	Controlled Castings Corporation, Plainview	1.93	8.2991				
	Lockheed Martin Federal Systems, Great Neck	0.02	0.0020				
	Long Island Jewish Medical Center, New Hyde Park			0.11	0.3700	14-b	120
	North Shore University Hospital, Manhasset	0.13	0.5920			18.2-b	36
	OSI Pharmaceuticals, Inc., Uniondale	0.63	0.1024	2.52	0.2278	3.9-b	12
	Winthrop University Hospital, Mineola	0.10	0.0019			179-b	120
New York	Bell Atlantic[2]						
	City College NY- CUNY			1.00	0.0700	40-b	48
	Columbia University	0.05	0.7400	0.40	0.0148	200-b	60
	Haskins Laboratories of Pace University			0.56	0.0222	15.3-b	120

[1] LLRW was reported as shipped for recycling.

[2] The New York Office submits a single report reflecting the activities and volumes from all Bell Atlantic facilities in the State. LLRW from Bell Atlantic facilities reported in storage for 1998 report was shipped for recycling during 1999.

† The letter "b" following an entry in the Storage Capacity column indicates storage capacity that includes both storage pending disposal in a licensed LLRW disposal facility and storage for decay. Entries without a "b" indicate capacity for storage pending disposal in a licensed LLRW disposal facility.

* Less than 0.1 cubic meter or 0.0001 GBq.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

County	Facility & Location	Volume Disposed of (m^3)	Activity Disposed of (GBq)	Volume Stored (m^3)	Activity Stored (GBq)	Storage Capacity (m^3)†	Storage Time (months)
New York, cont.	Hunter College - CUNY			0.63	0.2553	2-b	6
	Memorial Sloan-Kettering Cancer Center	1.70	1.8833	18.17	25.5425	560-b	6
	New York City Department of Health Bureau of Laboratories			42.0	3.7000	63-b	26
	New York Department of Veteran's Affairs	0.30	0.1504			2-b	6
	New York Presbyterian Hospital/Cornell Medical Center	1.93	0.3505		7.7-b	6	
	New York University - Lanza Laboratories	0.20	0.0040				
	Public Health Research Institute			0.63	0.4900	8-b	200
	Rockefeller University	0.42	0.4500	1.68	1.2210	58-b	60
	Vitex	2.00	0.8817	5.00	0.1835	10	6
Niagara	Carborundum Abrasives Company, Niagara Falls	0.42	13.4400				
	Occidental Chemical Corporation, Niagara Falls			0.20	0	5000	.>1000
Oneida	Utica College, Utica			0.02	*	0.7	60
Onondaga	SUNY Health Science Center, Syracuse	0.21	2.9075			20-b	12
	Syncor International, Syracuse			0.06	0.4106	500-b	60
	Syracuse University	0.16	4.0467			18-b	> 240
Orange	Orange County Community College, Middletown	0.02	.0040				
Oswego	James A. FitzPatrick Nuclear Power Plant, Lycoming	119.08	4976.4229			1204	63
	Nine Mile Point Nuclear Station, Unit 1, Scriba	282.86	22284.2468			4360	236
	Nine Mile Point Nuclear Station, Unit 2, Scriba	70.73	192721.8634	33.29	15361.2790	12400	240
Putnam	Orentreich Foundation, Cold Spring-on-Hudson			0.54	0.4549	27.5-b	24
Queens	Queens College - CUNY, Flushing			1.19	0.0835	57.1-b	36
Rensselaer	Coromed, Inc., Troy			0.21	0.0200		
	Rensselaer Polytechnic Institute, Troy			15.00	3.6120		
	Virogenetics Corporation, Troy			3.82	0.0035	13.6-b	60

† The letter "b" following an entry in the Storage Capacity column indicates storage capacity that includes both storage pending disposal in a licensed LLRW disposal facility and storage for decay. Entries without a "b" indicate capacity for storage pending disposal in a licensed LLRW disposal facility.

* Less than 0.1 cubic meter or 0.0001 GBq.

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

County	Facility & Location	Volume Disposed of (m^3)	Activity Disposed of (GBq)	Volume Stored (m^3)	Activity Stored (GBq)	Storage Capacity (m^3)†	Storage Time (months)
Rockland	Good Samaritan Hospital, Suffern	0.31	0.00994			2-b	120
	ICN East, Inc., Diagnostics Division, Orangeburg	2.21	1.3224	1.68	0.1722	72.8-b	60
	Self-Powered Lighting, West Nyack	0.21	7.4000			4.2	60
	Wyeth Ayerst Research, Pearl River	6.10	178.7985			340-b	24
Schenectady	General Electric Corporate R&D, Niskayuna	3.64	0.0087	0.21	3.0081	5	36
St. Lawrence	APC Paper Company of NY, Norfolk	0.18	0.1591				
	St. Lawrence University, Canton			0.04	0	800-b	120
Suffolk	Department of VA Medical Center, Northport			1.05	0.8100	8.5-b	48
	Forest Laboratories, Farmingdale			1.30	0	1.5	12
	SUNY-Stony Brook	25.90	8.3318			63-b	48
Tompkins	Cornell University, Environmental Health & Safety, Ithaca	1.37	4.6268			41-b	28
	Ithaca College			0.50	2.4124	12-b	120
	U.S. Plant, Soil, & Nutrition Laboratories, Ithaca	1.30	0.0363			60	24
Wayne	R.E. Ginna Nuclear Power Plant, Ontario	41.07	10511.7290	4.42	1.7301	560	60
Westchester	American Health Foundation Naylor Dana Institute, Valhalla	0.30	0.1908			5.2-b	< 6
	Consolidated Edison Co. of New York, Inc., Indian Point #2, Buchanan	116.33	4369.9600			6000	60
	CIBA Specialty Chemicals Corporation, Tarrytown			1050.29	0.0308		
	New York Presbyterian Hospital/Cornell Medical Center, White Plains			0.21	0	16.5-b	120
	New York Power Authority, Indian Point #3, Buchanan	13.72	138.5915			1699	360
	OSI Pharmaceuticals, Tarrytown	0.21	0.4140			4-b	12
	Pharmaceutical Discovery Corporation, Tarrytown	0.21	0.4158			27-b	>60
	Regeneron Pharmaceuticals, Inc., Tarrytown	0.17	0.1110			29.9-b	70

† The letter "b" following an entry in the Storage Capacity column indicates storage capacity that includes both storage pending disposal in a licensed LLRW disposal facility and storage for decay. Entries without a "b" indicate capacity for storage pending disposal in a licensed LLRW disposal facility.

* Less than 0.1 cubic meter or 0.0001 GBq.

Table 4-b: Generators Reporting Only Storage for Decay

Albany
Albany College of Pharmacy, Albany
Capital Cardiology Associates, P.C., Albany
Empire Isotopes, LLC, Albany
NYS DOH - Wadsworth Center, Albany
Siena College, Loudonville
St. Peter's Hospital, Albany

Bronx
Fordham University
Laboratory for Plant Morphogenesis
Lincoln Medical & Mental Health Center
Our Lady of Mercy Medical Center
Saint Barnabas Hospital

Broome
Our Lady of Lourdes Memorial Hospital, Binghamton
United Health Services Hospitals - Binghamton General Hospital
United Health Services Hospitals - Wilson Medical Center, Johnson City

Chautauqua
Brooks Memorial Hospital, Dunkirk
SUNY-Fredonia

Chemung
Arnot Ogden Medical Center, Elmira
St. Joseph's Hospital, Elmira

Chenango
Chenango Memorial Hospital, Norwich

Clinton
CVPH Medical Center, Plattsburgh
W.H. Miner Institute, Chazy
Wyeth-Ayerst Research, Chazy

Cortland
Commons Cardiac Evaluation Centre, Cortland

Delaware
The Hospital, Sydney

Dutchess
DRA Imaging, Poughkeepsie
Hudson Valley Heart Center, Poughkeepsie
St. Francis' Hospital, Poughkeepsie
V.A. Hudson Valley Health Care Systems, Castle Point

Erie
Buffalo Cardiology and Pulmonary Associates
Buffalo General Hospital
Buffalo Medical Group, P.C.
Buffalo Medical Group, P.C., Williamsville
Canisius College, Buffalo
Cardiology Group of Western New York, Williamsville
Erie County Medical Center, Buffalo
Erie County Public Health Laboratory, Buffalo
Kenmore Mercy Hospital, Kenmore
Laurie L. Hill, M.D., Tonawanda
Life Technologies, Grand Island
Millard Fillmore Hospital, Buffalo
Millard Fillmore Hospitals, Williamsville
Millard Fillmore Suburban Hospital, Williamsville
Sheehan Memorial Hospital, Buffalo
Sisters of Charity Hospital, Buffalo
St. Joseph's Hospital, Cheektowaga
V.A. of WNY Healthcare Systems, Buffalo

Franklin
Adirondack Medical Center, Saranac Lake
Trudeau Institute, Inc., Saranac Lake

Genesee
United Memorial Medical Center, Batavia

Herkimer
Little Falls Hospital

Jefferson
Samaritan Medical Center, Watertown

Kings (Brooklyn)
Bay Imaging
Brooklyn Medical Imaging Center
Brooklyn College - CUNY
Diagnostic Cardiology Associates, P.C.
Dr. Kumar Shah
Family Health Care and Cardiac Center
Long Island College Hospital
Mark Novick, M.D.
New York Methodist Hospital
Shahrokh Abiri, M.D.
Universal Diagnostic Laboratories, Inc.
Wyckoff Heights Medical Center

Livingston
Nicholas Noyes Memorial Hospital, Dansville

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Madison
Colgate University, Hamilton
Oneida Healthcare Center, Oneida

Monroe
Lakeside Memorial Hospital, Brockport
Monroe County Medical Examiner, Rochester
Park Ridge Hospital, Rochester
Rochester Cardiopulmonary Group, P.C. (Portland Ave)
Rochester Cardiopulmonary Group, P.C. (South Clinton Avenue)
Rochester General Hospital
St. Mary's Hospital, Rochester
STS Duotek, Rush
SUNY-Brockport
The Genesee Hospital, Rochester

Montgomery
Amsterdam Memorial Hospital
St. Mary's Hospital, Amsterdam

Nassau
Advanced Medical Imaging of Long Island, Great Neck
Baldwin Medical Laboratory, Bethpage
Bethpage Medical Laboratory
Cardiovascular Diagnostic Services, Plainview
Cardiovascular Medical Associates, Garden City
Day-Op Center of Long Island, P.C., Mineola
Franklin Hospital Medical Center, Valley Stream
Great Neck Imaging
Howard Heimowitz, M.D., Syosset
Long Island Cardiovascular Imaging Consultants, P.C., Great Neck
Mallinckrodt, Inc., Hicksville
Mercy Medical Center, Rockville Centre
Nassau Cardiac Imaging, Valley Stream
Nassau County Medical Examiner's Office, East Meadow
Nassau Radiologic Group, P.C., Garden City
Nassau Radiological Group, Manhasset
North Shore Cardiac Imaging, P.C., New Hyde Park
North Shore Cardiopulmonary Associates, Syosset
North Shore University Hospital at Glen Cove
North Shore Univerisity Hospital at Plainview
North Shore University Hospital at Syosset
Nycomed Amersham, Port Washington
Vincent Pacienza, M.D., Manhasset
Prohealth Corporation, Lake Success
Radiological Associates of Long Island, Oceanside
Radiological Diagnositic Imaging, Syosset
Sanjay S. Kirtane, Lawrence
Sitron & Ciluffo, M.D., Bethpage
South Shore Diagnostic Heart Center, Massapequa
South Shore Heart Associates, P.C., Rockville Centre
SUNY College at Old Westbury
Winthrop Radiology Associates, P.C., Mineola
Zwanger-Pesiri Radiology Group, Massapequa

New York
407 Medical Associates, P.C.
Aaron Diamond AIDS Research
Advanced Fertility Services, P.C.
Beth Israel Medical Center
James A. Blake, M.D., P.C.
CUNY - Lehman College
Dr. Jacob Lichy and Dr. Thomas Kolb
Lenox Hill Radiology and Medical Imaging Associates
Maklansky, Grunther, Kurzban, Zimmer, M.D., P.C.
Memory Pharmaceuticals
Montefiore Medical Center
New York University
NYU/Bellevue Hospital

Niagara
DeGraff Memorial Hospital, North Tonawanda
Lockport Memorial Hospital
Mount St. Mary's Hospital, Lewiston
Niagara University, Niagara Falls

Oneida
Faxton Hospital, Utica
Mohawk Glen Imaging, Rome
Rome Memorial Hospital

Onondaga
Bristol-Myers Squibb, East Syracuse
Community General Hospital, Syracuse
Crouse Hospital, Syracuse
CV Group, LLC, Fayetteville
Heart Care Center, Liverpool
Onondaga Hill Cardiovascular Group, Liverpool
St. Joseph's Hospital Health Center, Syracuse
The New York Heart Center, Syracuse

Ontario
Clifton Springs Hospital and Clinic
F.F. Thompson Hospital, Canandaigua

Orange
Arden Hill Hospital, Goshen
Cardiology Consultants of Westchester, Hawthorne
Horton Medical Center, Middletown
Hudson Valley Heart Center, New Windsor
St. Anthony's Hospital, Warwick
Syncor International Corporation, Newburgh

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Wallkill Radiology Associates, P.C., Middletown

Orleans
Medina Memorial Hospital

Oswego
A.L. Lee Memorial Hospital, Fulton

Otsego
SUNY - Oneonta

Putnam
New England Equine Practice, P.C., Brewster
Northeast Radiology, Brewster

Queens
Elmhurst Hospital Center (City Hospital)
Empire Imaging of New York, Forest Hills
Howard Sacher, D.O., Queens
Joseph Hung, M.A., M.D., Flushing
Mount Sinai Hospital of Queens, Long Island City
Myong Sang Choi, M.D., Queens
North Shore University Hospital at Forest Hills
NY Hospital Medical Center of Queens, Flushing
Parkway Hospital, Forest Hills
Peninsula Hospital Center, Far Rockaway
Raytel Medical Imaging, Forest Hills
U.S. Food & Drug Administration, Jamaica
York College - CUNY, Jamaica

Rensselaer
Regeneron Pharmaceuticals, Rensselaer
Seton Health - St. Mary's, Troy
Therion Corporation, Troy

Richmond (Staten Island)
NYS Institute for Basic Research in Developmental Disabilities
Regional Radiology

Rockland
Dr. Noah Weg and Associates, Suffern
Helen Hayes Hospital, West Haverstraw
Nathan Kline Institute, Orangeburg
Nyack Hospital
Ramapo Radiology Associates, P.C., Ponoma

Saratoga
Saratoga Cardiology Associates, P.C., Saratoga Springs
Saratoga Hospital, Saratoga Springs
Skidmore College, Saratoga Springs

Schenectady
Cardiology Associates of Schenectady
Ellis Hospital, Schenectady
St. Clare's Hospital, Schenectady
Union College, Schenectady

St. Lawrence
E.J. Noble Hospital, Gouveneur
Hepburn Medical Center, Ogdensburg
Massena Memorial Hospital

Steuben
Corning Hospital
St. James Mercy Hospital, Hornell

Suffolk
Amityville Heart Center
BAB Radiology, Bay Shore
BAB Radiology, Huntington
Babylon Heart Center-Long Island Cardiovascular
Brookhaven Cardiac Center, Medford
Brookhaven Memorial Medical Center
Brunswick Hospital Medical Center, Amityville
Caremax Surgical-Suffolk Nuclear Imaging, East Patchogue
Central Suffolk Hospital, Riverhead
East End Cardiology, P.C., Riverhead
Eastern Long Island Hosptial, Greenport
Gary E. Veit, M.D., Bay Shore
Good Samaritan Hosptial, West Islip
Huntington Hospital
Huntington Medical Group, P.C.
Long Island Diagnostic Imaging at Riverhead
Neometrics, Inc., East Northport
North Fork Radiology, Riverhead
North Shore Hematology and Oncology Associates, East Setauket
North Suffolk Cardiology Associates, Stony Brook
South Bay Cardiovascular Associates, Bay Shore
South Shore Cardiologists, West Islip
Southampton Hospital
Southside Hospital, Bay Shore
St. John's Episcopal Hospital, Smithtown
Suffolk Heart Group, P.C., Bay Shore
Sunrise Medical Laboratories, Hauppauge
The Huntington Heart Center
Tularik, Inc., Greenlawn
United Biomedical, Inc., Hauppauge

Tompkins
Cayuga Medical Center at Ithaca

Ulster
Benedictine Hospital, Kingston
SUNY - New Paltz

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

Warren
Glens Falls Hospital

Westchester
Bayer Diagnositics, Tarrytown
Cardiology Consultants of Westchester, Hawthorne
DOCS Physicians Affiliated with Beth Israel Hospital, Yonkers
Emisphere Technologies, Inc., Tarrytown
Hudson Valley Heart Center, Cortlandt Manor
Mojave Therapeutics, Inc., Tarrytown
Mount Vernon Hospital
Northern Westchester Hospital, Mt. Kisco
Polymedco, Inc., Cortlandt Manor
Progenics Pharmaceuticals, Inc., Tarrytown
Sohn, M.D. Laboratory, Larchmont
Sound Shore Medical Center of Westchester, New Rochelle
Westchester Medical Center, Valhalla
W.M. Burke Medical Center, Valhalla

Unless otherwise noted, all data were derived from low-level radioactive waste generator reports received by NYSERDA as of May 30, 2000.

CONVERSIONS FOR UNITS

The standardized measurement units used in science and technology today are known as the metric system. These metric or SI system (Système International d'Unités) units have been incorporated in the NRC's Uniform Waste Manifest. This manifest has been adopted by the licensed LLRW disposal facility in Barnwell, South Carolina. Use of the NRC Uniform Waste Manifest became mandatory on March 1, 1998.

Volume and activity are presented in cubic meters and gigabecquerels (GBq) or megabecquerels (Mbq). These units have been adopted for this report to be consistent with the uniform national LLRW manifest requirements. Some conversions for SI units to the previously used units of cubic feet and curies are in the following tables.

CONVERSIONS FOR UNITS

Quantity	SI Unit	Previously Used Unit	Value of Conventional Unit in SI Units	Conversion Factors
Activity	Gigabecquerel (GBq) Megabecquerel (MBq)	Curie (Ci)	1 Ci = 37 GBq 1 Ci = 37,000 MBq	Ci x 37 = GBq Ci x 37,000 = MBq GBq ÷ 37 = Ci MBq ÷ 37,000 = Ci
Volume	cubic meters (m^3)	cubic feet (ft^3)	1 ft^3 = 0.028 m^3	ft^3 x 0.028 = m^3 m^3 x 35.31 = ft^3

Activity Conversions

mCi	MBq	GBq
500	18,500	18.500
200	7,400	7.400
100	3,700	3.700
50	1,850	1.850
20	740	0.740
10	370	0.370
5	185	0.185
2	74	0.074
1	37	0.037

Volume Conversions

ft^3	m^3
11.9 (89 gal. drum)	0.33
11.1 (83 gal. drum)	0.31
7.5 (55 gal. drum)	0.21
4.01 (30 gal. drum)	0.11
0.67 (5 gal. pail)	0.019