



New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials

2006 New York State Low-Level Radioactive Waste Transportation Report



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Executive Summary

Low-level radioactive waste (LLRW) is transported into, within, and through New York State in three general categories of shipments. LLRW is transported by New York State based waste brokers who collect waste from individual generators in New York State and New England and bring it back to their facilities in New York. LLRW is also transported by out-of-State waste brokers who collect waste from New York generators and those in New England and bring it back to their facilities located outside New York State. Lastly, LLRW is transported by non-broker transporters (and New York-based brokers in consolidated and direct shipments) who carry large shipments of waste from New York and New England and take the waste directly to treatment or disposal facilities located outside New York. These three general categories of shipments are discussed in greater detail in this Report.

The total amount of LLRW transported by highway shipment into, within, and through New York State in the three general categories mentioned above for calendar year 2006 was 336,073.4 cubic feet (9,516.54 cubic meters), with a total radioactivity level of 46,948.35 curies¹ (1,737,088,950 megabecquerels)². The waste was contained in 4,421 packages in a total of 1,010 shipments.

LLRW waste classes are established and defined by the United States Nuclear Regulatory Commission (NRC). The classes are distinguished by different allowable maximum concentrations of isotopes and requirements for stability, packaging, and segregation from other wastes. Examples of Class A wastes are trash, paper, plastic, lower specific activity resins from nuclear power plants, and most medical and institutional wastes; Class B wastes generally consist of evaporator concentrates, resins, filters, and sealed sources; and Class C wastes include sealed sources and nuclear power plant irradiated reactor components.

Based on waste volume, 99 % of waste transported in New York State was Class A, and one percent (1.0%) was Class B or Class C.

During 2006, nuclear power plants shipped a total of 139,026.69 ft³ (3,936.80 m³) of Class A, B, & C LLRW containing a total activity of 10,903.5 Ci (403,429,500 MBq) through New York State in 155 shipments. Approximately 44.0 % of the total power plant

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¹Curie (Ci) - the basic unit of activity of any radionuclide that undergoes an average transformation rate of 37 billion transformations per second. One curie is the approximate activity of one gram of radium.

²Becquerel (Bq) - A unit, in the International System of Units (SI), of measurement of radioactivity equal to one transformation per second.

waste volume [61,283.5 ft³ (1,735.36 m³)] and 8.5 % [930.4 Ci (34,424,800 MBq)] of the activity was from New York State nuclear power plants.

Of all the waste transported through New York State in 2006, approximately 71.38 % of the volume and 78.02 % of the activity was generated in New York State. This consisted of 239,886.68 ft³ (6,792.83 m³) with a total activity of 36,628.91 Ci (1,355,269,300 MBq). The remaining 28.62 % of the waste volume transported through New York State came in shipments from the states of Massachusetts, Pennsylvania, Connecticut, New Hampshire, New Jersey, Vermont, Delaware, Michigan, West Virginia, Virginia, Rhode Island, Ohio, North Carolina, Maryland and Maine, and in shipments from brokers (consolidated shipments and local broker collections). New Jersey was the single greatest out-of-State contributor, with 31,452.49 ft³ (890.64 m³) and 21.23 Ci (785,510 MBq) transported by non-broker transporters.

Wastes transported through New York State either were brought into New York for temporary storage for consolidation and forwarding (New York State-based brokers) or were shipped on New York State roads en route to another state for disposal, storage, or treatment. New York State-generated waste was sent for treatment or disposal primarily to the Alaron Corporation in Wampum, PA; Envirocare facility (EnergySolutions) in Clive, Utah; GTS Duratek facility (EnergySolutions) in Oak Ridge, TN; Studsvik/RACE, LLC, Memphis, TN; Studsvik Processing Facility, Erwin, TN; Perma-Fix of Florida, Gainesville, FL; NSSI / Recovery Services, Houston, TX; and the Chem-Nuclear Disposal Facility (Duratek) in Barnwell, SC. Other treatment or disposal facilities that received waste generated in New York State or surrounding New England states include: Diversified Scientific Services, Inc. (DSSI), Kingston, TN; Materials & Energy Corporation (M&EC) Oak Ridge, TN; RSO, Inc., Laurel, MD; Waste Control Specialists, LLC, Andrews, TX; NSSI, Inc., Houston, TX; NNSA/Nevada NTS, Mercury, NV; and Lawrence Livermore National Laboratory, Livermore, CA.

Waste was carried by fourteen (14) permitted transporters, consisting of one (1) New York State-based broker, one (1) out-of-State broker, and twelve (12) non-broker transporters. The non-broker transporters are, for the most part, based in states other than New York State

The reader should be aware that individual data entries in the text and tables of this Report have been rounded. Because the totals shown in the tables represent the sum of rounded entries, they may vary slightly from one table to another.

SECTION I: INTRODUCTION

Enabling Legislation

The legislative directive for establishing a LLRW permit and manifest tracking system is set forth in Chapter 508 of the Laws of 1986 of New York State. This Act directed the New York State Department of Environmental Conservation (NYSDEC) to issue an annual report based on the LLRW manifests received. The law directed that such report shall include, but not be limited to, information on the origin, destination, types of LLRW, and frequency of highway shipments into, within, and through New York State.

Chapter 508 amended Sections 27-0303 and 27-0305 of Article 27, Title 3 of the Environmental Conservation Law (ECL) to include LLRW as a regulated waste, require a permit for LLRW transportation into, within, and through New York State, require a manifest tracking system and require promulgation of regulations to implement this program.

On January 1, 1987, the NYSDEC amended on an emergency basis the Waste Transporter Permit Regulations, codified as 6 NYCRR Part 364, to include LLRW as a regulated waste, to require a permit for its transport within the State, and to require that manifest copies be sent to the Department.

On February 27, 1987, the Low-Level Radioactive Waste Transporter Permit and Manifest System Regulations (6 NYCRR Part 381) were adopted on an emergency basis, and the emergency rule making for Part 364 with similar requirements was allowed to lapse. The emergency Part 381 regulations were maintained in effect until they became a final rule on September 15, 1988, after the issuance of a final environmental impact statement (FEIS). This impact statement was issued in July 1988, and was entitled “Final Generic Environmental Impact Statement for Promulgation of 6 NYCRR Part 381: Regulations for Low-Level Radioactive Waste Transporter Permit and Manifest System.”

Purpose and Need

Low-level radioactive waste is defined in Chapter 508 as:

“. . . radioactive material that:

- a. is not high-level radioactive waste, transuranic waste, spent nuclear fuel, or the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content; and

- b. the United States Nuclear Regulatory Commission consistent with federal law and in accordance with paragraph a. of this subdivision, classifies as low-level radioactive waste.”

The Low-Level Radioactive Waste Transporter Permit and Manifest System Regulations apply to the transport of LLRW as defined above. These regulations do not, however, apply to radioactive material that is not LLRW. In addition, LLRW that is generated by the United States Department of Energy (DOE) and the United States Department of Defense is not tracked on the manifest system. These agencies and their prime contractors are exempt from 6 NYCRR Part 381 and are, therefore, not required to obtain permits or submit manifests to the NYSDEC. 6 NYCRR Part 381 regulates the transport of LLRW by highway only. Therefore, shipments of LLRW by rail or water are not regulated under Part 381.

As stated in the FEIS for Part 381, LLRW when properly transported, does not constitute a significant environmental impact. The 6 NYCRR Part 381 regulations were promulgated to ensure the proper transport of LLRW. Manifest copies submitted to the NYSDEC in accordance with 6 NYCRR Part 381, Section 381.13 provide the NYSDEC and the people of the State of New York with information on LLRW transport within the State. This information is useful in determining the point of origin and eventual disposal, assessing potential transportation hazards, and assisting emergency response plans where necessary. The manifest tracking system thus provides documentation that LLRW is properly disposed of and assists in enforcement actions to assure that it is.

The establishment of a manifest tracking system results in New York State meeting its Agreement State obligations to implement NRC manifest requirements set forth in 10 CFR Part 61, 10 CFR Part 20 Section 20.2006 and Appendix G. All licensees are required to use Appendix G which, among other things, requires the use of the NRC uniform manifest (Form 540, Form 541, etc.).

The NRC has evaluated the NYSDEC’s regulatory programs dealing with LLRW transportation and release of radioactive materials to the environment. The New York State LLRW transportation permit and manifest program (6 NYCRR Part 381) has been determined to be compatible with the NRC regulatory program for NRC regulated radioactive material.

General Manifest Data Base Structure

Three basic types of LLRW transport movements occur in New York State. These types are: (1) collection of LLRW within and outside of the State by New York State-based brokers and storage within the State for a period of time; (2) pickup of LLRW by out-of-State brokers for storage in their respective states; and (3) transport to treatment, storage, or disposal facilities (TSDF) located outside of the State by non-broker transporters and New York State brokers (consolidated shipments).

One data base was established to track out-of-State broker collections, non-broker transporter shipments, and New York State broker consolidated shipments which all leave the State for treatment, storage, or disposal. The broker consolidated shipments may represent waste collected in the previous year as well as some waste collected during the present year. Evaluation of this data base provides information on all waste that travels through or from New York State en route to a TSDF.

A second separate data base was established for New York State-based broker collections which are temporarily stored in New York State. New York State-based brokers (in 2006, Radiac Research Corporation was the only one) frequently make collections from New York State LLRW generators and those of neighboring states and store the waste at their facilities for a period of time prior to shipping the waste for treatment or disposal out-of-State. This time period can be up to a year in some cases but more often is a matter of weeks or a few months. This data base provides information on LLRW that is not immediately shipped out of the State for treatment or disposal. The New York State generated portion of this waste is included in the total annual waste production for New York. However, this waste is not counted as leaving New York State until it is placed in the consolidated shipments mentioned above.

This Report describes the three general categories of LLRW transport in three separate sections. The first category is LLRW collections by New York State-based brokers. The second category is LLRW collections by out-of-State brokers. The third category consists of non-broker transport and New York State broker consolidated shipments which go to out-of-state TSDFs. In addition, the New York State generated component of these consolidated broker shipments is also described in each section.

Classes of Low-Level Radioactive Waste

The LLRW carried by the transporters in this Report has been subdivided into three classes by the NRC in 10 CFR Part 61. The classes of LLRW are:

Class A

Class A wastes are wastes for which there are no stability requirements, but which must be disposed of in a manner segregated from other wastes if not stabilized. These wastes, termed Class A “segregated” wastes, are defined in terms of maximum allowable concentrations of certain isotopes and certain minimum requirements on waste form packaging that are necessary for safe handling. Class A wastes are often referred to as Class AS (stabilized) or Class AU (unstabilized). If a package of Class A waste meets the stability requirements, it can be disposed of with Class B wastes. These wastes would be typically composed of materials with low concentrations of radionuclides. The large majority of LLRW in New York are Class AU. These include trash, paper, plastic, low specific activity resins, and most medical and institutional wastes.

Class B

Class B wastes are wastes which need to be placed in stable form (i.e., last a long time and not change its size and shape significantly during that period of time) and disposed of in a manner segregated from unstable waste forms (Class AU). Class B wastes are defined in terms of allowable concentrations of specific isotopes, and for disposal must satisfy both stable waste form and minimum handling requirements. These wastes would be composed of moderate concentrations of short-lived radionuclides and possible low concentrations of some long-lived radionuclides. Examples of Class B wastes include evaporator concentrates, resins, filters, etc., from nuclear power plants or from research reactors.

Class C

Class C wastes are wastes which need to be placed in stable form, disposed of in a manner segregated from non-stable waste forms, and disposed of so that a barrier is provided against potential inadvertent intrusion after institutional controls have lapsed. Class C wastes are defined in terms of allowable concentrations of isotopes. These wastes have high concentrations of either or both long- and short-lived radionuclides. Class C wastes generally account for less than ten percent (10%) of the volume of all LLRW generated in New York State. In 2006, Class C wastes accounted for less than one percent. These wastes are generated primarily by nuclear power plants.

SECTION II: LLRW TRANSPORT BY NEW YORK STATE BROKERS

Radiac Research Corporation (RRC) was the only New York State-licensed broker operating during 2006. A total of one hundred forty eight (148) manifests were submitted by RRC for the year 2006. Information such as generator, broker, and transporter names and addresses are entered into the data base. Information regarding LLRW waste class, waste description, and shipment date are entered. Numeric fields such as total packages, disposal volume, and total activity are entered and summed.

LLRW brokers (also called collectors) typically collect LLRW from various generators (both within and outside New York State) and bring the material back to their facilities for storage. The waste packages are eventually consolidated in a number of large loads and transported either by the broker or another transporter to a disposal or waste compaction/treatment facility. The amount of LLRW shipped out of the State in any one year is often close to the amount collected in that year. The waste collected in one year may or may not be shipped out of the State in that year. The date the waste is shipped depends, in part, on accumulating sufficient waste for a full consolidated load. RRC collected 3,019.56 ft³ (85.50 m³) of LLRW in 2006 from New York and other states. The waste was contained in 507 packages and had a total activity of 9.4 Ci (347,800 MBq). The maximum activity for any one collection was 2.59 Ci (95,830 MBq).

RRC shipped 2,933.0 ft³ (83.05 m³) out of the State in consolidated shipments for disposal or treatment during the same time period (See Table IV-1, page 12). The total activity of these consolidated shipments was 4.253 Ci (157,361 MBq) and was contained in 487 waste containers.

Origin and Destination

RRC collected LLRW from nine (9) states other than New York during 2006. This waste was brought back to their facility in Brooklyn, New York. Approximately fifty-four percent (53.78 %) of the waste collected (by volume) came from New York State generators in 92 of the 148 waste collections. The New York State waste component of these collections had an activity of 5.87 Ci (217,190 MBq) which represents about 62.4 % of all waste activity collected. Table II-1 lists the states from which waste was collected in the year 2006.

**TABLE II-1
ORIGIN OF LLRW IN NYS BROKER COLLECTIONS**

Generators	Volume		Activity		Number of Collections
	ft ³ (cubic feet)	m ³ (cubic meters)	Ci (curie)	MBq (megabecquerel)	
New York	1623.83	45.98	5.87	217,190	92
New Jersey	395.66	11.204	2.69	99,530	13
Connecticut	362.44	10.262	0.053	1,961	13
Pennsylvania	9.65	0.273	0.555	20,535	3
Vermont	8.5	0.2407	0.0000711	2.6307	1
Massachusetts	442.4	12.527	0.233	8,621	17
Maine	22.5	0.637	0.000003	0.111	1
North Carolina	73	2.067	0.000145	53.65	1
Ohio	0	0	0	0	0
New Hampshire	46.4	1.314	0.000656	24.272	3
Rhode Island	35.21	0.997	0.0057859	214.078	4
Totals	3019.56	85.50	9.41	348,131.74	148

Collection Frequency

LLRW was collected by RRC several days a week, except for holidays and weekends, and in all months of 2006. These LLRW collections consisted mainly of local pickups and return of the waste to the broker's facility. RRC performed approximately 12.3 collections per month for the 12-month period. The minimum number of collections per month was one (1) and the maximum number was 23. A total of 105 generators were serviced by RRC during 2006. Fifty-eight (58) of these generators were located in New York State.

Waste Categories

New York State-based brokers (in this case RRC) transported LLRW in 148 individual collections. Ninety-nine percent (99.66%) of this waste by volume was Class A. There was no Class B waste collected and only eight shipments contained some Class C waste (sealed sources). A variety of LLRW types are collected by brokers from hospitals, universities, and other businesses. Materials contaminated by radioactive isotopes are grouped in general categories or types. The following is a listing of LLRW types collected by brokers and the total number of collections (shipments) for each type (see Table II-2).

**TABLE II-2
LLRW TYPES COLLECTED BY NYS BROKERS**

Waste Type	Waste Class	# of Collections	Percent
Compactible Trash (DAW)	AU	87	58.8
Scintillation Fluids	AU	10	6.8
Other	AU	30	20.3
Glassware	AU	4	2.7
Paint/Plating	AU	1	0.675
Depleted Uranium	AU	2	1.35
Animal Carcass	AU	1	0.675
Other EPA Hazardous	AU	0	0
Aqueous Liquids	AU	2	1.35
Sealed Sources	AS/AU/C	9	6.0
Mechanical Filter	AU	1	0.675
Demolition Rubble/Soil	AU	1	0.675
Totals		148	100%

Package Types Transported By Brokers

LLRW brokers collect primarily Class A waste that is normally packaged in United States Department of Transportation (DOT) Type A packaging. Type A packaging is designed to withstand the stress of transportation under normal non-accident conditions. Strong tight containers (STC) are sometimes used if the waste is low-specific activity

(LSA). LSA material packaged in STC must be carried in exclusive use vehicles. "Exclusive use" is defined in 49 CFR 173.403 as meaning ". . . the sole use of a conveyance by a single consignor and for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignee or consignor. Any loading or unloading must be performed by personnel having radiological training and resources appropriate for safe handling of the consignment." There were 26 New York State broker shipments designated as "exclusive use" in 2006. The Type A packaging used for local broker collections consists primarily of 55-gallon (7.5 ft³), 30-gallon (4.01 ft³), or 5-gallon (0.67 ft³) metal drums. In some cases wood or fiber boxes (5.0 ft³) or plastic pails (0.67 ft³) are used.

Placarding

The DOT specifies packaging, labeling, and placarding requirements in 49 CFR 172 for all hazardous material transport, including radioactive material. The DOT labeling requirements are based on the transport index (T.I.), maximum surface radiation levels, and fissile class. The three labels possible for radioactive packages are "White I," "Yellow II," or "Yellow III" (lowest to highest category). For the most part, brokers transport LLRW in packages bearing either the "White I" or "Yellow II" labels. In some cases, a small number of packages may bear the "Yellow III" label. Broker collections containing packages with "Yellow III" labels are required to have radioactive placards placed on the vehicle pursuant to 49 CFR, Section 172.504. In 2006, there were three (3) shipments by a broker that had packages with a "Yellow III" label on them.

SECTION III: LLRW TRANSPORT BY OUT-OF-STATE BROKERS

In the past, two out-of-state brokers have operated in New York State. During the year 2006, ADCOM Express, Inc. (ADCO) was the only out-of-State LLRW broker that transported waste within or through New York State. A total of 51 manifests were submitted to the Department by this waste broker during 2006. Out-of-State brokers are required to submit manifests for collections that originate in, or pass through New York State. ADCO performed 51 LLRW collections servicing primarily universities and hospitals. The manifests submitted indicate that 21 of the 51 collections performed by ADCO were from New York State generators and the rest were from neighboring states.

The total activity of LLRW collected by this broker was 204.23 Ci (7,556,510 MBq). The total volume collected was 764.7 ft³ (21.65 m³). A total of 144 waste packages contained this LLRW volume.

Origin and Destination

New York State generators produced the LLRW for 21 of the 51 collections by out-of-State broker(s). There were 30 manifests submitted to the Department from ADCO that showed LLRW shipments from neighboring states (CT, MA, NJ, PA) passing through New York. The waste collected by this out-of-State broker was taken back for storage or consolidation into larger shipments to ADCO's facility. Approximately 764.7 ft³ (21.65 m³) of LLRW went back to ADCO in Illinois.

This waste is sometimes stored for decay or is eventually placed in consolidated loads and sent to a disposal or waste processing facility.

Shipment Frequency

LLRW was collected by ADCO in an eleven (11) month period of the year. During the eleven-month period of 2006 in which the collections were performed, waste was collected approximately 4.64 times per month (average). The month of September had the highest number of collections (9). The months of August and October had the lowest number of collections (1) each month. The waste types (e.g., compactible trash) collected by the one out-of-State broker are similar to those collected by New York State brokers.

Generator Category

There are five general categories of LLRW generators that are serviced by out-of-State brokers. These generator categories are: industry, hospitals, universities, research organizations, and government.

Placarding

LLRW which meets the DOT criteria for low specific activity (LSA) can be transported in DOT Type A containers and labeled with the appropriate label, or can be stenciled "Radioactive Material LSA" and transported in "exclusive use vehicles." The DOT regulations in 49 CFR require that all vehicles carrying "Yellow III" packages or "LSA" packages carried in exclusive use vehicles must be placarded with the appropriate DOT placard. Out of 51 shipments carried by ADCO, 47 shipments were designated as "exclusive use" shipments.

SECTION IV: LLRW TRANSPORT BY NON-BROKER TRANSPORTERS AND NEW YORK STATE BROKERS IN CONSOLIDATED SHIPMENTS

Non-broker transporters are those carriers of LLRW that generally do not perform small waste collections and are not licensed to store LLRW for load consolidation or perform other broker functions. Non-broker transporters typically pick up one large shipment of LLRW from the waste generator and transport it directly to a disposal facility or licensed waste processor. Consolidated shipments by New York State-based brokers are included in this section because the loads are generally of the same volume and the waste is leaving New York State for disposal or treatment prior to disposal.

Twelve (12) non-broker transporters and one (1) New York State based broker transported LLRW from or through New York State directly to a disposal facility or a licensed waste processor during 2006. These transporters carried 332,289.14 ft³ (9,409.38 m³) of LLRW in 811 shipments within or through New York State during 2006. This is a larger volume than the volume of LLRW transported in 2005 by these transporters (275,898.5 ft³ [7,812.5 m³] in 608 shipments).

The total activity of the LLRW transported in the 811 shipments by non-broker transporters and brokers in consolidated shipments was 46,734.72 Ci (1,729,184,640 Mbq). This is an increase from year 2005 (23,590.263 Ci [872,839,731 Mbq]). Increases or decreases in total activity transported in any one year are largely dependent on nuclear power plant maintenance or site remediations.

Non-broker transporters generally service large industrial firms and nuclear power plants. Many shipments carried by these transporters are of lower volume than the broker consolidated shipments, but have higher activity. Non-broker transporters carry waste Classes AS, AU, B, and C. Some of this waste is carried in Type B packages.

New York State broker consolidated shipments represent an amalgamation of waste collected and stored at broker facilities in the State. The individual waste packages that are packed and labeled by the generator remain intact and are consolidated into one large load destined for disposal or waste treatment. Broker consolidated shipments are comprised of primarily Class AU LLRW and are transported in Type A packages. The amount of waste in consolidated shipments is shown in Table IV-1 (page 12).

Origin and Destination

Twelve (12) states, other than New York State, have their waste transported through this State by these transporters. In addition, broker consolidated shipments

contained LLRW collections from various New England states. Table IV-1 shows the volume and activity of LLRW leaving or going through the State.

Treatment, Storage or Disposal Facilities (TSDF)

A total of seventeen (17) different TSDFs were used by New York State-permitted non-broker transporters during 2006. These facilities are:

GTS Duratek (*EnergySolutions*), Oak Ridge, TN;
Barnwell Waste Management Facility (Duratek), Barnwell, SC;
Envirocare of Utah (*EnergySolutions*), Clive, UT;
Thomas Gray Associates (Environmental Mgt. & Control) Turlock, CA
Studsvik Processing Facility, Erwin, TN;
Lawrence Livermore National Laboratory, Livermore, CA;
Diversified Scientific Services, Inc. (DSSI), Kingston, TN;
Alaron Corporation, Wampum, PA;
NSSI, Inc., Houston, TX;
Studsvik/RACE Logistics LLC, Memphis, TN;
Materials & Energy Corporation (M&EC), Oak Ridge, TN;
Perma-Fix of Florida, Gainesville, FL; and
Waste Control Specialists, Andrews, TX;
NNSA/Nevada NTS, Mercury, NV;
Pacific EcoSolutions (PecoS), Richland, WA;
RSO, Inc., Laurel, MD;
TOXCO Material Management Corp., Oak Ridge, TN.

The majority (33% by volume) of the waste transported by non-broker transporters and brokers in consolidated shipments went to the GTS Duratek Facility in Oak Ridge, TN. This waste was processed prior to disposal. The Envirocare Facility in Clive, Utah received (for disposal) 24.3% of the total volume. Alaron Corporation in Wampum, PA received (for treatment) 26.6% of the LLRW and Studsvik/RACE Logistics LLC received (for treatment) 12.2%. The Barnwell Waste Management Facility in Barnwell, SC, received less than one percent (0.26%) by volume. The remaining 3.6 % went to the other TSDFs. Table IV-2 (page 13) lists the TSDFs and the amounts each received.

TABLE IV-1
STATES TRANSPORTING LLRW WITHIN OR THROUGH NEW YORK

State of Origin	Total Volume		Total Activity	
	ft ³ (cubic feet)	m ³ (cubic meters)	Ci (curie)	MBq (megabecquerel)
Broker Consolidated ¹	1,450.95	41.086	1.242	45,954
Broker Consolidated ²	1,482.05	41.967	3.011	111,407
New York ³	238,233.928	6,746.034	36,627.63	1,355,222,310
Maine	3,428.2	97.076	7.56	279,720
Massachusetts	10,163.13	287.788	8,812.425	326,059,725
Vermont	6,490.97	183.804	838.209	31,013,733
Connecticut	30,875.18	874.288	324.476	12,005,612
Virginia	8.18	0.232	0.00101	37.37
New Jersey	31,256.09	885.074	20.033	741,221
New Hampshire	8,548.56	242.068	99.475	3,680,575
Delaware	0.68	0.0193	0.006	222
Pennsylvania	127.38	3.607	0.0623	2305.1
North Carolina	73	2.067	0.000145	5.365
Maryland	95	2.69	0.56	20,720
Rhode Island	55.84	1.58	0.021439	793.243
Tennessee	0	0	0	0
Illinois	0	0	0	0
Kentucky	0	0	0	0
Wisconsin	0	0	0	0
Totals	332,289.138	9,409.38	46,734.71	1,729,184,340

¹ Portion of broker consolidated shipment generated in New York State.

² Portion of broker consolidated shipments generated in other states

³ LLRW generated in New York State and transported by non-broker transporters

The reader should be aware that individual data entries in the text and tables of this Report have been rounded. Because the totals shown in the tables represent the sum of rounded entries, they may vary slightly from one table to another.

**TABLE IV-2
TSDFs RECEIVING LLRW TRANSPORTED FROM OR
THROUGH NEW YORK STATE**

TSDFs	Volume		Activity	
	ft ³ (cubic feet)	m ³ (cubic meters)	Ci (curie)	MBq (megabecquerel)
GTS Duratek	109,866.218	3,111.06	30,031.27	1,111,156,990
Barnwell	872.68	24.71	9,067.964	335,514,668
Envirocare	80,722.81	2,285.82	18.58	68,7460
TOXCO Material Mgmt.	379.15	10.736	0.04826	1,785.62
M & EC	183.08	5.18	0.0579	2142.3
Studsvik/Race Logistics LLC	40,684.83	1,152.07	59.234	2,191,658
Alaron Corporation	88,398.61	2,503.17	2.59	95,830
Perma-Fix of Florida	702.47	19.89	0.369	13,653
Studsvik Processing	4,804.05	136.035	1,767.382	65,393,134
NSSI, Inc.	1,276.53	36.147	0.184	6,808
NNSA/Nevade NTS	688	19.48	4,362.8	161,423,600
RSO, Inc.	242.25	6.86	0.0005	18.5
DSSI	506.14	14.33	102.51	3,792,870
PECoS, LLC	1,317.2	37.30	21.137	782,069
Thomas Gray Assoc. Envir Mgt & Control	54.72	1.55	0.3865	14,300.5
Lawrence Livermore/ National Lab	22.5	0.637	1,300.198	48,107,326
Waste Control Specialists	1,567.9	44.4	0.00326	120.62
Totals	332,289.138	9,409.375	46,734.71442	1,729,184,433.54

Note: This Table does not include TSDF's used by out-of-State brokers
discussed in Section III.

Shipment Frequency

Eight hundred eleven (811) shipments of LLRW were transported out of or through New York State during 2006 by non-broker transporters or New York State brokers in consolidated shipments. This averages out to about 67.6 shipments per month. The number of shipments ranged from 34 to 109 per month. Of the 811 shipments, 770 were shipments of Class A LLRW, twenty-four (24) of Class B, and seventeen (17) of Class C.

Waste Categories

The waste types carried by brokers in consolidated loads are essentially the same as those found in small broker collections except that the volume is larger. The waste is typically Class AU and consists primarily of compactible trash and scintillation fluids. Hospitals, universities, government, research, and non-nuclear industry are serviced primarily by brokers and are represented in the broker consolidated shipments.

The majority of waste types transported by non-broker transporters are derived from nuclear power plants and large industrial and manufacturing firms. These waste types include mixed bead ion exchange resins, evaporator bottoms, filter media, irradiated reactor components, solidified liquids, contaminated soil/debris, and compactible or non-compactible trash.

Package Types Transported by Non-Broker Transporters

The DOT has established two basic types of packaging for radioactive material transport. These package types are Type A and Type B. Generally speaking, Type A packaging is designed to withstand the stress of transportation under normal non-accident conditions, while Type B packaging is designed to withstand the stress associated with actual or hypothetical accident conditions. Radioactive material which is less than the A1 or A2 values established in 49 CFR 173.435 can be transported in Type A packaging. Normally, any radioactive material exceeding the A1 or A2 values must be transported in a Type B container. In addition to these two basic types, industrial packages (IP) are used for certain types of waste. Low specific activity (LSA) material and surface contaminated objects (SCO) may be transported in industrial packages IP-1, IP-2 and IP-3 provided that the waste meets the requirements of 49 CFR 173.427. In addition to other requirements in that section, the waste must not exceed 1 rem/h for the unshielded dose rate at three meters and cannot exceed the activity limits listed in Table 5 of that section. If the waste package exceeds the unshielded dose rate limit, or the waste is greater than the Table 5 activity limits, then the waste must be transported in a Type B package as provided in 10 CFR 71.

A total of 3,770 LLRW packages were transported by these transporters during 2006. A total of 479 of the 811 shipments transported by non-broker transporters and New York State brokers in consolidated shipments were designated as “exclusive use.”

Transporters

In 2006, RRC was the New York State-based broker that, in addition to local broker collections, also transported LLRW to disposal or processing facilities in consolidated shipments (waste from more than one generator, stored and then combined in one shipment) and direct shipments for disposal. The remaining transporters carried waste in direct shipments only (no storage for consolidation).

**TABLE IV-3
LLRW TRANSPORTERS**

Transporter Name	Waste Volume ft³	Waste Volume m³	Waste Activity in Ci	Waste Activity in MBq
Hittman Transport Services, Inc.	118,301.16	3,349.92	40,890.996	151,296,852
T.A.G. Transport, Inc.	747.09	21.155	1.135	41,995
Tri-State Motor Transit	3,886.198	110.045	1,329.69	49,198,530
Buffalo Fuel Corporation	130,814.82	3,704.26	6.642	245,754
Priority Transport Services	3,049.51	86.35	3.11	115,070
R & R Transport, Inc.	222.58	6.3	1.079	39,923
RSB Logistics	7,043.43	199.45	4,364.41	161,483,170
Dart Trucking	452.47	12.81	10.171	376,327
Onyx/Veolia Environmental Services	2,277.97	64.5	87.015	3,219,555
Radiac Research Corporation	4,184.49	118.49	6.832	252,784
Studsvik/RACE Logistics, LLC	40,484.42	1,146.39	32.134	1,188,958
McCutcheon Enterprises	20,727	586.92	1.484	54,908
J. Supor and Son Trucking	98	2.775	0.0196	725.2

SECTION V: COMPARISON WITH NYSERDA DATA

The volume and activity of LLRW presented in this Report for New York State generators may or may not closely coincide with New York State generator data contained in the New York State Energy, Research and Development Authority's (NYSERDA) LLRW Status Report for the same year. This is due to a number of reasons.

Some nuclear power plants find it more economical or more practical to ship heavy casks of irradiated reactor components directly to LLRW burial sites by rail and/or barge. Shipment of LLRW by rail car or barge is not regulated under 6 NYCRR Part 381 and, therefore, these shipments are not tracked on the manifest data base. The generator of this waste will, however, report it to NYSERDA for that year.

Some radioactive material is shipped out of New York State for decontamination and recycling to facilities such as GTS Duratek in Oak Ridge, TN. These materials are shipped as radioactive material rather than LLRW. Some of this radioactive material is eventually determined to be LLRW at these out-of-State facilities and is shipped to a disposal site. No LLRW manifests are received by NYSDEC in these cases and, therefore, this LLRW is not tracked on the manifest data base. Generators of this material are, however, notified of the resultant volume and activity of the LLRW and include that material in their report to NYSERDA.

LLRW volumes that are contained in this document represent initial volume shipped before compaction. Much of the LLRW sent to treatment facilities is volume reduced. In many cases, waste volumes found in the NYSERDA LLRW Status Report are after volume reduction has been performed.

In some cases, shipments of LLRW which are en route to compaction or treatment facilities may have shipment dates near the end of one year and actual disposal dates early in the following year. The NYSDEC manifest data base uses the shipment date to determine whether a shipment is listed in one annual report or the following one. Generators will often send NYSERDA information they received from disposal sites based on the actual date of burial. Waste shipped in one year could conceivably be listed in the next year's NYSERDA LLRW Status Report.

Lastly, the data in this document is based on LLRW manifests received by NYSDEC from permitted LLRW transporters. This Report relies on transporter compliance with requirements for sending in manifests. Non-compliance will result in missing data.

SECTION VI: GENERAL CONCLUSIONS

A total of 1,010 manifests with their associated continuation sheets were received by the NYSDEC from all LLRW transporters for 2006 LLRW shipments in accordance with 6 NYCRR Part 381. The manifest data presented in this Report provides useful information on the types of LLRW transported, the number of shipments and their frequency, and the origin and destination of the LLRW transported.

The following general conclusions are based on these data:

1. ***LLRW Shipments*** - Transporters permitted under 6 NYCRR Part 381 in 2006 performed a total of 148 in-State broker collections and 862 shipments to TSDFs located outside of New York State. The latter 862 shipments consisted of 51 out-of-State broker shipments and 811 non-broker transporter and broker consolidated shipments.
2. ***New York State-based brokers*** - A substantial amount of the LLRW (46.2%) collected by New York State-based brokers was generated in states other than New York. These states are primarily in New England. RRC collected 3,019.6 ft³ (85.5m³) of LLRW with a total activity of 9.407 Ci (348,059 MBq). RRC shipped in consolidated shipments about 2933 ft³ (83.05 m³) with an activity of 4.253 Ci (157,361 MBq) for disposal (see No. 4 below).
3. ***Out-Of-State Brokers*** - One out-of-State broker permitted under 6 NYCRR Part 381 to transport LLRW into, within, and through New York collected a total of 764.7 ft³ (21.65 m³) with a total activity of 204.225 Ci (7,556,325 MBq). Approximately twenty-six (26.4) percent of this waste volume was generated in New York State.
4. ***Non-Broker Transporters*** - A total of 332,289.14 ft³ (9,409.38 m³) of LLRW having a total activity of 46,734.72 Ci (1,729,184,640 MBq) was transported into, within, or through New York State in 2006 by non-broker transporters and brokers in consolidated shipments. These shipments were en route to TSDFs located outside New York. This is a larger volume of waste than was transported in year 2005.
5. ***TSDF's*** - The LLRW disposal facility in Barnwell, SC, received less than one percent (0.26%), by volume, of the waste transported from or through New York State. The GTS Duratek LLRW treatment facility in Oak Ridge, TN, received approximately 33% of the waste. Envirocare of Utah, located in Clive, UT, received 24.3% of the waste volume. Alaron Corporation,

located in Wampum, PA received 26.6% and Studsvik/RACE Logistics LLC in Memphis, TN received 12.2%. The remaining 3.6% went to facilities such as: Studsvik Processing Facility, Erwin, TN; Perma-Fix of Florida, Gainesville, FL; NSSI, Inc., Houston, TX; DSSI, Kingston, TN; TOXCO Material Management Corp., Oak Ridge, TN; and Materials & Energy Corporation (M & EC), Oak Ridge, TN. A small amount of the waste was also transported to the broker storage facilities of ADCOM Express in Tinley Park, IL. The final destination of the LLRW collected by out-of-State brokers is undetermined because it is taken to facilities outside of New York State and shipped for disposal at a later date.

6. ***Broker Shipment Frequency*** - The frequency of LLRW transport varies depending on whether the shipment is a broker collection or a load destined for treatment or disposal. New York State-based broker collections occurred several days a week except holidays and weekends. The one New York State based broker averaged 12.3 collections per month. Broker collections in New York by out-of-State brokers averaged about 4.64 collections per month.
7. ***Non-Broker Transporter Shipment Frequency*** - In 2006, a total of 811 shipments of LLRW were transported out of or through New York State by non-broker transporters and broker consolidated shipments. These shipments were destined for waste treatment (i.e., volume reduction) or disposal. The frequency of this type of transport averaged out to 67.6 shipments per month. The range of shipments was 34 to 109 per month.
8. ***Waste Class*** - New York State-based brokers and out-of-State brokers transported predominantly Class A LLRW in 2006. Approximately 99 percent of the LLRW volume transported by non-broker transporters or brokers in consolidated shipments was Class A waste. Approximately 1% of the LLRW was Class B or Class C waste.
9. ***Waste Type*** - Contaminated compactible trash constituted the major waste type carried by both New York State brokers and out-of-State brokers. Scintillation vials, aqueous liquids, biological, sealed sources, and organic liquids constituted the remainder. The major waste types carried by non-broker transporters are primarily derived from nuclear power plants and large industrial or manufacturing firms. These waste types are (in order of volume magnitude), non-compactible dry active waste (DAW), compactible DAW, activated material, contaminated equipment, mixed bead ion exchange media, and demolition rubble.

10. ***Exemptions*** - 6 NYCRR Part 381 has provisions for exemption from permit and manifest requirements, provided that the applicant can meet existing criteria (381.5(a)-(f)). Currently, six (6) applicants have applied for and received exemptions.

11. ***Transport Safety*** - The safety record for LLRW transport in New York State is excellent. Only eighteen (18) transportation events occurred in New York State during the period 1971 to 2006, and none of these events involved a release of radioactivity to the environment. A transportation event can be anything from an improperly sealed waste package (called an incident) to a vehicular accident. Of the 18 LLRW transportation events during this 35-year period (1971-2006), seven (7) were vehicular accidents and eleven (11) were incidents of minor contamination of empty shipping casks that exceeded regulatory limits. This data is from hazardous materials incident data reports (HMIR) that are required to be filed with DOT. This incident data is available from the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Hazardous Materials Safety within the U.S. DOT.