IEMA
Illinois Emergency Management Agency
Division of Nuclear Safety

Rod R. Blagojevich, Governor
William C. Burke, Director

March 22, 2005

The Illinois Low-Level Radioactive Waste Management Act and 32 Illinois Administrative Code, Chapter II, Part 620 require that all generators and brokers of low-level radioactive waste (LLRW) in Illinois register with the Illinois Emergency Management Agency and file survey forms with the Agency on an annual basis.

The enclosed report is a summarization of the information received from these facilities in 2003. This is the 20th report based upon information received from Illinois generators. Previous yearly reports are available upon request.

Sincerely,

Gary McCandless

Gary W. McCandless, P.E.
Manager, Low-Level Radioactive
Waste & Site Decommissioning

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Enclosure

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State of Illinois
Rod R. Blagojevich, Governor

Illinois Emergency Management Agency
William C. Burke, Director

Low-Level Radioactive Waste 2003 Annual Survey Report

February 2005

IEMA

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PREFACE

In 1980, the Illinois Department of Nuclear Safety (IDNS) was established as the state agency with the responsibility for managing low-level radioactive waste (LLRW) issues in Illinois. On July 1, 2003, the Illinois Department of Nuclear Safety merged with the Illinois Emergency Management Agency (IEMA) and the combined agency is now known as IEMA. The low-level radioactive waste management program is within IEMA/DNS.

The Illinois Low-Level Radioactive Waste Management Act mandates an annual survey of all LLRW generators in Illinois. The IEMA requires all LLRW generators to complete a questionnaire requesting the following information: 1) the types and quantities of LLRW that were either shipped for disposal or stored on site during the year in question; 2) how LLRW is being managed (e.g., treatment); and 3) what management alternatives a generator might use in the future. This is the 20th report based on information provided by Illinois LLRW generators.

Chapter 1 contains an introduction to LLRW, disposal facility history, IEMA agency history, governing regulations, and responsibilities. It also contains general information about the annual surveys, survey results and analyses, and the waste tracking system.

Chapter 2 contains detailed generator category volume and activity information, detailed breakdown of LLRW shipment information and projection data as well as a discussion of mixed waste. This information is from the IEMA database.

Chapter 3 gives volumetric data and activity figures using all generator projections between 2004 and 2010.

Please note that, where possible, International System of Units (S.I.) are included in parentheses behind English units. For example: 141 cubic feet (4 cubic meters).

Annual reports based on the survey of LLRW generators in Illinois are also available for the years 1984 through 2003. Comments on this report and suggestions for preparing future reports are welcome and should be addressed to:

Manager, Low-Level Radioactive Waste & Site Decommissioning
Division of Nuclear Safety
Illinois Emergency Management Agency
1035 Outer Park Drive
Springfield, IL 62704

Additional information about LLRW is also available by writing to the above address and through the agency's website at www.state.il.us/iema.

CONVERSION FACTORS

Multiply English Unit	by	To obtain Metric or System International Unit
Cubic Foot (ft^3)	0.02832	Cubic Meter (m^3)
Millicurie (mCi)	37.0	Megabecquerel (MBq)
Curie (Ci)	0.037	Terabecquerel (TBq)

1 millicurie = 0.001 curies

1 megabecquerel = 1,000,000 becquerels

1 terabecquerel = 1,000,000,000,000 becquerels

CHAPTER ONE
REPORT SUMMARY

INTRODUCTION

Low-level radioactive waste (LLRW) is defined in federal and Illinois law as any radioactive waste that is not high-level radioactive waste, transuranic waste, spent nuclear fuel, or uranium mill tailings. Generators of LLRW include nuclear power plants, hospitals, universities, and manufacturers. Each category of generator produces ordinary trash that has been contaminated by radioactive material as well as waste materials that are typical for the generator. For example:

-Nuclear power plant LLRW includes protective clothing, resins, filters and filter sludges from water cleanup equipment, and activated reactor hardware.

-Medical and research LLRW includes radionuclides used for research and for diagnostic and therapeutic procedures, power sources for cardiac pacemakers, sealed sources, and laboratory equipment and clothing.

-Industrial LLRW includes machine parts, plastics, radiopharma-ceuticals, medical devices, sealed sources, and consumer goods, such as lantern mantles, smoke alarms, and exit signs.

This report summarizes data on LLRW generated in Illinois. It is based on reports from generators that must be filed annually with the Illinois Emergency Management Agency (IEMA). The Low-Level Radioactive Waste Management Act requires LLRW generators to submit annual reports detailing classes, quantities, and types of LLRW generated.

LLRW DISPOSAL FACILITY HISTORY

During the 1970's, six commercial LLRW disposal facilities operated in the United States: Sheffield, Illinois; Maxey Flats, Kentucky; Beatty, Nevada; West Valley, New York; Barnwell, South Carolina; and Richland, Washington. By the end of 1978, only three remained in operation: Beatty, Barnwell, and Richland. In early 1988, a disposal facility located in Clive, Utah, began accepting naturally occurring radioactive materials (NORM). In 1992, the Beatty disposal facility closed. Today, there are three commercial LLRW disposal facilities open: Barnwell, Richland, and Clive.

IEMA HISTORY AND GOVERNING REGULATIONS

Concern rose during the 1970's about possible shortages of storage and disposal capacity for nuclear waste and about the need for a complete, reliable waste management system for both high-level and low-level radioactive waste. The Three Mile Island (TMI) accident and a series of packaging and transportation incidents prompted several states to pass laws prohibiting further nuclear power plant construction, while other states restricted or prohibited disposal of radioactive waste within their borders. The governors of Nevada, South Carolina, and Washington became concerned that their states would become the nation's disposal grounds for LLRW and banded together to halt disposal operations. Congress responded by passing the Low-Level Radioactive Waste Policy Act in 1980. Under this law, states are encouraged to form regional compacts to regulate and be responsible for the availability of disposal capacity for LLRW generated within their borders.

In this atmosphere, then-Governor James R. Thompson established a separate cabinet-level state agency, the Illinois Department of Nuclear Safety (IDNS). The IEMA's mission was to provide radiation protection for individuals in Illinois, with a goal to manage, establish, implement, and enforce LLRW policies in Illinois.

The Illinois Low-Level Radioactive Waste Management Act of 1983 (Management Act) expanded Illinois' responsibilities to include a LLRW management program with requirements for generators and brokers of LLRW to register and report information regarding their LLRW activities, established fees to fund the program, and called for development of a tracking system to monitor waste disposal.

In late 1984, Illinois and Kentucky formed the Central Midwest Interstate Low-Level Radioactive Waste Compact to develop and implement regional solutions to LLRW disposal issues. The federal Low-Level Radioactive Waste Policy Amendments Act of 1985 established specific milestones, penalties, and mandates to encourage the development of new disposal facilities across the country. Under these statutes, Illinois was selected as the host state for the compact and given the responsibility to oversee the siting, design, licensing, construction and operation of a regional LLRW disposal facility.

The Management Act also called for the attainment of Agreement State status with the U.S. Nuclear Regulatory Commission (NRC). On June 1, 1987, Illinois became an Agreement State and is responsible for regulating LLRW disposal under this agreement.

On July 1, 2003, IDNS merged with IEMA to streamline and consolidate functions. IEMA's Division of Nuclear Safety administers the programs of the former IDNS, while the merged IEMA enables the State to provide efficient use of specialized expertise and facilities in any emergency response to a terrorist attack or other potential disasters involving radioactive materials. Legislative authority to run the program was transferred to IEMA by Executive Order.

ANNUAL SURVEYS

In compliance with the Management Act, IEMA conducts an annual survey of LLRW generators in Illinois and any broker that handles Illinois LLRW within or outside of the state. Each generator provides IEMA with information (by completing a standard questionnaire) about the types, quantities, and activity of LLRW generated, stored, treated and disposed of, and future LLRW shipment projections. Brokers provide information regarding any and all Illinois waste received, treated, processed, and shipped for disposal. These questionnaires are called the Generators' Annual Survey and the Brokers' Annual Survey.

SURVEY RESULTS AND ANALYSES

This report contains information from a database created to include the volume of direct shipments to disposal facilities plus the volume of shipments to brokers or processors obtained from the Generators' Annual Survey. A copy of this standard survey questionnaire is found in Appendix A. The list of generators responding to the survey can be found in Appendix B. This database does not include the after-treatment volume (off-site treatment volume of LLRW transferred to a broker or processor) actually disposed of at the operating LLRW disposal facilities. However, the shipment data includes the data for wastes (e.g., liquid scintillation fluids) shipped for incineration.

Information from the brokers' survey is compared to the information obtained from the generators' survey. This comparison allows the IEMA to offset errors in the reporting and billing process of generators, look at after-treatment volumes of LLRW that were disposed of, and ascertain if and which LLRW generators need to comply with the Management Act. A listing of the brokers that responded to the IEMA survey, including facility names and addresses, can be found in Appendix C.

One other data source is used in this report to identify the final disposal data recorded by the disposal facilities. The U.S. Department of Energy gathers data from the manifests received by the commercial disposal sites and maintains a database accessible via the internet.

TRACKING SYSTEM

Regulatory requirements, entitled "Access to Facilities for Treatment, Storage or Disposal of Low-Level Radioactive Waste," became effective October 1, 1996. The rules, known as the "Tracking System Rules," are codified at 32 Illinois Administrative Code Part 609. This rule implements some of the requirements, prohibitions and mandates of the Central Midwest Radioactive Waste Compact Act, the Radioactive Waste Enforcement Act, and the Illinois Low-Level Radioactive Waste Management Act, by establishing a monitoring and tracking system for LLRW shipments into, out of, or within Illinois. The purpose of the tracking system is to administratively track LLRW shipments from the point of origin to the final place of destination.

All persons who ship LLRW into, out of, or within Illinois must submit to IEMA a Tracking System Permit Application Form for approval. The IEMA reviews the application and, if approved, issues a permit number. Prior to making a shipment to an Illinois broker, the shipper shall either telefax a copy of the shipment manifest to the tracking system operator (TSO) or contact the TSO and provide a limited amount of shipment information over the phone. The Illinois broker provides detailed shipment information to the TSO. For shipments from a generator to an out-of-state broker, a processor, or a disposal facility, the shipper provides the TSO with an electronic data file which contains the pertinent information regarding the shipment in general (consignee, consignor, etc.), the waste in detail (waste type, volume, activity, radionuclides, etc.), and the type and source of shipment (original, consolidated, or final; in or out of state, etc.). The TSO issues a transaction reference number to the shipper within seven days after the receipt of the information.

The IEMA uses the information from the tracking system to provide to Illinois LLRW generators the off-site waste management and shipping tables on the annual surveys. The reporting process was streamlined by having registrants verify the information gathered by the tracking system. This streamlined reporting process also helps prevent delays for registrants submitting yearly information.

CHAPTER TWO
2003 SURVEY RESULTS

GENERATOR DEFINITION AND SURVEY RESPONSE

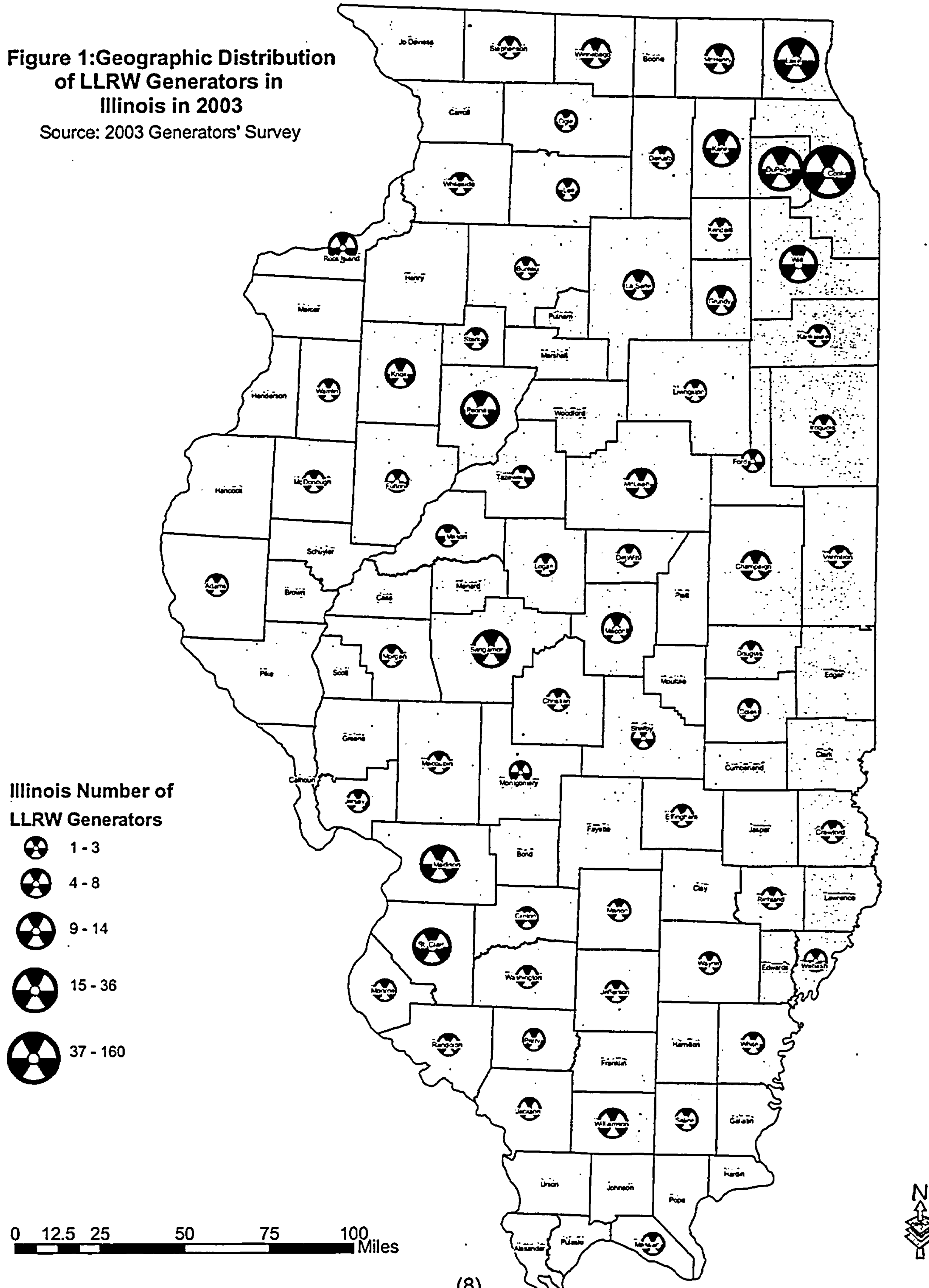
In this report, a LLRW "generator" refers to any individual or organization producing or possessing LLRW in the course of their business operations. Figure 1 shows the geographic distribution of LLRW generators in Illinois during 2003. For the last five years the IEMA has been getting a 98.5% response to the survey. This year the IEMA received 100% response to the 2003 IEMA survey from the 429 registered or reactivated Illinois generators of LLRW. This report is based solely on all the generators who responded to the 2003 IEMA survey.

A LLRW "broker" refers to any entity that takes possession of LLRW for the purpose of consolidation and shipment. At the beginning of the reporting period, the IEMA had 20 registered brokers. All 20 registered brokers responded to the 2003 survey as having received Illinois LLRW.

IEMA uses radioactive materials licenses, broker reports, disposal records, and tracking system permits to identify new or cancelled registrants. During the 2003 reporting period, there were 27 new or reactivated registrations and 28 cancellations. (A listing of the generators that responded to the IEMA survey, including facility names and addresses, can be found in Appendix B.)

Figure 1:Geographic Distribution of LLRW Generators in Illinois in 2003

Source: 2003 Generators' Survey



CATEGORIES AND DEFINITIONS

LLRW generators are classified into six categories according to the activities that generate LLRW.

Academic - Includes LLRW generators from high schools, colleges, universities, and their associated research facilities. University hospitals, however, are placed in the medical category.

Fuel-Cycle - Includes LLRW generators whose operations are part of the nuclear fuel cycle. Illinois has two fuel-cycle generators, one producing uranium hexafluoride used in the nuclear fuel enrichment process and one storing spent nuclear fuel.

Governmental - Includes LLRW generated by city, state, and federal governmental entities. This category also includes federal medical facilities such as Veterans Administration (V.A.) hospitals.

Industrial - Includes LLRW generated by private entities that provide products or services to the private and public sectors. Radiopharmaceutical manufacturers and radiopharmacies are placed in the industrial category even though their product line may be limited to serving medical needs. Likewise, private analytical laboratories and other firms providing services to both non-medical and medical entities, as well as generators such as coal-fired power plants, are included.

Medical - Includes LLRW generated by hospitals, medical centers, clinics, laboratories, and private medical offices. Teaching or research hospitals and medical centers are also included.

Reactor - Includes LLRW generated at nuclear power stations. Reactor wastes are reported by station site rather than by individual reactor. Until January 1998, there were 13 operating reactors at seven stations. Currently, there are 11 operating reactors at six stations.

GENERATOR CATEGORIES

Table 1 illustrates the number of generators included in the IEMA categories for the years 1999 through 2003. From 1999 to 2000, there was a 2.9 percent increase; in 2001, there was a 3.3 percent increase; in 2002, there was a 1.2 percent decrease; and in 2003, there was a 6.7% increase.

TABLE 1
Illinois LLRW Generator Survey Response by Generator Category 1999-2003

Generator Category	1999 Generators	2000 Generators	2001 Generators	2002 Generators	2003 Generators
Academic	40	51	49	42	40
Fuel-Cycle	2	2	2	2	2
Governmental	24	22	21	22	21
Industrial	85	75	80	75	76
Medical	225	237	248	254	283
Reactor	7	7	7	7	7
Total	383	394	407	402	429

2003 Generators' Survey

LLRW VOLUME AND ACTIVITY SHIPPED BY CATEGORY

The breakdown by generator category of the volume and activity of all LLRW shipped in Illinois during 2003 is summarized in Table 2. The volume and activity figures in this table represent all LLRW shipped directly for disposal and to brokerage/processing facilities. Nuclear power reactor facilities shipped 83.9 percent of the LLRW volume (137,249 cubic feet). The industrial facility shipments comprised 73.3 percent of the radioactivity (55 curies).

TABLE 2
2003 Volume and Activity by Generator Category (Direct Shipments Plus Shipments Made to Brokers/Processors)

Generator Category	Volume (ft^3)	Volume (m^3)	Activity (Ci)	Activity (TBq)
Academic	1,481	41	1	<1
Fuel-Cycle	9,282	263	<1	<1
Governmental	595	17	9	<1
Industrial	14,972	424	55	2
Medical	101	3	3	<1
Reactor	137,249	3,887	8	≤1
Totals	163,680	4,635	75	2

2003 Generators' Survey
Totals may not add due to rounding.

Table 3 through Table 8 present detailed volume and activity data for each of the IEMA generator categories in 2003. These tables contain data for respondents that reported shipping LLRW during either 2002 or 2003. Any and all tables indicating values of less than one are not included in the total volumes ending each table. Due to waste production and shipping cycles, many generators will only ship once every few years. This and other pertinent information will be noted and discussed.

Activity figures in the reactor category are given in curies and terabecquerels rather than in millicuries or megabecquerels because the activity of the waste shipped is generally higher. Reactor generator waste shipped in 2003 was lower in activity than in previous years. Activity of waste produced by non-reactor generators is rarely in the curie range, and sometimes the waste is reported in units as small as microcuries.

ACADEMIC – Eighteen out of 40 academic generators shipped waste for treatment or disposal in 2003. Most academic generators are one-time shippers, except for a few of the larger universities and medical schools. All academic waste was shipped through a broker and/or processor. There were eight academic generators that shipped LLRW in 2002 but terminated their registration in 2003. Seven academic generators who reported shipping waste in 2003 were not registered in 2002. One academic generator reactivated their registration in 2003 after being closed years previously. Table 3 represents the academic generators' shipping activity. Between 2002 and 2003, the total volume decreased by 203 cubic feet (6 cubic meters) and the activity decreased by 3,911 millicuries (144,707 megabecquerels).

TABLE 3
Academic LLRW Shipped
2002-2003

Academic Generator	2002 Volume (ft^3)	2002 Volume (m^3)	2002 Activity (mCi)	2002 Activity (MBq)	2003 Volume (ft^3)	2003 Volume (m^3)	2003 Activity (mCi)	2003 Activity (MBq)
Addison Trail H.S.	1	<1	<1	<1	**	**	**	**
Benedictine University	0	0	0	0	1	<1	<1	<1
Bradley University	**	**	**	**	3	<1	<1	<1
DePaul University	8	<1	<1	<1	8	<1	<1	<1
Dundee Crown H.S.	1	<1	<1	<1	**	**	**	**
Finch Univ. of Health Sciences The Chicago Medical School	75	2	4	148	73	2	6	222
Guilford School	1	<1	<1	<1	**	**	**	**
Haines Middle School	*	*	*	*	1	<1	<1	<1
Harper College	1	<1	<1	<1	1	<1	<1	<1
IIT Research	113	3	21	777	0	0	0	0
Illinois Central College	*	*	*	*	1	<1	<1	<1
Lake View H.S.	1	<1	<1	<1	**	**	**	**
Lebanon H.S.	*	*	*	*	2	<1	<1	<1
Lourdes H.S.	1	<1	<1	<1	**	**	**	**
Mather H.S.	1	<1	<1	<1	**	**	**	**
Midwestern University	*	*	*	*	4	<1	1	37
J. Sterling Morton West H.S.	1	<1	<1	<1	1	<1	1	37
Northwestern University	240	7	55	2,035	208	6	600	22,200
Prairie State College	1	<1	<1	<1	**	**	**	**
SIU-Carbondale	0	0	0	0	30	1	3	111
SIU-Edwardsville	4	<1	4	148	12	<1	3	111
Nicholas Senn H. S.	*	*	*	*	1	<1	<1	<1
Amos Alonzo Stagg H.S.	*	*	*	*	3	<1	<1	<1
Adlai E. Stevenson H.S.	*	*	*	*	1	<1	<1	<1
The University of Chicago	1,166	33	932	34,484	729	21	329	12,173
Harry S. Truman College	2	<1	1	37	**	**	**	**
University of Illinois at Chicago	67	2	4,061	150,257	402	11	224	8,288
Total	1,684	47	5,078	187,886	1,481	41	1,167	43,179

2003 Generators' Survey
Totals may not add due to rounding.
Fractions are used in conversions.
*Not registered in 2002.
**Registration canceled.

FUEL-CYCLE – This year the two fuel-cycle facilities shipped a total of 9,282 cubic feet (263 cubic meters) to Barnwell. Honeywell International has been shipping waste as it is generated instead of storing waste for a major shipment. This year Honeywell International increased its volume shipped by 6,393 cubic feet (181 cubic meters). Historically, G. E.'s volume of waste varies from year to year. G. E. decreased its volume shipped by 1,075 cubic feet (30 cubic meters). Table 4 gives 2002 and 2003 volume and activity figures for the LLRW that was shipped by the fuel-cycle category.

TABLE 4
Fuel-Cycle LLRW Shipped
2002-2003

Fuel-Cycle Generator	2002 Volume (ft³)	2002 Volume (m³)	2002 Activity (mCi)	2002 Activity (MBq)	2003 Volume (ft³)	2003 Volume (m³)	2003 Activity (mCi)	2003 Activity (MBq)
G. E. Nuclear Energy	2,176	62	608	22,496	1,101	31	19	703
Honeywell International	1,788	51	<1	<1	8,181	232	359	13,283
Total	3,964	113	608	22,496	9,282	263	378	13,986

2003 Generators' Survey
Totals may not add due to rounding.

GOVERNMENTAL – Three out of the 21 registered governmental generators shipped LLRW to a broker or processor for treatment in 2003. This year there was a 79.8 percent increase in volume and a 10,048 percent increase in activity. This increase is because The Department of the Army, Rock Island Arsenal, is recycling governmental commodities (mainly instruments and articles) containing high levels of tritium. Also The Department of the Army, Rock Island Arsenal, was the only government facility to ship LLRW to Envirocare of Utah. Table 5 shows governmental shipping activity for 2002 and 2003.

TABLE 5
Governmental LLRW Shipped
2002-2003

Governmental Generator	2002 Volume (ft³)	2002 Volume (m³)	2002 Activity (mCi)	2002 Activity (MBq)	2003 Volume (ft³)	2003 Volume (m³)	2003 Activity (mCi)	2003 Activity (MBq)
Department of the Army Rock Island Arsenal	0	0	0	0	495	14	9,026	333,962
Department of Veteran Affairs	55	2	45	1,665	10	<1	2	74
IEMA	49	1	33	1,221	0	0	0	0
Nat'l Center for Food Safety & Technology	8	<1	<1	<1	**	**	**	**
U.S. Nuclear Commission Region III	15	<1	<1	<1	**	**	**	**
V.A. Chicago Healthcare	204	6	11	407	0	0	0	0
V.A. Westside Medical Center	0	0	0	0	90	3	4	148
Total	331	9	89	3,293	595	17	9,032	334,184

2003 Generators' Survey
Totals may not add due to rounding.
**Registration canceled.

INDUSTRIAL – In 2003, more than 25 percent of the registered industrial generators shipped waste. Amersham Health contributed 66 percent of the industrial LLRW volume shipped for treatment or disposal and 94.3 percent of the activity. Table 6 shows the industrial generators and the LLRW volume and activity figures for waste shipped in 2002 and 2003. Amersham Health and General Dynamics-OTS were the only industrial facilities to ship LLRW to Envirocare of Utah.

Table 6
Industrial LLRW Shipped
2002-2003

Industrial Generator	2002 Volume (ft³)	2002 Volume (m³)	2002 Activity (mCi)	2002 Activity (MBq)	2003 Volume (ft³)	2003 Volume (m³)	2003 Activity (mCi)	2003 Activity (MBq)
AAR Corporation	*	*	*	*	8	<1	6	222
Abbott Laboratories	947	27	101,572	3,758,164	1,127	32	1,972	72,964
Acceletronics Midwest, Inc.	*	*	*	*	23	1	596	22,052
Albany Molecular Research Inc.	*	*	*	*	1	<1	40	1,480
Alnor Instrument Company	5	<1	<1	<1	**	**	**	**
American Ingredients	1	<1	<1	<1	**	**	**	**
American Pharmaceuticals Partners, Inc.	*	*	*	*	1	<1	<1	<1
Amersham Health	1,674	47	35	1,295	9,890	280	51,774	1,915,638
Analysts, Inc.	0	0	0	0	16	1	<1	<1
Austenol	1	<1	1	37	**	**	**	**
BP Amoco Naperville Complex	15	<1	151	5,587	10	<1	<1	<1
Baxter Healthcare Corporation MacGraw Park	11	<1	<1	<1	**	**	**	**
Baxter Healthcare Corporation Round Lake	11	<1	<1	<1	**	**	**	**
Brookfield Zoo	1	<1	3	111	0	0	0	0
Cardinal Health	1	<1	<1	<1	0	0	0	0
Conopco	*	*	*	*	90	3	2	74
Dor BioPharma	6	<1	4	148	**	**	**	**
E C Technologies, Inc.	7	<1	<1	<1	0	0	0	0
Gas Technology Institute	40	1	108	3,996	0	0	0	0
General Dynamics – OTS	968	27	<1	<1	880	25	16	592
David Jones	23	1	<1	<1	**	**	**	**
K A Steel	1	<1	<1	<1	**	**	**	**
Koppers Industries, Inc.	30	1	850	31,450	0	0	0	0
Life Fitness	1	<1	200	7,400	**	**	**	**
M S Kaplan Company	1	<1	<1	<1	**	**	**	**
Motorola, Inc.	*	*	*	*	1	<1	<1	<1
Nuclin Diagnostics, Inc.	9	<1	1	37	0	0	0	0
Onyx Environmental Services	*	*	*	*	1	<1	<1	<1

Table 6
Industrial LLRW Shipped
2002-2003
(Continued)

Industrial Generator	2002 Volume (ft³)	2002 Volume (m³)	2002 Activity (mCi)	2002 Activity (MBq)	2003 Volume (ft³)	2003 Volume (m³)	2003 Activity (mCi)	2003 Activity (MBq)
Perkin Elmer Life Sciences	27	1	1	37	0	0	0	0
Pfizer (Formerly Pharmacia)	0	0	0	0	330	9	8	296
Powers Process Controls	1	<1	<1	<1	**	**	**	**
Prairie Packaging	*	*	*	*	8	<1	420	15,540
Railway & Industrial Specialties	*	*	*	*	23	1	<1	<1
Rohm & Haas Company	1	<1	<1	<1	0	0	0	0
A. E. Staley Manufacturing Company	*	*	*	*	1	<1	<1	<1
Smurfit-Stone Container Corporation	** *	** *	** *	** *	1	<1	45	1,665
Unitech Services Group, Inc. (Morris)	2,560	73	<1	<1	2,560	73	<1	<1
Viskase Corporation	1	<1	1	37	0	0	0	0
Vysis, Inc.	*	*	*	*	1	<1	<1	<1
Total	6,343	180	102,927	3,808,299	14,972	424	54,879	2,030,523

2003 Generators' Survey
Totals may not add due to rounding.
*Not registered in 2002.
**Registration canceled.

MEDICAL –. Historically, all medical waste is shipped to brokers or processors, and the overall volume is on the decline. This decrease can be attributed to the increased number of medical generators that are opting to replace nuclear medicine with ultrasound, magnet resonance imaging (MRI) and spectrophotometric methods for radioimmunoassay (RIA) testing procedures for medical diagnosis. The increase in the activity is attributed to the significant number of cesium sources that were disposed of in 2003. Table 7 shows 2002 and 2003 medical generator data.

TABLE 7
Medical LLRW Shipped
2002-2003

Medical Generator	2002 Volume (ft³)	2002 Volume (m³)	2002 Activity (mCi)	2002 Activity (MBq)	2003 Volume (ft³)	2003 Volume (m³)	2003 Activity (mCi)	2003 Activity (MBq)
Children's Mem. Hosp.	100	3	21	777	0	0	0	0
Loyola Univ. Med. Ctr.	42	1	298	11,026	23	1	23	851
Michael Reese Hospital	12	<1	<1	<1	0	0	0	0
Northwestern Memorial Hospital	0	0	0	0	57	2	8	296
Provena United Samaritan Medical Center	0	0	0	0	5	<1	326	12,062
Radiation Protection Services, Ltd.	*	*	*	*	1	<1	<1	<1
St. Anthony's Memorial Hospital	0	0	0	0	5	<1	560	20,720
St. Elizabeths Memorial Hospital	0	0	0	0	7	<1	837	30,969
John H. Stroger Hospital of Cook County (Formerly Cook County County Hospital)	22	1	6	222	3	<1	712	26,344
Sunstar Pharmaceutical, Inc.	1	<1	<1	<1	**	**	**	**
Varian Medical System	90	3	1	37	0	0	0	0
Total	267	8	326	12,062	101	3	2,466	91,242

2003 Generators' Survey
Totals may not add due to rounding.
*Not registered in 2002.
**Registration cancelled

REACTOR - Today there are 11 operating reactors at six stations. Each reactor facility (Braidwood, Byron, Clinton, Dresden, LaSalle, and Quad Cities) has a single radioactive waste processing facility where LLRW is prepared for transportation and disposal.

Table 8 contains a comparison of 2002 and 2003 volumes and activities shipped by reactor generators. The volume shipped in 2003 is less than in 2002 by 87,220 cubic feet (2,470 cubic meters). This is due to the reduced volumes of waste shipped in 2003 by the Dresden, Quad Cities, and Clinton facility. Activity figures in table 8 are given in curies rather than in millicuries.

TABLE 8
Reactor LLRW Shipped
2002-2003

Reactor Generator	2002 Volume (ft^3)	2002 Volume (m^3)	2002 Activity (Ci)	2002 Activity (TBq)	2003 Volume (ft^3)	2003 Volume (m^3)	2003 Activity (Ci)	2003 Activity (TBq)
Braidwood	10,709	303	<1	<1	10,506	298	<1	<1
Byron	13,085	371	1	<1	16,671	472	<1	<1
Dresden	78,050	2,210	5	<1	37,531	1,062	4	<1
LaSalle	29,476	835	<1	<1	36,324	1,029	<1	<1
Quad Cities	62,755	1,777	5	<1	24,017	680	4	<1
Zion	2,030	58	<1	<1	0	0	0	0
Clinton	28,364	803	<1	<1	12,200	346	<1	<1
Total	224,469	6,357	11	<1	137,249	3,887	8	<1

2003 Generators' Survey
Totals may not add due to rounding.

VOLUME AND CLASS OF LLRW SHIPPED BOTH DIRECTLY TO DISPOSAL FACILITIES AND TO BROKERS/PROCESSORS

While most LLRW is relatively short-lived and has low concentrations of radioactive material, some LLRW presents a significant radiation hazard initially; thus, standards were developed for the safe handling and shipping of this material. The U. S. Nuclear Regulatory Commission (NRC) established a waste classification system (10 CFR 61) which is incorporated and defined in 32 Illinois Administrative Code 340.1052. According to these regulations, LLRW suitable for land disposal is placed in one of three categories: Class A, Class B, or Class C.

Class A waste has the lowest concentrations of specific radionuclides and can be disposed of with the least stringent requirements governing waste form and disposal packaging requirements. Waste that contains higher concentrations of the shorter-lived radionuclides is classified as Class B and must meet more rigorous waste form and packaging requirements to ensure physical stability. Class B waste has no concentration limits for such shorter-lived radioisotopes as cobalt-60 and tritium. In addition to rigorous waste form and packaging requirements, Class C waste must be additionally protected, when disposed, by intruder barriers with an effective life of at least 500 years.

Class C waste has concentration limits for some longer-lived radionuclides that are greater than those set for Class A waste and has higher limits for short-lived radionuclides. Maximum concentrations of radionuclides are specified for each waste classification, so the amount of radioactivity remaining at the end of 500 years does not pose a significant environmental or safety hazard.

Table 9 illustrates by generator category the classifications of waste shipped both directly to disposal facilities and to brokers/processors. The majority of waste shipped (approximately 98.1 percent by volume) was Class A waste. Almost 0.9 percent was classified as Class B waste and about 1.0 percent was classified as Class C waste.

TABLE 9
Distribution by Class of LLRW Shipped by Generator Category in 2003

Generator Category	Class A Volume (ft^3)	Class A Volume (m^3)	Class B Volume (ft^3)	Class B Volume (m^3)	Class C Volume (ft^3)	Class C Volume (m^3)	Total Category Volume (ft^3)	Total Category Volume (m^3)
Academic	1,469	41	12	<1	0	0	1,481	41
Fuel-Cycle	9,282	263	0	0	0	0	9,282	263
Government	565	16	0	0	30	1	595	17
Industrial	14,964	424	8	<1	0	0	14,972	424
Medical	101	3	0	0	0	0	101	3
Reactor	134,227	3,801	1,474	42	1,548	44	137,249	3,887
Total	160,608	4,549	1,494	42	1,578	45	163,680	4,636

2003 Generators' Survey
Totals may not add due to rounding.

In addition to class A, B, and C waste, some wastes are noted as having special properties and are not included in every shipment to LLRW disposal facilities. Some of this waste is classified due to special chemical properties, such as the presence of chelating agents. There are restrictions on the amount of certain materials such as transuranics (TRU), naturally-occurring or accelerator-produced material (NARM/NORM), or source material, such as uranium-contaminated material produced by fuel-cycle processes. Table 10 illustrates by generator category the number of generators shipping such materials.

Table 10
Number of Generators Shipping Special Waste by Category in 2003

Generator Category	NARM/ NORM	Special Nuclear Material	Source Material	TRU	Chelating Agents
Academic	2	1	1	2	0
Fuel-Cycle	0	1	1	1	0
Government	2	0	1	0	0
Industrial	3	1	3	2	0
Medical	1	0	0	0	0
Reactor	0	3	0	5	1
Total	8	6	6	10	1

2003 Generators' Survey

SPECIFIC WASTE

The NRC and Illinois have designated certain wastes in which the concentrations of hydrogen-3 (tritium), carbon-14, or iodine-125 are so low they do not pose a significant radiation threat to public health and safety. This type of waste is defined in 32 Illinois Administrative Code 340.1050 as specific waste and may be disposed of as non-radioactive waste. Some of these wastes contain non-radioactive hazardous materials, such as toxic chemicals, or consist of animal tissue that can become biohazardous as it decomposes. Most of these wastes are generated by university and medical research activities and are either diluted with water and flushed down the drain, destroyed by incineration, or transferred to a hazardous waste disposal facility. In some cases, these wastes are shipped to LLRW disposal facilities despite their low radioactive content. In 2003, ten academic facilities, four governmental facilities, three industrial facilities, and twelve medical facilities disposed of waste down the drain with copious amounts of water.

LLRW STORED ON-SITE FOR DECAY TO BACKGROUND LEVELS

One alternative Illinois generators have to shipping LLRW contaminated with short-lived radionuclides for disposal is to store the waste on-site until the radioactivity diminishes to levels that permit disposal as non-radioactive waste. The standard authorization to store waste for decay is for waste with half-lives less than 90 days. However, depending upon the needs of the generator, authorization for extended periods is granted. LLRW in storage for decay is normally held for 10 half-lives, or until the radioactivity has diminished to background levels. Table 11 shows the number of generators that stored waste for decay. Fuel-cycle and reactor generators did not store LLRW for decay in 2003. Table 12 shows the radionuclides with half-lives less than 65 days held for decay and the number of generators that stored these radionuclides. Table 13 shows the radionuclides with half-lives greater than 65 days but less than 120 days held for decay and the number of generators that stored these radionuclides.

Table 11
Number of Generators Storing for Decay to Background by Waste Type in 2003

Waste Type	Academic	Governmental	Industrial	Medical	Total
Charcoal	0	0	3	65	68
Gas	0	0	2	9	11
Oil	0	0	0	1	1
Contaminated Aqueous Liquids	10	4	12	42	68
Filter Media	1	0	3	5	9
Mechanical Filter	0	0	1	1	2
EPA or State Hazardous	0	0	2	0	2
Exchange Media	1	0	1	0	2
Contaminated Equipment	1	0	2	12	15
Organic Liquid	2	0	1	3	6
Glassware/Labware	3	0	3	7	13
Sealed Sources	0	0	2	12	14
Dry Active Waste (Compactible & Noncompactible)	18	9	16	247	290
Animal Carcass	0	2	1	0	3
Biological Material	1	1	5	11	18
Medical Generators	1	0	4	7	12
Other	0	0	0	1	1

2003 Generators' Survey

Table 12
Radionuclides Held for Decay <65 Days
in 2003

Radionuclide	Academic	Governmental	Industrial	Medical	Total
Ar-41	0	0	1	0	1
Au-198	0	0	0	1	1
Ba-139	0	0	1	0	1
Br-82	0	0	1	0	1
Ce-141	0	2	1	0	3
Cl-38	0	0	1	0	1
Cr-51	6	1	5	9	21
Cs-138	0	0	1	0	1
F-18	0	0	0	29	29
Fe-59	2	0	1	0	3
Ga-67	2	6	9	142	159
Hg-197m	0	0	1	0	1
I-123	1	2	14	133	150
I-125	19	7	20	48	94
I-131	3	4	13	118	138
I-135	0	0	1	0	1
In-111	2	4	19	117	142
K-42	0	0	1	0	1
Mn-56	0	0	1	0	1
Mo-99	1	0	3	9	13
N-13	0	0	0	1	1
Na-24	0	0	1	1	2
Nb-95	0	0	1	0	1
P-32	27	6	7	22	62
P-33	3	0	5	2	10
Pd-103	0	0	0	12	12
Rb-86	2	0	0	0	2
Ru-103	0	0	1	0	1
Sb-122	0	0	1	0	1
Sm-153	1	0	3	19	23
Sr-85	0	2	0	0	2
Sr-89	1	1	5	27	34
Sr-92	0	0	1	0	1
Tc-99m	4	6	14	288	312
Tl-201	1	3	20	206	230
Tl-202	0	0	8	0	8
Xe-133	1	1	6	92	100
Y-90	0	0	4	5	9
Yb-169	0	0	2	0	2

2003 Generators' Survey

Table 13
Radionuclides Held for Decay >65 Days and <120 Days in 2003

Radionuclide	Academic	Governmental	Industrial	Medical	Total
Ir-192	0	0	0	1	1
S-35	17	0	6	9	32

2003 Generators' Survey

MIXED WASTE

Waste shown to contain radioactive components and meet the U. S. Environmental Protection IEMA (EPA) hazardous waste criteria is considered mixed waste. The EPA has issued explicit guidelines to determine whether a waste is hazardous. Hazardous components are generally those that exhibit any of the following four characteristics: ignitability, corrosivity, reactivity, or toxicity (Note: toxicity is determined by using the toxic characteristic leaching procedure (TCLP) test or are produced from a listed activity). TCLP tests for toxicity will likely define more compounds as being hazardous due to both its sensitivity to compounds and also its inclusion of some organic compounds. Table 14 shows the cumulative total of mixed waste in storage in both 2002 and 2003.

A type of LLRW that is clearly mixed waste is scintillation fluid consisting of toluene, xylene, benzene, or dioxin-based liquid usually containing 0.05 microcuries or more of tritium or carbon-14 per gram of fluid. If an organic liquid scintillation fluid contains less than 0.05 microcuries of tritium or carbon-14 per gram of fluid, then it is still considered to be hazardous and can be disposed of as a hazardous material only. The radioactive component is not considered in this case. Most of these wastes are used as a secondary fuel source.

TABLE 14

Types of Mixed Waste Stored On-Site 2002-2003

Waste Type	2002 Volume (ft^3)	2002 Volume (m^3)	2003 Volume (ft^3)	2003 Volume (m^3)	Radionuclides
Lead					
Contaminated Lead	27.5	1.0	5.0	<1.0	Cs-137, Ra-226
Metals					
Mercury	<1.0	<1.0	<1.0	<1.0	Co-60
Cadium	6.7	<1.0	3.6	<1.0	U-238
Barium	310.0	9.0	----	----	Co-58, Co-60, Cs-137, Fe-55, Mn-54
Other	<1.0	<1.0	----	----	C-14
Scintillation Fluids					
Dioxane	<1.0	<1.0	----	----	C-14
Toluene	10.5	<1.0	1.0	<1.0	C-14, H-3
Xylene	48.3	1.3	48.2	1.4	Co-60, Cs-134, Cs-137, Mn-54
Solvents & Other Organic Fluids	<1.0	<1.0	<1.0	<1.0	C-14
Freon	56.1	1.6	10.0	<1.0	Co-60, U-238
Other	54.7	1.5	8.0	<1.0	C-14, Mn-54
Alkaline Liquids	32.0	1.0	32.0	1.0	Co-60
Acidic Liquids	<1.0	<1.0	----	----	C-14
Other	343.7	25.1	333.9	10.0	C-14, Cl-36, Co-60, Cs-137, H-3, I-123, In-111, Mn-54, Th-232, Tl-202, U-238, Zn-65
Total	889.5	22.7	441.7	12.4	

2003 Generators' Survey

Totals may not add due to rounding.

CHAPTER THREE

PROJECTIONS FOR THE FUTURE

The 2003 annual survey required all generators to project the amount of mixed waste they expect to produce or possess between 2004 and 2010. This survey also required all generators that shipped waste, stored waste on-site for future shipment, or believed they would ship waste in the future to project the amount of LLRW they would expect to produce or possess between 2004 and 2010. Tables 15 through 18 provide the projected LLRW volumes and activities provided by all the academic, fuel-cycle, government, industry, and medical generators. Tables 19 through 26 provide actual LLRW volumes and activities of previous shipments as well as projected LLRW volumes and activities for future shipments.

MIXED WASTE PROJECTIONS

According to these projections, the total annual mixed waste volume possessed and produced is expected to increase from 728 cubic feet to 857 cubic feet, an increase of 17.7 percent over a seven year period. Tables 15 and 16 detail the volume projections by generator category. Tables 17 and 18 detail activity projected during this same period and indicates an decrease of 56 percent between 2004-2010. This decrease in activity is because one of the industrial generators, Abbott Laboratories, will dispose of mixed organic waste containing high levels of tritium in 2004.

Table 15
Mixed Waste Volume Projections by Generator Category
2004-2010

Projection Year	Academic Volume (ft³)	Fuel-Cycle Volume (ft³)	Gov't Volume (ft³)	Industrial Volume (ft³)	Medical Volume (ft³)	Reactor Volume (ft³)	Total Volume (ft³)
2004	308	12	22	381	3	2	728
2005	308	12	22	401	3	1	747
2006	313	12	22	421	3	1	772
2007	313	12	22	441	3	1	792
2008	313	12	22	461	3	1	812
2009	318	12	22	481	3	1	837
2010	318	12	22	501	3	1	857

2003Generators' Survey

Table 16
Mixed Waste Volume Projections by Generator Category
2004-2010

Projection Year	Academic Volume (m³)	Fuel-Cycle Volume (m³)	Gov't Volume (m³)	Industrial Volume (m³)	Medical Volume (m³)	Reactor Volume (m³)	Total Volume (m³)
2004	9	<1	1	11	<1	<1	21
2005	9	<1	1	11	<1	<1	21
2006	9	<1	1	12	<1	<1	22
2007	9	<1	1	12	<1	<1	22
2008	9	<1	1	13	<1	<1	23
2009	9	<1	1	14	<1	<1	24
2010	9	<1	1	14	<1	<1	24

2003Generators' Survey

Table 17
Mixed Waste Activity Projections by Generator Category
2004-2010

Projection Year	Academic Activity (mCi)	Fuel-Cycle Activity (mCi)	Gov't Activity (mCi)	Industrial Activity (mCi)	Medical Activity (mCi)	Reactor Activity (mCi)	Total Activity (mCi)
2004	34	300	15	86,110	7	2	86,468
2005	34	300	15	1,125	7	<1	1,481
2006	34	300	15	1,140	7	<1	1,496
2007	34	300	15	1,150	7	<1	1,506
2008	34	300	15	1,165	7	<1	1,521
2009	35	300	15	1,180	7	<1	1,537
2010	35	300	15	1,195	7	<1	1,552

2003 Generators' Survey

Table 18
Mixed Waste Activity Projections by Generator Category
2004-2010

Projection Year	Academic Activity (MBq)	Fuel-Cycle Activity (MBq)	Gov't Activity (MBq)	Industrial Activity (MBq)	Medical Activity (MBq)	Reactor Activity (MBq)	Total Activity (MBq)
2004	1,258	11,100	555	3,186;070	259	74	3,199,316
2005	1,258	11,100	555	41,625	259	<1	54,797
2006	1,258	11,100	555	42,180	259	<1	55,352
2007	1,258	11,100	555	42,550	259	<1	55,722
2008	1,258	11,100	555	43,105	259	<1	56,277
2009	1,295	11,100	555	43,660	259	<1	56,869
2010	1,295	11,100	555	44,215	259	<1	57,424

2003 Generators' Survey

LLRW PROJECTIONS

The 2003 annual survey required all generators that shipped waste, stored waste on-site for future shipment, or believed they would ship waste in the future to project the amount of LLRW they would expect to produce or possess between 2004 and 2010. Because reactors produce the most waste, each station is given a separate projection breakdown. Tables 19 and 20 show projected reactor volumes and historical final disposal volumes. The actual volume shipped in 2003 (137,249 cu.ft.) was significantly higher than what was forecast in 2002 (42,618 cu.ft.). Past practice for the nuclear power plants were to subcontract all the LLRW for volume reduction by super compaction or incineration before it was sent to burial. Under today standards the disposal facilities require actual volumes of LLRW for burial instead of reduced volumes. Tables 21 and 22 show projected reactor activity and historical activity disposed. The LaSalle facility is one of four facilities that have a boiling water reactor (BWR). All BWR facilities conduct a fuel pool cleanup approximately every two years. The activated hardware that will be disposed of during this clean-up period contains tremendous levels of radioactivity as reflected in Tables 21 and 22 for the Quad Cities facility starting 2004. Appendix D gives a history of LLRW volume and activities disposed by reactors from 1970 to 1985. Tables 23 and 24 show historical and projected non-reactor generator disposal volumes, and Tables 25 and 26 show historical and projected activity levels. Once every three to five years one of the fuel-cycle generators produces high activity class B waste, which is reflected in the activity spike for 2006 in Tables 25 and 26.

Table 19
Historical and Projected Annual Disposal Volume of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2010

Year	Braidwood (ft^3)	Byron (ft^3)	Dresden (ft^3)	LaSalle (ft^3)	Quad Cities (ft^3)	Zion (ft^3)	Clinton (ft^3)	Total Volume (ft^3)
1986	0	10,875	76,580	26,528	45,228	11,846	0	171,057
1987	0	10,788	78,723	24,725	23,300	13,237	1,200	151,973
1988	2,424	7,713	31,090	18,833	20,617	8,208	11,054	99,939
1989	3,890	10,585	28,205	20,522	22,628	13,633	14,630	114,093
1990	4,044	6,782	24,238	13,053	20,608	10,814	9,794	89,333
1991	7,909	8,959	25,931	23,085	14,483	6,520	8,761	95,648
1992	6,910	5,622	29,494	15,017	19,970	12,016	8,439	97,468
1993	3,577	2,876	24,169	9,782	13,663	6,233	3,136	63,436
1994	5,334	2,681	12,622	8,908	15,558	5,691	2,895	53,689
1995	6,630	5,090	14,178	11,253	10,580	6,284	2,380	56,395
1996	2,321	4,562	11,424	9,460	10,683	7,701	1,299	47,450
1997	1,668	1,720	10,648	9,301	6,805	2,681	3,097	35,920
1998	2,560	1,763	7,424	6,613	5,085	1,608	2,324	27,377
1999	42	182	1,708	1,125	1,417	1,048	2,431	7,953
2000	548	670	1,697	6,003	1,001	592	3,137	13,648
2001	33,899	12,049	69,391	22,278	20,395	3,480	22,896	184,388
2002	10,709	13,085	78,050	29,476	62,755	2,030	28,394	224,499
2003	10,506	16,671	37,531	36,324	24,017	0	12,200	137,249
2004	**5,300**	**4,441**	**7,900**	**11,806**	**8,522**	**191**	**10,199**	**48,359**
2005	**5,300**	**4,320**	**7,900**	**9,250**	**8,522**	**196**	**10,063**	**45,551**
2006	**5,300**	**4,480**	**7,900**	**8,278**	**8,522**	**316**	**10,199**	**44,995**
2007	**5,300**	**4,320**	**7,900**	**8,250**	**8,522**	**196**	**10,063**	**44,551**
2008	**5,300**	**4,480**	**7,900**	**8,278**	**8,522**	**196**	**10,199**	**44,875**
2009	**5,300**	**4,441**	**7,900**	**8,250**	**8,522**	**196**	**10,063**	**44,672**
2010	**5,300**	**4,441**	**7,900**	**8,278**	**8,522**	**196**	**10,199**	**44,836**

2003 Generators' Survey projected volumes are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

Table 20
Historical and Projected Annual Disposal Volume of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2010

Year	Braidwood (m³)	Byron (m³)	Dresden (m³)	LaSalle (m³)	Quad Cities (m³)	Zion (m³)	Clinton (m³)	Total Volume (m³)
1986	0	308	2,169	751	1,281	335	0	4,844
1987	0	306	2,229	700	660	375	34	4,304
1988	69	218	881	533	584	232	313	2,830
1989	110	300	799	582	641	386	414	3,232
1990	115	192	686	370	584	306	277	2,530
1991	224	254	734	654	410	185	248	2,709
1992	196	159	835	425	566	340	239	2,760
1993	101	81	684	277	387	177	89	1,796
1994	151	76	358	252	441	161	82	1,521
1995	188	144	402	319	300	178	67	1,598
1996	66	129	324	266	303	218	37	1,343
1997	47	49	302	263	193	76	88	1,018
1998	72	49	210	187	144	45	65	772
1999	1	5	48	32	40	30	69	225
2000	16	19	48	170	28	17	89	387
2001	960	341	1,965	631	578	99	648	5,222
2002	303	371	2,210	835	1,777	58	803	6,357
2003	298	472	1,063	1,029	680	0	346	3,888
2004	**150**	**126**	**224**	**334**	**241**	**5**	**289**	**1,369**
2005	**150**	**122**	**224**	**262**	**241**	**6**	**285**	**1,290**
2006	**150**	**127**	**224**	**234**	**241**	**9**	**289**	**1,274**
2007	**150**	**122**	**224**	**234**	**241**	**6**	**285**	**1,262**
2008	**150**	**127**	**224**	**234**	**241**	**6**	**289**	**1,271**
2009	**150**	**126**	**224**	**234**	**241**	**6**	**285**	**1,266**
2010	**150**	**126**	**224**	**234**	**241**	**6**	**289**	**1,270**

2003 Generators' Survey projected volumes are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

Table 21
Historical and Projected Annual Disposal Activity of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2010

Year	Braidwood (Ci)	Byron (Ci)	Dresden (Ci)	LaSalle (Ci)	Quad Cities (Ci)	Zion (Ci)	Clinton (Ci)	Total Activity (Ci)
1986	0	100	37,319	1,107	2,136	674	0	41,336
1987	0	876	840	2,286	28,961	708	<1	33,671
1988	3	509	1,749	3,888	627	1,597	62	8,435
1989	618	1,122	2,487	2,740	133,067	3,578	1,717	145,329
1990	510	1,574	2,029	2,895	504	86	544	8,142
1991	62	623	975	3,998	1,537	1,947	803	9,945
1992	1,522	880	33,476	5,950	57,009	3,024	2,146	104,007
1993	1,570	409	20,554	11,189	2,399	1,004	568	37,693
1994	290	186	14,124	11,598	1,576	883	1,281	29,938
1995	179	433	818	543	3,771	929	146	6,819
1996	195	3,388	886	2,402	52,723	256	247	60,097
1997	88	277	12,267	1,202	3,187	77	970	18,067
1998	206	144	22,506	73,354	1,475	104	201	111,260
1999	18	127	43,916	1,577	24,310	86	268	70,302
2000	224	305	1,161	45,391	3,917	12	645	51,655
2001	<1	<1	2	<1	5	<1	1	8
2002	<1	1	5	<1	<1	<1	<1	6
2003	<1	<1	<1	<1	<1	<1	<1	<1
2004	**180**	**80**	**51**	**4,032**	**60,550**	**<1**	**3,650**	**68,543**
2005	**180**	**65**	**51**	**1,252**	**60,550**	**<1**	**2,800**	**64,898**
2006	**180**	**74**	**51**	**1,392**	**60,550**	**<1**	**3,650**	**65,897**
2007	**180**	**62**	**51**	**1,252**	**60,550**	**<1**	**2,800**	**64,895**
2008	**180**	**90**	**51**	**1,392**	**60,550**	**<1**	**3,650**	**65,913**
2009	**180**	**80**	**51**	**1,252**	**60,550**	**<1**	**2,800**	**64,913**
2010	**180**	**80**	**51**	**1,392**	**60,550**	**<1**	**2,800**	**65,053**

2003 Generators' Survey projected activities are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

Table 22
Historical and Projected Annual Disposal Activity of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2010

Year	Braidwood (TBq)	Byron (TBq)	Dresden (TBq)	LaSalle (TBq)	Quad Cities (TBq)	Zion (TBq)	Clinton (TBq)	Total Activity (TBq)
1986	0	4	1,381	41	79	25	0	1,529
1987	0	32	31	85	1,072	26	<1	1,246
1988	<1	19	65	144	23	59	2	312
1989	23	42	92	101	4,923	132	64	5,377
1990	19	58	75	107	19	3	20	301
1991	2	23	36	148	57	72	30	368
1992	56	33	1,239	220	2,109	112	79	3,848
1993	58	15	771	414	89	37	21	1,405
1994	11	7	523	429	58	33	47	1,108
1995	7	16	30	20	140	34	5	252
1996	7	125	33	89	1,951	9	9	2,223
1997	3	10	454	44	118	3	36	668
1998	7	5	832	2,714	545	3	7	4,113
1999	1	5	1,625	58	899	3	10	2,601
2000	8	11	43	1,680	145	<1	24	1,911
2001	<1	<1	<1	<1	<1	<1	<1	<1
2002	<1	<1	<1	<1	<1	<1	<1	<1
2003	<1	<1	<1	<1	<1	<1	<1	<1
2004	**7**	**3**	**2**	**149**	**2,240**	**<1**	**135**	**2,536**
2005	**7**	**2**	**2**	**46**	**2,240**	**<1**	**104**	**2,401**
2006	**7**	**3**	**2**	**52**	**2,240**	**<1**	**135**	**2,439**
2007	**7**	**2**	**2**	**46**	**2,240**	**<1**	**104**	**2,401**
2008	**7**	**3**	**2**	**52**	**2,240**	**<1**	**135**	**2,439**
2009	**7**	**3**	**2**	**46**	**2,240**	**<1**	**104**	**2,402**
2010	**7**	**3**	**2**	**52**	**2,240**	**<1**	**104**	**2,408**

2003 Generators' Survey projected activities are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

Table 23
Historical and Projected Annual Disposal Volume of LLRW
Generated by Non-Reactor Generators
1986-2010

Projection Year	Academic (ft^3)	Fuel-Cycle (ft^3)	Governmental (ft^3)	Industrial (ft^3)	Medical (ft^3)	Total Volume (ft^3)
1986	3,762	23,357	13,761	5,689	3,846	50,415
1987	4,064	17,748	466	5,651	3,717	31,646
1988	4,787	9,958	277	6,715	3,092	24,829
1989	4,233	6,387	58	31,675	2,834	45,187
1990	1,249	1,055	1,032	4,106	1,475	8,917
1991	840	0	1,316	3,641	782	6,579
1992	1,159	2,970	679	176,622	1,264	182,694
1993	223	1,422	106	113	166	2,030
1994	403	3,622	1,931	1,268	209	7,433
1995	50	962	19	294	43	1,368
1996	125	2,365	224	1,550	121	4,385
1997	83	279	391	743	33	1,529
1998	51	3	346	1,151	21	1,572
1999	80	7	120	255	19	481
2000	5	0	79	45,054	7	45,145
2001	2,502	4,266	611	12,661	206	20,246
2002	1,684	3,964	331	6,343	267	12,589
2003	1,481	9,282	595	14,972	101	26,431
2004	**1,149**	**9,280**	**474**	**8,012**	**692**	**19,607**
2005	**1,149**	**6,280**	**432**	**6,251**	**752**	**14,864**
2006	**1,147**	**9,380**	**414**	**6,441**	**752**	**18,134**
2007	**1,147**	**6,280**	**404**	**8,619**	**722**	**17,172**
2008	**1,152**	**6,280**	**394**	**6,839**	**647**	**15,312**
2009	**1,152**	**6,280**	**384**	**7,039**	**647**	**15,502**
2010	**1,152**	**6,280**	**374**	**9,208**	**647**	**17,661**

2003 Generators' Survey projected volumes are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

Table 24
Historical and Projected Annual Disposal Volume of LLRW
Generated by Non-Reactor Generators
1986-2010

Projection Year	Academic (m^3)	Fuel-Cycle (m^3)	Governmental (m^3)	Industrial (m^3)	Medical (m^3)	Total Volume (m^3)
1986	*106*	*661*	*389*	*161*	*108*	*1,425*
1987	115	502	13	160	105	896
1988	135	282	7	190	87	701
1989	119	180	1	897	80	1,279
1990	35	29	29	116	41	252
1991	23	0	37	103	22	186
1992	1,159	84	19	5,001	35	6,298
1993	32	40	106	3	4	185
1994	11	102	3	35	5	156
1995	1	27	<1	8	1	38
1996	3	66	6	43	3	124
1997	2	8	11	21	1	43
1998	1	<1	10	33	1	45
1999	2	<1	3	7	1	13
2000	<1	0	2	1,276	<1	1,278
2001	71	121	17	359	6	574
2002	47	113	9	180	8	357
2003	**41**	**263**	**17**	**424**	**3**	**748**
2004	**33**	**263**	**13**	**227**	**20**	**556**
2005	**33**	**178**	**12**	**177**	**21**	**421**
2006	**32**	**266**	**12**	**182**	**21**	**513**
2007	**32**	**178**	**11**	**244**	**20**	**485**
2008	**33**	**178**	**11**	**194**	**18**	**434**
2009	**33**	**178**	**11**	**199**	**18**	**439**
2009	**33**	**178**	**11**	**261**	**18**	**501**

2003 Generators' Survey projected volumes are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

Table 25
Historical and Projected Annual Disposal Activity of LLRW
Generated by Non-Reactor Generators
1986-2010

Projection Year	Academic (mCi)	Fuel-Cycle (mCi)	Governmental (mCi)	Industrial (mCi)	Medical (mCi)	Total Activity (mCi)
1986	4,000	1,000	121,000	43,000	3,000	172,000
1987	3,000	3,000	45,000	9,000	3,000	63,000
1988	6,000	1,000	761,000	17,000	6,000	791,000
1989	6,000	3,000	16,000	46,000	2,000	73,000
1990	10,000	46,330	311,000	28,670	2,000	398,000
1991	2,000	0	5,000	186,000	1,000	194,000
1992	4,000	432,000	130,000	128,000	3,000	697,000
1993	1,000	<1	6,000	28,000	<1	35,000
1994	5,000	1,756,000	353,000	79,000	6,000	2,199,000
1995	<1	224,328	<1	1,672	<1	226,000
1996	<1	199,000	88,000	8,000	1,000	296,000
1997	2,310	145,640	24,960	142,090	2,800	317,800
1998	<1	<1	1,334,010	56,900	<1	1,390,910
1999	120	110	3,490	27,810	30	31,560
2000	20	0	2,820	29,220	330	32,390
2001	3,470	119,524	3,617	94,390	679	221,680
2002	5,078	608	89	102,927	326	109,028
2003	1,167	378	9,032	54,879	2,466	67,922
2004	**434**	**1,300**	**1,200,063**	**87,373**	**576**	**1,289,746**
2005	**434**	**1,300**	**1,200,064**	**2,651**	**577**	**1,205,026**
2006	**440**	**121,300**	**1,200,057**	**87,951**	**577**	**1,410,325**
2007	**440**	**1,300**	**1,200,057**	**3,250**	**577**	**1,205,624**
2008	**446**	**1,300**	**1,200,057**	**88,521**	**557**	**1,290,881**
2009	**446**	**1,300**	**1,200,057**	**3,821**	**557**	**1,206,181**
2010	**451**	**1,300**	**1,200,057**	**12,640**	**557**	**1,215,005**

2003 Generators' Survey projected activities are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

Table 26
Historical and Projected Annual Disposal Activity of LLRW Generated by Non-Reactor Generators 1986-2010

Projection Year	Academic (MBq)	Fuel-Cycle (MBq)	Governmental (MBq)	Industrial (MBq)	Medical (MBq)	Total Activity (MBq)
1986	148,000	37,000	4,477,000	1,591,000	111,000	6,364,000
1987	111,000	111,000	1,665,000	333,000	111,000	2,331,000
1988	222,000	37,000	28,157,000	629,000	222,000	29,267,000
1989	222,000	111,000	592,000	1,702,000	74,000	2,701,000
1990	370,000	1,714,210	11,507,000	1,060,790	74,000	14,726,000
1991	74,000	0	185,000	6,882,000	37,000	7,178,000
1992	148,000	15,984,000	4,810,000	4,736,000	111,000	25,789,000
1993	37,000	<1	222,000	1,036,000	<1	1,295,000
1994	185,000	64,972,000	13,061,000	2,923,000	222,000	81,363,000
1995	<1	8,300,136	<1	61,864	<1	8,362,000
1996	<1	7,363,000	3,259,700	296,000	37,000	10,955,700
1997	85,470	5,388,680	923,520	5,257,330	103,600	11,758,600
1998	<1	<1	49,358,370	2,105,300	<1	51,463,670
1999	4,440	4,070	129,130	1,028,970	1,110	1,167,720
2000	740	0	104,340	1,081,140	12,210	1,198,430
2001	128,390	4,422,388	133,829	3,492,430	25,123	8,202,160
2002	187,886	22,496	3,293	3,808,299	12,062	4,034,036
2003	43,179	13,986	334,184	2,030,523	91,242	2,513,114
2004	**16,058**	**48,100**	**44,402,331**	**3,232,801**	**21,312**	**47,720,602**
2005	**16,058**	**48,100**	**44,402,368**	**98,087**	**21,349**	**44,585,962**
2006	**16,280**	**4,488,100**	**44,402,109**	**3,254,187**	**21,349**	**52,182,025**
2007	**16,280**	**48,100**	**44,402,109**	**120,250**	**21,349**	**44,608,088**
2008	**16,502**	**48,100**	**44,402,109**	**3,275,277**	**20,609**	**47,762,597**
2009	**16,502**	**48,100**	**44,402,109**	**141,377**	**20,609**	**44,628,697**
2010	**16,687**	**48,100**	**44,402,109**	**467,680**	**20,609**	**44,955,185**

2003 Generators' Survey projected activities are in bold print.
Actual volumes are in regular print (includes Barnwell & Envirocare).
Totals may not add due to rounding.

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APPENDIX A
2003 LLRW Generators' Annual Survey

STATE OF ILLINOIS
Generators' Annual Survey
2003

GENERAL INSTRUCTIONS

Survey Completion

1. The survey for calendar year 2003 must be completed and submitted no later than **February 3, 2004** as required by 32 Ill. Admin. Code 620.30.

2. All quantitative data entered on the survey form must include data for the entire calendar year, unless otherwise specified.

   Enter all volume data in cubic feet.

   For purposes of this survey, one 55-gallon drum is equal to 7.5 cubic feet, one 30-gallon drum is equal to 4.0 cubic feet, and one 83-gallon drum is equal to 11.6 cubic feet.

   Enter all activity data in millicuries.

3. Complete only those questions and tables that are applicable to your facility. If your facility only stores LLRW for decay to background, only Parts I-IV and Table 1 need to be completed. If your facility only does in-vitro testing, then Parts I-IV must be completed.

4. Be sure to mark all YES and NO choices clearly with an "X" or check mark.

5. Complete the appropriate table(s) as directed.

6. If any response exceeds the space available for it in the survey or its tables, type or print the response on a separate sheet and attach it to the survey. Explanatory notes on attachments are welcome. The survey form or any of its pages or attachments may be reproduced.

7. Retain these instructions and a copy of your completed survey and attachments in the office of the contact person identified in Part I of the survey.

8. Return the completed survey and attachments to:

Vera L. Small, Low-Level Radioactive Waste Management & Site Decommissioning
Illinois Emergency Management Agency
Division of Nuclear Safety
1035 Outer Park Drive
Springfield, Illinois 62704

If you require assistance, call Vera L. Small at 217-524-6309.

Additional Information

1. Appendix I contains a list of waste type descriptions and codes used to complete Part IV Section 4C and Tables 1, 2, 7, and 9.

2. Appendix II contains a list of treatment method descriptions and codes used to complete Part IV Section 4C and Tables 2, 7, and 9.

3. Appendix III contains a list of IDNS mixed waste type descriptions and codes, and general RCRA hazardous waste type codes used to complete Tables 4 and 5.

4. Appendix IV contains the container description codes necessary to complete Table 7.

5. Appendix V contains a copy of the State of Illinois requirements, as reflected in 32 Illinois Administrative Code 340.1052, which determines waste classification as A, B, C, or greater than class C, and 340.1050 which provides information regarding the disposal of specific wastes used to complete Tables 2, 3, 4, 5, 6, 7, 8, and 9.

6. Appendix VI contains the glossary of terms.

STATE OF ILLINOIS
Generators' Annual Survey
2003

PART I

FACILITY INFORMATION

1. LLRW Registration number:	1. OWT - _____
2. Check the label at right for facility name, address, and contact person and make corrections below. Enter the phone number of the contact person at g.	2.
a. Name of organization:	a. _____
b. Name of facility:	b. _____
c. Street address:	c. _____
d. City, State, Zip Code:	d. _____
e. Contact person:	e. _____
f. Title:	f. _____
g. Phone:	g. ( ) _____
3. County:	3. _____
4. Principal officer:	4. _____
5. Title:	5. _____
6. Name of person completing report:	6. _____
7. Phone:	7. ( ) _____
8. Date of report:	8. _____

Part II

Place an "X" in the appropriate space to indicate how each type of LLRW you either produced or possessed during 2003 was managed or disposed.

Type of LLRW	Stored for decay to background	Stored on-site for future disposal	Shipped directly to disposal site	Transferred to broker or processor	Combined with other waste for shipment[1]	Other[2] (describe)
20. Charcoal						
21. Incinerator Ash						
22. Soil						
23. Gas						
24. Oil						
25. Aqueous Liquid						
26. Filter Media						
27. Mechanical Filter						
28. EPA or State Hazardous						
29. Demolition Rubble						
30. Cation Ion-exchange Media						
31. Anion Ion-exchange Media						
32. Mixed Bed Ion-exchange						
33. Contaminated Equipment						
34. Organic Liquid (except oil)						

Part II (cont.)

Type of LLRW	Stored for decay to background	Stored on-site for future disposal	Shipped directly to disposal site	Transferred to broker or processor	Combined with other waste for shipment[1]	Other[2] (describe)
35. Glassware						
36. Sealed Source or Device*						
37. Paint or Plating						
38. Evaporator Bottoms/ Sludges/Concentrates						
39. Compacted Trash						
40. Uncompacted Trash						
41. Animal Carcass						
42. Biological Material						
43. Activated Material						
44. Medical Generators						
59. Other (describe) ____________ ____________						

*Do *not* include sealed sources returned to the manufacturer or supplier.

1. Specify the combined waste types.
2. Provide the management practices, such as incineration, disposal down a sanitary drain, return to manufacturer or supplier, etc.

PART III

WASTE MINIMIZATION AND TREATMENT

Place an "X" in the appropriate space for each waste minimization and treatment practice that you used in 2003 to reduce or eliminate LLRW.

0. None. No waste minimization and treatment practices used in reporting year. (continue to Part IV) 0. ______

1. Limiting the number of contaminated areas 1. ______

2. Limiting articles brought into contaminated areas 2. ______

3. Sorting low-level radioactive waste by radionuclide 3. ______

4. Sorting low-level radioactive waste by half-life 4. ______

5. Sorting low-level radioactive waste by activity 5. ______

6. Using strippable coatings 6. ______

7. Recycling materials rather than discarding: 7. ______
   Describe recycling practices and materials recycled.

   ____

   ____

8. a. Decontaminating articles on-site: 8a. ______
   Describe decontamination process and articles decontaminated.

   ____

   ____

   b. Decontaminating articles off-site: 8b. ______
   Describe decontamination process and articles decontaminated.

   ____

   ____

If the decontamination was done by a company other than your own, include the name and address of the company performing this treatment:

Name of company:________________________________

Address:________________________________

City:____________________State:________Zip:__________

If waste was decontaminated by more than one company, provide additional information in an attachment.

9. a. Incinerating LLRW on-site, including scintillation fluids and specific waste. 9a. ______

b. Incinerating LLRW off-site, including scintillation fluids and specific waste. 9b. ______

If the incineration was done by a company other than your own, include the name and address of the company performing this treatment:

Name of company:________________________________

Address:________________________________

City:____________________State:________Zip:__________

10. Replacing techniques that use radionuclides with techniques that do not use radionuclides: (describe) 10. ______

____

____

11. Returning unit dose syringes or other contaminated material to a radiopharmacy: (do not include sealed sources returned to the manufacturer or supplier). 11. ______

12. Other (describe)________________________________

____

____

PART IV

ON-SITE WASTE MANAGEMENT

1. Did you store LLRW on-site for decay to background during 2003? (Do *not* include sealed sources stored for future return to manufacturer or supplier.)

_____ NO
_____ YES–Complete TABLE 1 (page 13) for such waste.

NOTE: If you **only** store waste for decay to background levels, you are only required to complete Table 1. If you **only** dispose of waste through the sanitary drain, you do not need to complete the rest of this form.

2. Did you store LLRW on-site that was in a form suitable for disposal in 2003 for future disposal? (Do not include LLRW stored for decay to background, mixed waste, or waste awaiting further on-site processing.) Do include specific waste as defined in 32 Ill. Adm. Code 340.1050

_____ NO
_____ YES–Complete a, b, and TABLE 2 (page 14).

a) Enter the volume of LLRW placed in storage during the period of 01/01/03 through 12/31/03 — 2a. ______cu.ft.

b) Enter the total volume (awaiting disposal) that was placed in storage prior to 01/01/03 — 2b. ______cu.ft.

3. Do you plan to generate LLRW at anytime during 2004 through 2010 that will require disposal at some time in the future? (Include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050.)

_____ NO
_____ YES–Complete TABLE 3 (page 15) for such waste.

4. Will you need a Tracking System Permit Application to dispose of any LLRW at any time during 2004? (If you already have a Tracking System Permit, you do not need to re-apply.)

_____ NO
_____ YES–Complete Tracking System Permit Application form (page 12).

PART V

MIXED WASTE

1. Are you presently storing mixed wastes (see Appendix VI for definitions)? (Do *not* include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050.)

   _____ NO
   _____ YES–Complete TABLE 4 (page 16) and the remainder of this question.

   Enter the volume of mixed waste that was placed in storage during 2003 **only.**

   _____cu.ft.

   Enter the total volume of mixed waste presently in storage as of 12/31/03.

   _____cu.ft.

2. What testing methods do you use to determine that your LLRW is mixed waste?

   ____

   ____

3. Do you plan to produce or possess mixed waste during 2004 through 2010 that will require on-site storage for future treatment or shipment for disposal at some time in the future? (Include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050.)

   _____ NO
   _____ YES–Complete TABLE 5 (page 17) for such mixed waste.

4. Did your facility ship mixed waste for treatment, storage, and/or disposal during 2003?

   _____ NO
   _____ YES–Complete the remainder of this question.

   a) List the total volume of mixed waste shipped for treatment, storage, and/or disposal during 2003. (Include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050.) This waste also must be included on Tables 6 & 7 (pages 18 thru 20) and/or 8 & 9 (pages 21 thru 23).

   _____cu.ft.

b) Complete the names, addresses, and telephone numbers of the carrier/transporter; and the storage and treatment facilities:

Name of Carrier:____

Address:____

City:____State:________Zip:__________

Telephone:(_____)______________________________

Name of Storage/Treatment Facility:____

Address:____

City:____State:________Zip:__________

Telephone:(_____)______________________________

If the mixed waste was transported by more than one carrier, or if the mixed waste was shipped to more than one storage and treatment facility, provide additional information in an attachment.

PART VI

OFF-SITE WASTE MANAGEMENT

1. Did you ship LLRW directly to a LLRW disposal facility during 2003?

   _____ NO
   _____ YES–Complete TABLES 6 (page 19) and 7 (pages 20-21) for the waste.

2. Did you transfer LLRW to a waste processor or broker for treatment and/or disposal during at a LLRW disposal facility during 2003? (Include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050.)

   _____ NO
   _____ YES–Complete TABLE 8 (page 22) and 9 (pages 23-24) for the waste.

3. Did you ship LLRW containing naturally-occurring or accelerator-produced radioactive material (NARM) for disposal either directly or via a broker/processor during 2003?

   _____ NO
   _____ YES _______________ cu.ft.

4. Did you ship LLRW containing special nuclear material for disposal either directly or via a broker/processor during 2003?

   _____ NO
   _____ YES _______________ cu.ft.

5. Did you ship LLRW containing source material for disposal either directly or via a broker/processor during 2003? (Do *not* include sealed sources.)

   _____ NO
   _____ YES _______________ cu.ft.

6. Did you ship LLRW containing transuranic radionuclides in concentrations ≤100 nanocuries per gram either directly or via a broker/processor in 2003?

   _____ NO
   _____ YES _______________ cu.ft.

7. Did you ship LLRW containing chelating agents in concentrations exceeding 0.1% by weight for disposal either directly or via a broker/processor during 2003?

   _____ NO
   _____ YES _______________ cu.ft.

Type of Chelating Agent–____

Percent by weight–____

8. Did you dispose of LLRW for any other person, company, or entity in 2003?

_____ NO

_____ YES–Provide the name and address below.

Name of

Person/Company/Entity:____

Address:____

City:________________________________State:________Zip:__________

Telephone:(_____)__________________________

9. Other off-site waste management practices: (describe)

____

____

RETURN ENTIRE REPORT TO:

Chief, Low-Level Radioactive Waste Management & Site Decommissioning
Illinois Emergency Management Agency
1035 Outer Park Drive
Springfield, Illinois 62704

COMMENTS:____

ILLINOIS EMERGENCY MANAGEMENT AGENCY
DIVISION OF NUCLEAR SAFETY
TRACKING SYSTEM PERMIT APPLICATION FORM

Facility Information :

Facility Name: ______________________________

Address: ______________________________

City, State, Zip: ______________________________

Phone Number: ( ) ______________________________

Contact Name: ______________________________

Contact Number: ( ) ______________________________

License Information :

License Number: ______________________________

Licensing Agency: ______________________________

Final Waste Disposition :

Is your facility licensed to receive back its own waste? Yes [ ] No [ ]

Is your facility permitted to use a disposal facility? Yes [ ] No [ ]

If yes: Disposal Facility: ______________________________

Site Permit Number: ______________________________

Other Disposition Arrangement/Facility: ______________________________

I hereby certify that the above information is correct and complete. Further I hereby certify that radioactive material will not be treated, stored or disposed of in Illinois in violation of any provisions of the Compact Enforcement Act. I further agree to allow the Illinois Emergency Management Agency, Division of Nuclear Safety to inspect shipments at times and locations determined to be convenient by the Agency.

Name/Title: ______________________________

Signature: ______________________________ Date: ______________

Completed Applications shall be sent to:

Chief, Low-Level Radioactive Waste Management & Site Decommissioning
Illinois Emergency Management Agency
Division of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

The Illinois Emergency Management Agency, Division of Nuclear Safety is requesting disclosure of information that is required to accomplish the statutory provisions as outlined in the Illinois Low-Level Radioactive Waste Management Act, 420 ILCS 20/9, as amended. Failure to provide this relevant information will result in the rejection of the permit application by issuing authority. Shipping waste without this required permit may subject the offender to criminal and/or civil penalties per 45 ILCS 141/30, and 32 Ill. Admin. Code 609-80.

Do Not Write Below This Line

Approval By: ____________ Entered By: ____________ Application Type: Initial [ ]

Yes No Date: ____________ Date: ____________ Renewal [ ]

[ ] [ ] Facility Classification: ____________ Permit Number: ____________

TABLE 1: Waste Stored On-Site for Decay to Background during 2003

Provide the waste type, the volume in cubic feet, and the associated radionuclide(s) for each type of LLRW generated in Illinois and stored for decay to background at any given time during 2003. See Appendix I for waste type codes. All waste types listed on Table 1 must be listed in Part II. Attach additional sheets as necessary.

TABLE 1: Waste Stored On-site for Decay to Background during 2003							
Waste Types	Volume (cu.ft.)	Radionuclides					
Total Volume:							

Instructions:

<u>Waste Type</u> - Enter the appropriate waste type code in this column. Appendix I contains a list of codes describing various waste types.

<u>Volume</u> - Enter the maximum volume in cubic feet of each type of waste that was in storage for decay at any one time.

<u>Radionuclides</u> - List the radionuclides originally present in the waste for each type of waste stored on-site for decay to background.

TABLE 2: Waste Stored On-Site During 2003 for Future Disposal

Provide the waste type, the volume in cubic feet, and the associated prominent radionuclide(s) for each type of LLRW generated in Illinois that was stored on-site for future disposal in a form suitable for final disposal at any given time during 2003. See Appendix I for waste type codes. All waste types on Table 2 also must be listed in Part II. Attach additional sheets as necessary.

TABLE 2: Waste Stored On-Site During 2003 for Future Disposal							
Waste Type	Volume (cu.ft.)	Activity (mCi)	Waste Class	Treatment Code	Primary Radionuclide(s)		
Total Volume:							

Instructions:

<u>Waste Type</u> - Enter the appropriate waste type code in this column. Appendix I contains a list of codes describing various waste types.

<u>Volume</u> - Enter the volume in cubic feet for each type of waste that was in a form suitable for disposal (after treatment).

<u>Activity</u> - Enter the total activity content in millicuries for each of the waste types listed.

<u>Waste Class</u> - The State of Illinois' requirements, as reflected in 32 Ill. Adm. Code 340.1052, determine waste classification as A, B, or C. Refer to Appendix V to determine waste classification and enter the appropriate classification of the waste in this column.

<u>Treatment Code</u> - Enter the appropriate code in this column. Include only for waste stored on-site for future disposal. Appendix II contains a list of codes describing various waste treatments.

<u>Radionuclides</u> - List the radionuclides present in the waste for each type of waste stored on-site for future disposal.

TABLE 3: LLRW Generation Projections (2004-2010)

Enter the estimated volume in cubic feet and radioactivity content in millicuries of waste in each class projected to be generated in Illinois during 2004 through 2010 that will require disposal at some time in the future. Waste classification as A, B, or C is determined by the state of Illinois' requirements, as reflected in 32 Ill. Adm. Code 340.1052 (see Appendix V). Include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050.

TABLE 3: LLRW Generation Projections						
Year	Class A		Class B		Class C	
	Volume (cu.ft.)	Activity (mCi)	Volume (cu.ft.)	Activity (mCi)	Volume (cu.ft.)	Activity (mCi)
2004						
2005						
2006						
2007						
2008						
2009						
2010						

Instructions :

Volume - Enter the volume of waste generated forecasted for disposal either directly or via a broker/processor during each year from 2004 through 2010.

Activity - Enter the activity content in millicuries of waste forecasted for disposal during each year from 2004 through 2010.

TABLE 4: Storage of Mixed Wastes during 2003

Provide the IEMA/DNS mixed waste types, the RCRA hazardous waste codes, the volume in cubic feet, the activity in millicuries, the waste class, the form the waste is in, the associated radionuclides(s), and the practice used to generate the waste for each type of mixed waste generated in Illinois and stored on-site during 2003. Attach additional sheets as necessary.

TABLE 4: Storage of Mixed Wastes during 2003											
IEMA/DNS Mixed Waste Type	RCRA Waste Code	Volume (cu.ft.)	Activity (mCi)	Waste Class	Waste Form	Radionuclides					Generating Practice
Total:											

Instructions:

Mixed Waste Type - Enter the appropriate mixed types and hazardous waste codes in the first two columns. Appendix III contains a list of codes describing various IEMA/DNS mixed waste types and RCRA hazardous waste codes.
Volume - Enter the total volume for each type of mixed waste in cubic feet placed in storage during 2003.
Activity - Enter the activity for each type of mixed waste in millicuries placed in storage during 2003.
Waste Class - The State of Illinois' requirements, as reflected in 32 Ill. Adm. Code 340.1052, determine the waste classification as A, B, or C. Refer to Appendix V to determine waste classification and enter the appropriate classification in this column.
Waste Form - Specify the form that the mixed waste is in (solid, liquid, sludge, etc.).
Radionuclides - List the radionuclides present in the waste for each separate type of mixed waste stored on-site.
Generating Practice - List the practice used in generating this waste (e.g. laboratory counting procedures, research or manufacturing (kind), spent reagents, cleaning components, decontamination, spill, etc.).

TABLE 5: Mixed Waste Projections (2004-2010)

Provide IEMA/DNS mixed waste types, RCRA hazardous waste codes, estimated generated volumes in cubic feet, waste classes, and radioactivity contents in millicuries for each type of mixed waste projected to be generated in Illinois during 2004 through 2010 that will require disposal some time in the future. Include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050. Attach additional sheets as necessary.

TABLE 5: Mixed Waste Projections

Year	IEMA/DNS Mixed Waste Type	RCRA Waste Code	Volume (cu.ft.)	Waste Class	Activity (mCi)
2004					
2005					
2006					
2007					
2008					
2009					
2010					

Instructions:

Waste Type/Waste Code - Enter the appropriate codes. Appendix III contains a list of codes describing various IEMA/DNS mixed waste types and RCRA hazardous waste codes.

Volume - Enter the total volume in cubic feet of each type of mixed waste projected to be generated during each year from 2004 through 2010.

Waste Class - The State of Illinois' requirements, as reflected in 32 Ill. Adm. Code 340.1052, determine waste classification as A, B, or C. Refer to Appendix V to determine waste classification and enter the appropriate classification in this column.

Activity - Enter the activity content in millicuries of each type of mixed waste projected to be generated each year from 2004 through 2010.

TABLE 6: Destination of Waste Shipped Directly to LLRW Disposal Sites in 2003

For waste generated in Illinois, list the volume in cubic feet and activity in millicuries of all low-level radioactive waste in classes A, B, and C shipped directly to a disposal facility during 2003. Also list the number of shielded (SH) and unshielded (UNSH) shipments of waste in each class made to each disposal facility. See Appendix V for waste classification definitions.

TABLE 6: Destination of Waste Shipped Directly to LLRW Disposal Sites in 2003												
Waste Class	Barnwell, SC				Clive, UT				Facility (other) ________ (name)			
	Volume (cu.ft.)	Activity (mCi)	Number of Shipments		Volume (cu.ft.)	Activity (mCi)	Number of Shipments		Volume (cu.ft.)	Activity (mCi)	Number of Shipments	
			SH	UNSH			SH	UNSH			SH	UNSH
A												
B												
C												
Total:												

Instructions:

Volume - Enter the volume in cubic feet of waste in each class A, B, or C shipped to each disposal facility. The total volume listed for each facility on Table 6 must equal the transferred volume which is the container volume multiplied by the number of containers shipped to each facility listed on Table 7.

Activity - Enter the total activity in millicuries of waste in each class A, B, or C shipped to each disposal facility. The total activity listed on Table 6 must equal the total activity listed on Table 7.

Number of Shipments - Enter the total number of shielded (SH) and unshielded (UNSH) shipments of waste in each class made to each disposal facility.

Table 7: Waste Shipped Directly to LLRW Disposal Sites During 2003

For each disposal site to which LLRW generated in Illinois was shipped directly, indicate each type of container used, the disposal volume of the container (the exterior volume, not the interior capacity), the total number of containers of that type shipped, the surface dose rate range of the containers (A-E, see below), and the average weight of the containers when filled. Provide the total inventory of radionuclides with their associated activities in millicuries contained in the waste shipped for each type of container used. Also provide a description of each type of waste shipped in the containers and indicate the waste class, the waste type, and the volume. Additionally, for each waste description, indicate the methods used on-site to treat the waste prior to disposal (if any), and the volume in cubic feet of the waste after treatment. See Appendix I for waste type codes, Appendix II for treatment method codes, Appendix IV for container codes, and Appendix V for waste class definitions. Copy and attach a separate sheet for each type of container used to ship waste to a specific site. Include waste generated in Illinois only. **All waste types listed on TABLE 7 also must be listed in Part II.**

Instructions:

Disposal Site - Indicate the disposal site to which waste was shipped directly. Direct disposal sites are Barnwell, South Carolina (SC), Clive, Utah (UT) or "other".

Container Type - Use Appendix IV for container codes.

Container Volume - Enter the disposal volume in cubic feet of the container used (the exterior volume as recorded by the LLRW disposal site operator, *not* the interior capacity, with the exception of 55-gallon drums). The sum of this volume times the number of containers shall equal the transferred volume and the volume reported in Table 6.

Number of Containers - Enter the number of.containers of the specified type used to ship waste to the selected disposal site.

Surface Dose Rate Range - Enter the surface dose rate range (from A to F) of the containers used, where:

A = 0 - 100 mR/hr.
B = >100 - 1,000 mR/hr.
C = >1,000 - 15,000 mR/hr.
D = >15,000 - 100,000 mR/hr.
E = >100,000 - 500,000 mR/hr.
F = >500,000 mR/hr.

Radionuclides and Activity - List each radionuclide contained in the waste shipped and the associated activity in millicuries for each type of container used.

Average Filled Weight -Enter the average weight in pounds of filled containers (including the container) shipped off-site.

Waste Class - The state of Illinois' requirements, as reflected in 32 Ill. Adm. Code 340.1052, determine waste classification as A, B, or C. Refer to Appendix V to determine waste classification and enter the appropriate classification of the waste in the container in this column.

Waste Type - Enter the appropriate waste type code in this column. Appendix I contains a list of codes describing various waste types.

Treatment Code - Enter the appropriate treatment code in this column. Include only treatments done on-site. Appendix II contains a list of codes describing various waste treatment methods.

Transferred Volume - Enter the volume in cubic feet of the waste transferred to the disposal facility. The sum of this volume is the same as the container volume times the number of containers.

TABLE 7: Waste Shipped Directly to LLRW Disposal Sites During 2003

Disposal Site (SC, UT, other): ____________

Container Information				
Container Type (code)	Container Volume (cu.ft.)	Number of Containers	Surface Dose Rate Range (A-F)	Average Filled Weight (lbs.)

Nuclide Inventory			
Nuclide	Activity	Nuclide	Activity

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

TABLE 8: Destination of Waste Shipped to Brokers and Processors During 2003

For waste generated in Illinois, list the volume in cubic feet and activity in millicuries of all low-level radioactive waste in classes A, B, and C shipped to each broker/processor during 2003. Also list the number of shielded (SH) and unshielded (UNSH) shipments of waste in each class made to each disposal facility. See Appendix V for waste classification definitions.

TABLE 8: Destination of Waste Shipped to Brokers and Processors During 2003

Waste Class	Facility #1 ________ (name)				Facility #2 ________ (name)				Facility #3 ________ (name)			
	Volume (cu.ft.)	Activity (mCi)	Number of Shipments		Volume (cu.ft.)	Activity (mCi)	Number of Shipments		Volume (cu.ft.)	Activity (mCi)	Number of Shipments	
			SH	UNSH			SH	UNSH			SH	UNSH
A												
B												
C												
Total:												

Instructions:

Volume - Enter the volume in cubic feet of waste in each class A, B, or C transferred to each broker/processor facility. The total volume listed for each broker or processor on Table 8 must equal the total volume shipped to each facility listed on Table 9.

Activity - Enter the total activity in millicuries of waste in each class A, B, or C shipped to each broker or processor. The total activity listed on Table 8 must equal the total activity listed on Table 9.

Number of Shipments - Enter the total number of shielded (SH) and unshielded (UNSH) shipments of waste in each class made to each broker or processor.

Table 9: Waste Transferred to Broker(s) or LLRW Processor(s) for Treatment and/or Disposal During 2003

Provide the company's name and address and the total inventory of radionuclides with their associated activities in millicuries for LLRW generated in Illinois that was transferred to a broker or processor for treatment and/or disposal. Also provide a description of each type of waste transferred to the broker/processor and indicate the waste class, the waste type, and the volume of the waste transferred to the broker/processor. Include specific waste, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050. Additionally, for each waste description, indicate the methods used on-site to treat the waste prior to transfer to the broker/processor (if any). See Appendix I for waste type codes, Appendix II for treatment method codes, and Appendix V for waste class definitions. Copy and attach a separate sheet for each broker or processor used. Include waste generated in Illinois only. **All waste types listed on TABLE 9 also must be listed in Part II.**

Instructions:

Broker/Processor - Provide the name and address of each broker or processor to which waste was transferred.

Radionuclides and Activity - List all of the radionuclides contained in the waste transferred and their associated activities in millicuries for the total waste transferred to each individual broker or processor.

Waste Class - The state of Illinois' requirements, as reflected in 32 Ill. Adm. Code 340.1052, determine waste classification as A, B, or C. Refer to Appendix V to determine waste classification and enter the appropriate classification of the waste transferred in this column.

Waste Type - Enter the appropriate waste type code in this column. Appendix I contains a list of codes describing various waste types.

Treatment Code - Enter the appropriate treatment code in this column. IMPORTANT: Report only those waste treatment methods employed on-site *prior* to transferring waste to the broker or processor. Appendix II contains a list of codes describing various waste treatment methods.

Transferred Volume - Enter the volume in cubic feet of the waste transferred, if there was on-site treatment, use the after treatment volume.

TABLE 9: Waste Transferred To LLRW Broker(s) or Processor(s) for Treatment and/or Disposal During 2003
(Include specific waste as defined in 32 Ill. Adm. Code 340.1050 (e.g., scintillation fluids.)

Broker/Processor Information

Name: ______________________________

Address: ______________________________

City: ______________ State: ______________ Zip: ______________

Nuclide Inventory				
Nuclide	Activity		Nuclide	Activity

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

Waste Description/On-Site Treatment			
Waste Class	Waste Type	Treatment Code (if any)	Transferred Volume (cu.ft.)

APPENDICES

APPENDIX I: List of Waste Types

CODE	WASTE TYPE
20.	Charcoal
21.	Incinerator Ash
22.	Soil
23.	Gas
24.	Oil
25.	Aqueous Liquid
26.	Filter Media
27	Mechanical Filter
28.	EPA or State Hazardous
29.	Demolition Rubble
30.	Cation Ion-exchange Media
31.	Anion Ion-exchange Media
32.	Mixed Bed Ion-exchange Media
33.	Contaminated Equipment
34.	Organic Liquid (except oil)
35.	Glassware or Labware
36.	Sealed Source/Device
37.	Paint or Plating
38.	Evaporator Bottoms/Sludges/Concentrates
39.	Compacted Trash
40.	Uncompacted Trash
41.	Animal Carcass
42.	Biological Material (except animal carcass)
43.	Activated Material
44.	Medical Generators
59.	Other

APPENDIX II: Treatment Methods

CODE	TREATMENT METHOD
1.	Sorption*
	a.) Speedi Dry
	b.) Celetom
	c.) Floor Dry/Superfine
	d.) Hi Dri
	e.) Safe T Sorab
	f.) Safe N Dri
	g.) Florco
	h.) Florco X
	I.) Solid A Sorb
	j.) Chemcil 30
	k.) Chemcil 50
	l.) Chemcil 3030
	n.) Dicaperl HP200
	n.) Dicaperl HP500
	o.) Petroset
	p.) Petroset II
	q.) Aquaset
	r.) Aquaset II
	s.) Other
2.	Chemical Extraction
3.	Dewatering
4.	Evaporation
5.	Filtration
6.	Incineration
7.	Ion-exchange
8.	Solidification*
	t.) Cement
	u.) Concrete (encapsulation)
	v.) Bitumen
	w.) Vinyl Chloride
	x.) Vinyl Ester Styrene
9.	Washing
10.	Abrasive Cleaning
11.	High-pressure water
12.	Electropolishing
13.	Supercompaction
14.	Standard Compaction
15.	Baling/Shredding
99.	Other: (describe)________________

*Specify a, b, c, etc. (e.g., 8v = bitumen solidification)

APPENDIX III: Mixed Waste Types/RCRA Hazardous Waste Codes

CODES	WASTE TYPE	RCRA
1.	Lead*	
	a) activated lead	D008
	b) contaminated lead	D008
	c) lead containers (pigs)	D008
2.	Chromium *	D007
	a) corrosion-inhibiting chromates	D007
	b) incidental corrosion products	D007
	c) Cr-51 carrier	**
3.	Metals*	
	a) mercury	D009
	b) cadmium	D006
	c) barium	D005
	d) silver	D011
	e) arsenic	D004
	f) other	**
4.	Scintillation Fluids*	
	a) benzene	F005
	b) dioxane	D001/U108
	c) toluene	F005
	d) xylene	F003
	e) other	**
5.	Solvents and Other Organic Fluids*	
	a) freon	F002
	b) other	**
6.	Alkaline liquids (pH>=12.5)	D002
7.	Acidic liquids (pH<=2)	D002
99.	Other wastes not specifically listed above which are listed by the U.S. EPA in 40 CFR 261 or which exhibit at least one of the following properties:	
	Ignitability	D001
	Corrosivity	D002
	Reactivity	D003
	Toxicity	D004-43

*Specify a, b, c, etc. (e.g., 4c = toluene scintillation fluid)

**No waste code provided in this survey. If available, use the RCRA code.

APPENDIX IV: Container Description Codes

CODE	CONTAINER
1.	Wooden Box or Crate
2.	Metal Box
3.	Plastic Drum or Pail
4.	Metal Drum or Pail
5.	Metal Tank or Liner
6.	Concrete Tank or Liner
7.	Polyethylene Tank or Liner
8.	Fiberglass Tank or Liner
9.	Demineralizer
10.	Gas Cylinder
11.	Bulk, Unpackaged Waste
12.	Unpackaged Components
13.	High Integrity Container
19.	Other

APPENDIX V: Waste Classification (32 Ill. Adm. Code 340.1052) and Disposal of Specific Wastes (32 Ill. Adm. Code 340.1050)

Section 340.1052 Classification of Radioactive Waste for Land Disposal

a) Considerations. Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of lone-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form, and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form, and disposal methods are effective.

b) Classes of waste.

1) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in Section 340.1055(a) If Class A waste also meets the stability requirements set forth in Section 340.1055(b), it is not necessary to segregate the waste for disposal.

2) Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability (as defined in 32 Ill. Adm. Code 601.20) after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in Section 340.1055.

3) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures as the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in Section 340.1055.

c) Classification determined by long-lived radionuclides. If the radioactive waste contains only radionuclides listed in Table 1, classification shall be determined as follows:

1) If the concentration does not exceed 0.1 times the value in Table 1, the waste is Class A.

2) If the concentration exceeds 0.1 times the value in Table 1, but does not exceed the value in Table l, the waste is Class C.

3) If the concentration exceeds the value in Table 1, the waste is not generally acceptable for land disposal.

4) For wastes containing mixtures of radionuclides listed in Table 1, the total concentration shall be determined by the sum of fractions rule described in subsection (g).

TABLE 1

Radionuclide	Concentration curies/cubic meter
C-14	20,008.00
C-14 in activated metal	80.00
Ni-59 in activated metal	220.00
Nb-94 in activated metal	0.20
Tc-99	3.00
I-129	0.08
Alpha emitting transuranic radionuclides with half-life greater than five years	100.00*
Pu-241	3,500.00*
Cm-242	20,000.00*
Ra-226	100.00*

*AGENCY NOTE: Units are nanocuries per gram.

d) Classification determined by short-lived radionuclides. If the waste does not contain any of the radionuclides listed in Table 1, classification shall be determined based on the concentrations shown in Table 2. However, as specified in subsection (f), if radioactive waste does not contain any nuclides listed in either Table 1 or 21, it is Class A.

1) If the concentration does not exceed the value in Column 1, the waste is Class A.

2) If the concentration exceeds the value in Column 1 but does not exceed the value in Column 2, the waste is Class B.

3) If the concentration exceeds the value in Column 2 but does not exceed the value in Column 3, the waste is Class C.

4) If the concentration exceeds the value in Column 3, the waste is not generally acceptable for near-surface disposal.

5) For wastes containing mixtures of the radionuclides listed in Table 2, the total concentration shall be determined by the sum of fractions rule described in subsection (g).

TABLE 2

Radionuclide	Concentration curies/cubic meter Column 1	Column 2	Column 3
Total of all radionuclides with less than 5-year half-life	70.00	*	*
H-3	40.00	*	*
Co-60	700.00	*	*
Ni-63	3.50	70.00	700.00
Ni-63 in activated metal	35.00	700.00	7000.00
Sr-90	0.04	150.00	7000.00
Cs-137	1.00	44.00	4600.00

*AGENCY NOTE: There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other radionuclides in Table 2 determine the waste to be Class C independent of these radionuclides.

e) Classification determined by both long- and short-lived radionuclides. If the radioactive waste contains a mixture of radionuclides, some of which are listed in Table 1 and some of which are listed in Table 2, classification shall be determined as follows:

1) If the concentration of a radionuclide listed in Table 1 is less than 0.1 times the value listed i in Table 1, the class shall be that determined by the concentration of radionuclides listed in Table 2.

2) If the concentration of a radionuclide listed in Table 1 exceeds 0.1 times the value listed in Table 1, but does not exceed the value in Table 1, the waste shall be Class C, provided the concentration of radionuclides listed in Table 2 does not exceed the value shown in Column 3 of Table 2.

f) Classification of wastes with radionuclides other than those listed in Tables 1 and 2. If the waste does not contain any radionuclides listed in either Table 1 or 2, it is Class A.

g) The sum of the fractions rule for mixtures of radionuclides. For determining classification for waste that contains a mixture of radionuclides, it is necessary to determine the sum of fractions by dividing each radionuclide's concentration by the appropriate limit and adding the resulting values. The appropriate limits must all be taken from the same column of the same table. The sum of the fractions for the column must be less than 1.0 if the waste class is to be determined by that column. Example: A waste contains SR-90 in a concentration of 50 curies/cubic meter and CS-137 in a concentration of 22 curies/cubic meter. Since the concentrations both exceed the values in Column 1. Table 2, they must be compared to Column 2 values. For Sr-90 fraction, 50/150 equals 0.33: for Cs-137 fraction, 22/44 equals 0.5; the sum of the fractions equals 0.83. Since the sum is less than 1.0, the waste is Class B.

h) Determination of concentrations in wastes. The concentration of a radionuclide may be determined by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The concentration of a radionuclide may be averaged over the volume of the waste, or weight of the waste if the units are expressed as nanocuries per gram.

Section 340.1050 Disposal of Specific Wastes

a) A licensee may dispose of the following licensed material as if it were not radioactive:

1) 1.85 kBq (0.05 uCi), or less, of hydrogen-3, carbon-14, or iodine-125 per gram of medium used for scintillation counting; and

2) 1.85 kBq (0.05 uCi), or less, of hydrogen-3, carbon-14, or iodine-125 per gram of animal tissue, averaged over the weight of the entire animal.

b) A licensee shall not dispose of tissue pursuant to subsection (a)(2) above in a manner that would permit its use either as food for humans or as animal feed.

c) The licensee shall maintain records in accordance with Section 340.1180.

APPENDIX VI: Glossary of Terms

Abrasive cleaning: The use of abrasive substances to remove contamination from the surface of an object. Such abrasives may include sand or grit used in scouring and sand used in sandblasting.

Absorption: Any process in which a liquid is held in the interstices of an absorbent material, such as water being held in a sponge.

Absorbent materials: Absorbent materials such as diatomaceous earth or vermiculite are currently added to several institutional waste streams to minimize potential transportation impacts. These streams include liquid scintillation vial(LSV) waste, absorbed liquid waste, and biowaste. Existing commercial disposal facility operators require that these wastes be packaged with specified proportions of waste to absorbent material before they are accepted for disposal. For example, LSV waste is required to be packaged using sufficient absorbent material to absorb twice the total volume of the liquid in the package. Lime is frequently added to the biowaste stream. Double packaging of these waste streams is also used for additional safety. For the liquid scintillation vial and the absorbed liquid waste streams, a volume increase factor of 3.0 assumed. NOTE: Absorbents such as vermiculite and diatomaceous earth are not considered to be solidification agents since they do not chemically or physically bind the wastes.

Accelerator-produced material: Any material made radioactive by a particle accelerator.

Activated hardware: Tools, instruments, equipment, and lead or lead shielding made radioactive by irradiation. Activated metals and instruments come from equipment directly associated with the reactor and spent fuel pool.

Air filter: Any device used to filter particles or chemicals from the air. May include ventilation exhaust filters, HEPA (high-efficiency particulate air) filters, and charcoal filters, or the media used in air filters. Such air filter media may include charcoal or cellulosic fibers.

Aqueous liquid waste: Waste that is dissolved in water. Water-soluble liquid scintillation fluids are included in this waste type.

Ash: The product of incinerating low-level radioactive waste (LLRW).

Background radiation: The radiation in the natural environment, including cosmic rays and radiation from naturally-occurring radioactive elements both outside and inside living organisms. Also called naturally-occurring radiation.

Biological wastes: The waste consists of animal carcasses, tissues, animal bedding, and excreta, as well as vegetation and culture media.

Broker: Any person who takes possession of LLRW for the purposes of consolidation and shipment.

Byproduct material: 1) Any radioactive material, except special nuclear material, yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material; 2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from underground solution extraction processes, but not including underground ore bodies depleted by such solution extraction processes. Please note that for the purposes of this survey, the second definition (2) is not considered to be LLRW.

Cartridge filters: Cartridge filters contain one or more disposable filter elements. These elements may be typically constructed of woven fabric, wound fabric, or pleated paper supported internally by a stainless steel basket.

Chelating agent: Amine polycarboxylic acids (e.g. EDTA, DTPA), hydroxy-carboxylic acids, and polycarboxylic acids (e.g., citric acid, carbolic acid, and glucinic acid) used for purposes of bonding, i.e., to stabilize radioactive materials.

Class A waste: Waste with the lowest concentrations of radionuclides. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in 32 Ill. Adm. Code, ch. II, 340.3080(a). If Class A waste also meets the stability requirements set forth in 32 Ill. Adm. Code, ch. II 340.3080(b), it is not necessary to segregate the waste for disposal.

Class B waste: Waste with higher concentrations of radionuclides than Class A, Class B waste must meet more rigorous requirements on waste form to ensure stability (as defined in 32 Ill. Adm. Code, ch II, 601.20) after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in 32 Ill. Adm. Code, ch. II 340.3080.

Class C waste: The highest concentrations of waste that is permitted for disposal as low-level radioactive waste, Class C waste not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in 32 Ill. Adm. Code, ch. II 340.3080.

Compaction: Compaction is an often-used treatment method--particularly at nuclear fuel-cycle facilities--for reducing the volume of waste streams containing compressible material such as paper, plastic, glass, wood, and light-gauge metal. Most of the volume reduction is attained by compressing the waste to reduce its void volume. The term compactor is usually applied to hydraulic or mechanical rams that compress wastes into boxes or 55-gallon steel drums. The boxes and drums are then used as disposal containers. Typical hydraulic rams generate 20,000 to 30,000 pounds of force, and are fitted with shrouds and simple air filtration systems to minimize release of airborne radioactivity.

Concentration: The amount of a specified substance in a unit amount of another substance. The classification system for low-level radioactive waste is based on the concentrations of long- and/or short-lived radionuclides, measured in curies per cubic meter or nanocuries per gram.

Contaminated hardware: Tools, instruments, equipment, and lead or lead shielding having radioactive contamination on their surfaces.

Contaminated oils: Lubricating or machine oil which becomes contaminated with radioactive materials.

Contaminated Rubble, Sand, Soil: Concrete, gravel, sand and soil, or other building rubble contaminated with radioactive materials.

Contamination: The introduction of radioactive material any place where it is not desired.

Decay: The spontaneous transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. During decay, the unstable radioactive nucleus releases energy or particles. The process results in a decrease, with time, in the number of original radioactive atoms in the sample. Also referred to as radioactive disintegration.

Decontamination: The removal of radioactive contaminants from surfaces or equipment, using processes such as washing, electropolishing, abrasive cleaning, or cleaning with high-pressure water.

Depleted uranium: The source material uranium in which the isotope uranium-235 is less than 0.711 weight percent of the total uranium present. Depleted uranium does not include special nuclear material.

Dewatering: The process of removing water from wet low-level radioactive wastes.

Disposal facility: A parcel of land or site, together with structures, equipment, and improvements on or appurtenant to the land or site, which is used or is being developed for the disposal of LLRW. "Facility" does not include lands, sites, structures, or equipment used by a generator in the generation of LLRW.

Drums: Commonly used to ship and dispose of low-level radioactive waste, drums are usually made of steel, and are cylindrical in shape with either sealed or removable heads.

Dry active waste (DAW): Waste that commonly consists of paper, cloth, plastic, rubber, tape, non-metal filter, and scrap wood. May also include scrap metal; glass, smoke detectors, electrical conduit and cable, and insulation material. DAW may be both compactible and combustible, compactible and non-combustible, non-compactible and combustible, or non-compactible and non-combustible. Also see reactor trash and institutional trash.

Electropolishing: Any electrochemical process in which radioactive contamination is removed from the surface of the metal.

Evaporation: Treating liquid wastes by heating them to vaporize the volatile components. The vaporized liquid generally contains greatly reduced quantities of dissolved fluids, suspended solids, and radioactivity relative to those found in the input waste stream. In the nuclear industry, the vaporized waste is normally condensed and collected, and then either discharges or recycled after testing to determine whether the condensate requires additional treatment. The concentrated solution (bottoms) left in the evaporator retains virtually all of the solids and radioactivity and is solidified and shipped to a disposal facility.

Evaporator concentrates: Concentrated liquid waste may be produced by the evaporation of a wide variety of liquid waste streams. The waste consists of liquids with elevated suspended and dissolved solids content, and also consists of sludge resulting from supersaturation during evaporation.

Filter sludge: Filter sludge is waste produced by precoat filters and consists of filter aid and waste solids retained by the filter aid. Diatomaceous earth, powdered mixtures of cation and anion exchange resins, and high purity cellulose fibers are common filter aids. These materials are slurried and deposited (precoated) as a tin cake on the initial filter medium (wire mesh, cloth, etc.). The filter cake removes suspended solids from liquid streams.

Filtration: A process of removing radioactive particles from liquid waste by filtering. Filtration media may include cellulosic fiber, diatomaceous earth, and activated carbon. In some cases, the filtered liquid can be recycled. Filtration may also be applied to the removal of contamination from air by using high-efficiency particulate air (HEPA) filters or other kinds of filters.

Final disposal volume: The volume of waste shipped for disposal including the container in which it was disposed.

Gaseous waste: Radioactive waste in a gaseous state.

Generator: Any person who produces or possesses LLRW in the course of or incident to manufacturing, power generation, processing, medical diagnosis and treatment, research, education, or other activity.

Greater than Class C waste: Waste with a concentration of radioactivity exceeding those established for Class C low-level radioactive waste, as defined in 32 Ill. Adm. Code ch. II, Part 340.3070.

Half-life; radioactive: For a single radioactive decay process, the time required for the activity to decrease by half its value by that process. Glossary of Nuclear Science Terms.

Hazardous waste: A waste or combination of wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed, and which has been identified, by characteristics or listing, as hazardous pursuant to Section 3001 of the Resource Conservation and Recovery Act of 1976, P.L. 94-580 or pursuant to regulations of the Pollution Control Board.

High-integrity container (HIC): A type of container that is intended to provide structural stability and containment of low-level radioactive waste for a long period of time. The design, and physical and chemical properties of the materials from which such containers are fabricated contribute to this stability. They are used for both the transportation and disposal of waste.

High-level radioactive waste: 1) The highly radioactive material resulting from the reprocessing of spent nuclear fuel including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and 2) the highly radioactive material that the Nuclear Regulatory Commission has determined, on the effective date of this Amendatory Act of 1988 (Illinois Low-Level Radioactive Waste Management Act, Section 3(j)), to be high-level radioactive waste requiring permanent isolation.

High-pressure water cleaning: A process for cleaning radioactive contamination from the surfaces of objects by spraying with a jet of water. Also see "Decontamination."

Incineration: Treatment of combustible waste materials by thermal oxidation. Combustion or incineration involves complete oxidation of wastes by burning in an excess of oxygen (air). Most frequently used for organic liquids, animal carcasses, and most solid institutional wastes.

Institutional trash (DAW): Consists almost entirely of materials that are both compactible and combustible. It generally consists of paper, rubber or plastic gloves, disposable and broken labware, and disposable syringes.

Ion exchange: A process for selectively removing ionic constituents from liquid waste by reversibly transferring ions between resins and the waste.

Ion exchange media: Ion exchange media usually consist of organic resins, which can be cation or anion resins, or a mixture of both. Inorganic zeolite ion exchange media have also been used in some cases.

Ionizing radiation: Includes gamma rays and x-rays, alpha and beta particles, high speed electrons, neutrons, protons, and other nuclear particles or electromagnetic radiations capable of producing ions directly or indirectly in their passage through matter; but does not include sound or radio waves, or visible, infrared or ultraviolet light.

Isotope: One of two or more atoms with the same atomic number (the same chemical element), but with different atomic weights. Carbon-12, carbon-13, and carbon-14 are isotopes of the element carbon, the numbers denoting the approximate atomic weights. Isotopes may be stable or radioactive.

Limitation of articles in contaminated areas: Unnecessary contamination of tools and other articles can be avoided by restricting the number of articles allowed to enter contaminated areas.

Limitation of contaminated areas: Similar to "limitation of articles in contaminated areas," a limitation on the number of areas within a facility in which radioactive materials can be used will also minimize unnecessary contamination of materials.

Liquid filter cartridges: Disposable or cleanable filters that are replaceable as a cartridge unit.

Liquid filter media: A sludge consisting of diatomaceous earth, cellulosic fiber, powdered ion exchange resin, charcoal, or activated powdered carbon.

Liquid scintillation fluids: Flammable organic solvents (e.g. toluene, benzene, xylene) comprise the major constituents of scintillation fluids.

Liner: An inner package into which LLRW is packed that is loaded into an outer shielded packaging for shipping. The liner is subsequently unloaded for burial at the waste disposal site while the outer container is cleaned and reused.

Long-lived radionuclide: An atom whose nucleus decays at a slow rate so that a quantity of such radionuclides will exist for an extended time.

Low-level radioactive waste or "waste": Radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel or byproduct material as defined in Section 11e(2) of the Atomic Energy Act of 1954, 42 U.S.C. 2014. Except when otherwise indicated in the rules, LLRW includes "mixed waste."

Medical generators: Separation columns that are both "hazardous waste" and "low-level radioactive waste" as defined in the Illinois Low-Level Radioactive Waste Management Act. Also see hazardous waste and low-level radioactive waste.

Mixed waste: Waste that contains a combination of low-level radioactive waste and hazardous materials. Hazardous components are those listed by the Environmental Protection Agency in Subpart D of 40 CFR 261, or those that exhibit any of the following four hazardous characteristics: ignitability, corrosivity, reactivity, or extraction procedure (EP) toxicity. Both radiological and chemical toxicity must be considered in its management and disposal.

NARM: See "Naturally-occurring or Accelerator-produced Radioactive Material."

Natural uranium: An element with the atomic number 92 having 14 known isotopes ranging from uranium-227 to uranium-240, the most abundant being uranium-238. Natural uranium is found in several minerals from which uranium is extracted and processed for use in research, nuclear fuels, and nuclear weapons.

Naturally-occurring or Accelerator-produced Radioactive Material (NARM): Radioactive NARM waste includes discrete material (small volume, high activity accelerator-produced materials, radium needles used in medicine, and drinking water filters from radium-contaminated areas) as well as diffuse material (generally lower activity radium-contaminated soil at locations where radium was used for manufacturing luminous dials and paint or where natural deposits of radium exist, or material in which radium or other naturally-occurring materials have been concentrated).

Naturally-occurring Radioactive Material (NORM): Radioactive material that has a natural source. See Naturally-occurring or Accelerator-produced Radioactive Material.

Nuclide: A species of atoms characterized by its mass number, atomic number, and nuclear energy state provided that the lifetime in that state is long enough to be observable. Nuclides may be stable or radioactive.

Oils (contaminated): Lubricating or machine oil contaminated with radioactive materials.

Organic liquid: Carbon-based compounds such as alcohols, aldehydes, ketones, and organic acids. Includes liquid scintillation media containing chemicals such as benzene, xylene, or toluene, and degreasing solvents such as carbon tetrachloride, freon, or vanadous formate. For purposes of this report, this waste type does not include oils.

Processing: The preparation, manipulation, or conversion of radioactive material.

Processor: Any person or company taking possession of LLRW for treatment.

Radiation: See ionizing radiation.

Radioactive material: Any material, solid, liquid, or gas which emits radiation spontaneously.

Radioactivity: The spontaneous emission of radiation, generally alpha, or beta particles and often accompanied by gamma rays, from the nucleus of an unstable nuclide. Measured in curies.

Radioisotope: A radioactive isotope. An unstable atom of an element that decays or disintegrates spontaneously, emitting radiation. More than 1,300 natural and artificial radioisotopes have been identified.

Radionuclide: A radioactive species of atom having a specific mass, atomic number, and nuclear energy state.

Radium contaminated waste: Radium is a naturally occurring radioactive element which has been used in medical and industrial applications since the turn of the century. While there are several known isotopes of radium, the one that has the greatest utilization is radium-226, an isotope forming part of the uranium-228 decay scheme. Since it is an alkaline metal that reacts with nitrogen, in commercial use it is principally in the form of a salt.

Reactor trash (DAW): Trash is the most varied waste stream generated by Light Water Reactors and can contain everything from paper towels to irradiated reactor internals.

Recycling: The process of reusing items or materials. Recycling may include some form of treatment before the item or material can be reused for its intended purpose.

Rubble, sand, soil (contaminated): Concrete, gravel, sand and soil, or other building rubble contaminated with radioactive materials.

Sealed source: Any device containing radioactive material to be used primarily as a source of radiation which has been constructed in such a manner as to prevent the escape, under normal conditions, of any radioactive material.

Sludge: Wet wastes resulting from sewage or water treatment processes.

Solidification: Cement and synthetic polymer solidification systems are currently used by some light water reactors. Bitumen (another agent) is being actively marketed and some bitumen solidification systems (which are widely used in Europe) have been sold in this country. Polyester (another synthetic polymer) has been evaluated in laboratory and pilot plant studies using simulated light water reactor liquid wastes and may be routinely used in the future.

Sorting of waste by radionuclide, half-life, or activity: Keeping track of the radionuclide, curie content and the half-life of each type of waste enables generators to segregate materials according to the manner in which they must be handled and disposed.

Source material: Uranium or thorium, or any combination thereof, in any physical or chemical form; or ores which contain by weight one-twentieth of one percent (0.05 percent) or more of uranium; thorium; or any combination thereof. Source material does not include special nuclear material.

Source reduction: Those administrative practices that reduce the radionuclide levels of LLRW or that prevent the generation of additional LLRW.

Special nuclear material in quantities not sufficient to form a critical mass: Uranium enriched in the isotope U-235 in quantities not exceeding 350 grams of contained U-235; U-233 in quantities not exceeding 200 grams; or any combination of them, except source material.

Specific waste: Refers to two specific waste types that may be disposed of without regard to their radioactive component: 1) liquid scintillation fluids containing no more than 0.05 microcuries per gram of carbon-14 or hydrogen-3 (tritium); and 2) animal carcasses containing no more than 0.05 microcuries per gram of tissue of carbon-14 or tritium. These materials must still be handled in accordance with other applicable regulatory requirements.

Stabilization: Any process by which radioactive waste is made stable to physical, chemical, or biological degradation. Processes such as solidification, or certain packaging procedures may result in stabilization.

Standard compaction: Compacting material using a compactor capable of generating up to 15 tons of compressive force can produce volume reduction ratios of three or four to one when used to treat compactible waste streams. Waste streams compactible with a standard compactor include dry active waste, filter cartridges, and liquid scintillation vials.

Storage: Temporary holding of waste for treatment or disposal for a period determined by Department regulations.

Storage for decay to background: Practice of holding waste in storage for decay to background. Once at a background radiation level, as measured with an appropriate instrument, this waste could then be deemed no longer radioactive and routine trash disposal is permitted by most regulatory agencies.

Strippable coating: Any removable coating layered on a surface to prevent an item or area from becoming contaminated.

Supercompaction: Compacting material using a compactor that can apply compressive forces approaching 100 times those achievable by standard compactors. Volume reduction ratios can approach eight to one for selected applications.

Transferred disposal volume: The waste-only volume of low-level radioactive waste transferred to a broker or processor for storage, treatment, or disposal.

Transuranic: An element with an atomic number greater than 92.

Transuranic waste: Waste contaminated with alpha-emitting radionuclides with atomic numbers greater than 92 and half-lives greater than 20 years in concentrations greater than 100 nanocuries per gram.

Treatment: Any method, technique, or process, including storage for radioactive decay, designed to change the physical, chemical, or biological characteristics or composition of any waste in order to render the waste safer for transport or management, amenable to recovery, convertible to another usable material or reduced in volume.

Volume reduction: Those methods including, but not limited to, biological, chemical, mechanical, and thermal methods used to reduce the amount of space that waste materials occupy and to put them into a form suitable for storage or disposal.

Washing: Any procedure in which tools, glassware, and other contaminated articles are washed in order to partially or completely remove radioactive contamination. Washing may involve the use of detergents or chelating agents.

APPENDIX B
List of LLRW Generators Returning Surveys in 2003

ACADEMIC

Augustana College
639 38th Street
Rock Island, IL 61201

Benedictine University
Physics Department
5700 College Road
Lisle, IL 60532

Bradley University
Facilities Mgmt Dept.
103 Macmillan
Peoria, IL 61625

Chicago State University
Williams Science Center
9501 South King Drive, Sci-309
Chicago, IL 60628

College of DuPage
425 North Fawell Boulevard
Glen Ellyn, IL 60137

DePaul University
2325 North Clifton
Chicago, IL 60614

Eastern Illinois University
600 East Lincoln Avenue
Charleston, IL 61920

Field Museum of Natural History
Biochemistry Laboratories
1400 South Lake Shore Drive
Chicago, IL 60605

Finch University of Health Sciences
The Chicago Medical School
3333 Green Bay Road
North Chicago, IL 60064

Haines Middle School
305 South 9th Street
St. Charles, IL 60174

Harper College
1200 West Algonquin Road
Palatine, IL 60067

IIT Research Institute
10 West 35th Street
Chicago, IL 60616

Illinois Central College
One College Drive
East Peoria, IL 61635

Illinois Institute of Technology
3101 S. Dearborn St., Room 206 LS
Chicago, IL 60616

Illinois State University
Office of Env Health & Safety
Room 203, General Services Bldg.
Normal, IL 61761

Sterling Morton West High School
2400 Home Avenue
Berwyn, IL 60402

Knox College
2 East South Street
Galesburg, IL 61401

Lake Forest College
555 North Sheridan Road
Lake Forest, IL 60045

Lake View High School
4015 North Ashland Avenue
Chicago, IL 60613

Lebanon High School
District 9
200 West Schuetz Street
Lebanon, IL 62254

Loyola University of Chicago
6525 North Sheridan Road
Chicago, IL 60626

Midwestern University
Basic Science/Research Dept.
555 31st Street
Downers Grove, IL 60515

National University of Health Science
200 East Roosevelt Road
Lombard, IL 60148

Nicholas Senn High School
5900 North Glenwood Avenue
Chicago, IL 60660

Northeastern Illinois University
Department Of Earth Science
5500 North St. Louis
Chicago, IL 60625

Northern Illinois University
Montgomery Hall 341
DeKalb, IL 60115

Northwestern University
Office of Research Safety
303 East Chicago Avenue
Chicago, IL 60611

Roosevelt University
430 South Michigan, Room 554
Chicago, IL 60605

SIU at Carbondale
Center For Environmental Health & Safety
1325 Radio Drive
Carbondale, IL 62901

Southern Illinois University
SIU-Edwardsville
Campus Box 1657
Edwardsville, IL 62026

Southern Illinois University
SIU - School of Medicine
801 North Rutledge
Springfield, IL 62702

Amos Alonzo Stagg High School
Consolidated High School District 230
8015 West 111th Street
Palos Hills, IL 60456

Adlai E. Stevenson High School
District 125
One Stevenson Drive
Lincolnshire, IL 60069

The University of Chicago
Office of Radiation Safety
5841 S. Maryland Ave., MC 2106
Chicago, IL 60637

U of I at Urbana-Champaign
101 South Gregory Street
Urbana, IL 61801

University of IL At Peoria
College of Medicine
One Illini Drive, Box 1649
Peoria, IL 61656

University of Illinois
College of Medicine at Rockford
1601 Parkview Avenue
Rockford, IL 61107

University of Illinois at Chicago
820 S. Wood Street, Room 339 CSN
Chicago, IL 60612

Western Illinois University
1 University Circle
Macomb, IL 61455

Wheaton College
501 East College Avenue
Wheaton, IL 60187

FUEL-CYCLE

G.E. Nuclear Energy
Morris Operation
7555 East Collins Road
Morris, IL 60450

Honeywell International Inc.
U S Hwy 45N, P. O. Box 430
Metropolis, IL 62960

GOVERNMENTAL

375th Medical Group
310 West Losey Street
Scott AFB, IL 62225

American Water Works Service Company
Belleville Laboratory
1115 South Illinois Street
Belleville, IL 62220

Department of the Army
Rock Island Arsenal
AMSTA-RI-SEM
Building 210, Room 413
Rock Island, IL 61299

Department of Veterans Affairs
Edward Hines, Jr. Hospital
Ooas Box 5000, Bldg. 33
Hines, IL 60141

Illinois Army National Guard
USPFO for Illinois
1301 North Macarthur Boulevard
Springfield, IL 62702

Illinois Emergency Management Agency
1301 Knotts Street
Springfield, IL 62703

Illinois State Police
Westchester Forensic Science Laboratory
10001 Roosevelt Road
Westchester, IL 60154

Illinois State Police
Spgfld Forensic Science Lab
2060 Hill Meadows Drive
Springfield, IL 62702

Jesse Brown V.A. Medical Center
(Formerly V.A. Westside Medical Center)
820 South Damen Avenue
Chicago, IL 60612

Metro Wtr Recl Dist of Greater Chicago
R & D Laboratory
6001 West Pershing Road
Cicero, IL 60804

Naval Dental Research Institute
Building 1-H
Great Lakes, IL 60088

Naval Hospital Great Lakes
3001a Sixth Street
Great Lakes, IL 60088

Navy Drug Screening Laboratory
P. O. Box 886819, Building 38-H
Great Lakes, IL 60088

North Chicago V.A. Medical Center
3001 North Green Bay Road
North Chicago, IL 60064

Office of Medical Examiner
Cook County Toxicology Laboratory
2121 W. Harrison
Chicago, IL 60612

U. S. Environmental Protection Agency
Central Regional Laboratory
536 South Clark Street, 10th Floor
Chicago, IL 60605

U.S. Department of Agriculture, ARS
NCAUR
1815 North University Street
Peoria, IL 61604

U.S.E.P.A. Region V - St. Clair Site
77 West Jackson Boulevard
Chicago, IL 60604

V.A. Chicago Health Care System
333 East Huron Street
Chicago, IL 60611

V.A. Med Center
Nuclear Medicine Service
2401 West Main Street
Marion, IL 62959

V.A. Medical Center
1900 East Main Street
Danville, IL 61832

INDUSTRIAL

AAR Corporation
AAR-Wood Dale
1100 North Wood Dale Raod
Wood Dale, IL 60191

Abbott Laboratories
100 Abbott Park Road
Abbott Park, IL 60064

Acceletronics Midwest, Inc.
37 Sherwood Terrace, Suite 124
Lake Bluff, IL 60044

Albany Molecular Research, Inc.
601 Kensington
Mt. Prospect, IL 60056

Alion Science and Technology
10 West 35th Street
Chicago, IL 60616

American Pharmaceuticals Partners, Inc.
(Formerly Fujisawa U.S.A., Inc.)
2020 Ruby Street
Melrose Park, IL 60030

Amersham Health
1053 West Grand Avenue
Chicago, IL 60622

Analysts, Inc.
2450 Hassell Road
Hoffman Estates, IL 60195

APL Engineered Materials, Inc.
2401 North Willow Road
Urbana, IL 61802

Archer-Daniels-Midland Company
Corporate Office
4666 Faries Parkway
Decatur, IL 62526

Aventis Behring, L.L.C.
Centeon, L. L. C./Armour
Pharmaceutical Company
P. O. Box 511
Kankakee, IL 60901

Baxter Healthcare Corporation
1620 North Waukegon Road
McGraw Park, IL 60085

Baxter Healthcare Corporation
Round Lake Technology Park
Route 120 & Wilson Road WG3-2S
Round Lake, IL 60073

Bayer Crop Science
1816 South Oak, Suite C-1
Champaign, IL 61820

BP Amoco Chemical Company
P. O. Box 941
Joliet, IL 60434

BP Amoco Naperville Complex
150 West Warrenville Road
Naperville, IL 60563

BRK Brands, Inc.
3901 Liberty Street
Aurora, IL 60504

Brookfield Zoo
3300 Golf Road
Brookfield, IL 60513

Cardinal Health
(Formerly Syncor International
Corporation)
747 Church Road, G-9
Elmhurst, IL 60126

Cardinal Health
2200 West Lake Shore Drive
Woodstock, IL 60098

Caterpillar, Inc.
Hydraulics & Hydraulic Systems
2200 Channahon Road
Joliet, IL 60436

Chicago Magnesium Casting Company
14101 S. Seeley Ave., P. O. Box 237
Blue Island, IL 60406

Chromain, Inc.
Enterprise Center II
2255 West Harrison Street, Suite A
Chicago, IL 60612

Conoco Phillips Wood River Refinery
(Formerly Phillips Petroleum Company)
900 South Central Avenue
Roxana, IL 62084

Conopco
325 North Wells Street
Chicago, IL 60606

Corn Products U.S.
(Formerly Corn Products International, Inc.)
6400 Archer Road
Bedford Park, IL 60501

DICKEY-john Corporation
P. O. Box 10
Auburn, IL 62615

E C Technologies, Inc.
24137 West 111th Street
Naperville, IL 60564

Eastern Isotopes, Inc.
801b Forestwood Drive
Romeoville, IL 60446

EPL Bio-Analytical Services, Inc.
P. O. Box 109, 395 N. Memorial Pkwy
Harristown, IL 62537

Equistar Chemicals, LP
625 East U.S. Highway 36
Tuscola, IL 61953

Experimur
2929 South Ellis Avenue, Dreyfus Bldg., Ste. 600
Chicago, IL 60616

Gas Technology Institute
Formerly Institute Of Gas Technology
1700 South Mt. Prospect Road
Des Plaines, IL 60018

Gatorade Sports Science Institute
(Formerly Quaker Oats Company (The))
617 West Main Street
Barrington, IL 60010

General Dynamics - OTS
8820 Route 148
Marion, IL 62959

Hamilton Sundstrand
4747 Harrison Avenue, P. O. Box 7002
Rockford, IL 61125

Hanson Professional Services, Incorporated
1525 South 6th Street
Springfield, IL 62703

High Technology Medical Park
11800 Southwest Highway
Palos Heights, IL 60463

Stan A. Huber Consultants, Inc.
200 North Cedar Road
New Lenox, IL 60451

Keystone Steel And Wire
7000 South West Adams Street
Peoria, IL 61641

Keywell, L.L.C.
11900 South Cottage Grove
Chicago, IL 60628

Koppers Industries, Inc.
3900 South Laramie Avenue
Cicero, IL 60650

Kraft Foods, Inc.
Technology Center
801 Waukegan Road
Glenview, IL 60025

Lixi, Inc.
11980 Oak Creek Parkway
Huntley, IL 60142

Magnesium Electron North America Inc.
P. O. Box 258, 1001 College
Madison, IL 62060

Mallinckrodt Inc.
Nuclear Medicine Division
601-F Busse Road
Elk Grove Village, IL 60007

Marathon Ashland Petroleum LLC
Robinson Refinery
1 Marathon Avenue
Robinson, IL 62454

McCrone Associates, Inc.
850 Pasquinelli Drive
Westmont, IL 60559

Monsanto Research Farm/Monmouth
800 North Lindbergh Boulevard
St. Louis, MO 63167

Motorola, Inc.
CGISS EHS (IL02)
1301 East Algonquin Road, Room 0202
Schaumburg, IL 60196

Nuclin Diagnostics, Inc.
3322 Commercial Avenue
Northbrook, IL 60062

Nycomed Amersham
Medi-Physics, Inc.
3350 North Ridge Avenue
Arlington Heights, IL 60004

Onyx Environmental Services
Trade Waste Incineration
7 Mobile Drive
Sauget, IL 62201

Oxford Instruments Measurement Systems
(Formerly CMI International Corporation)
945 Busse Road
Elk Grove Village, IL 60007

P.E.T.Net Pharmaceutical Services
CTI Services, Inc. Chicago Pet Compound
200 East Howard, Suite 240
Des Plaines, IL 60018

Perkin Elmer Life Sciences
2200 Warrenville Road
Downers Grove, IL 60515

Pfizer
(Formerly Pharmacia)
4901 Searle Parkway
Skokie, IL 60077

Pharmacy Services of Peoria
330 NE Perry
Peoria, IL 61603

Prairie Packaging
7701 West 79th Street
Bridgeview, IL 60455

PSC Metals, Inc.
2500 East 23rd Street
Granite City, IL 62040

Railway & Industrial Specialties
2203 North Center Street
Joliet, IL 60435

Rohm & Haas Company
Midwest Technical Center
2531 Technology, Suite 301
Elgin, IL 60123

Siemens Medical Solutions USA, Inc.
2501 Barrington Road
Hoffman Estates, IL 60195

Smurfit-Stone Container Corporation
450 East North Avenue
Carol Stream, IL 60188

A.E. Staley Manufacturing Company
2200 East Eldorado Street
Decatur, IL 62525

Sterling Steel Company, L.L.C.
(Formerly Northwestern Steel And Wire)
101 Avenue K
Sterling, IL 61081

Syncor Corporation
614 East Carpenter Street
Springfield, IL 62701

Syngenta Crop Protection
495 County Rd 1300 N
Champaign, IL 61822

System Sensor
Division of Pittway
3825 Ohio Avenue
St. Charles, IL 60174

Teledyne Brown Eng. Env. Services
Midwest Laboratory
700 Landwehr Road
Northbrook, IL 60062

Unitech Services Group, Inc.
113 South Route 53
Gardner, IL 60424

Unitech Services Group, Inc.
1006 Third Avenue
Morris, IL 60450

UOP/Honeywell
Research Center
50 East Algonquin Road, Box 5016
Des Plaines, IL 60017

Viskase Corporation
625 Willowbrook Centre Parkway
Willowbrook, IL 60527

Vysis, Inc.
3100 Woodcreek Drive
Downers Grove, IL 60515

MEDICAL

Cornerstone Healthcare of IL, Inc.
400 Plum Street
Carmi, IL 62821

Abraham Lincoln Memorial Hospital
315 8th Street
Lincoln, IL 62656

Advanced Medical Imaging Center
111 North Wabash, Suite 620
Chicago, IL 60602

Advocate Bethany Hospital
3435 West Van Buren
Chicago, IL 60624

Advocate Health Care
Dreyer Medical Clinic
1221 North Highland Avenue
Aurora, IL 60506

Advocate Healthcare
Trinity Hospital
2320 East 93rd Street
Chicago, IL 60617

Advocate Illinois Masonic Medical Center
(Formerly Illinois Masonic Medical Center)
836 West Wellington Avenue
Chicago, IL 60657

Advocate Medical Imaging Center
249 North River Road
Des Plaines, IL 60064

Alexian Brothers Medical Center
800 West Biesterfield Road
Elk Grove Village, IL 60007

Alliance Imaging, Inc.
1065 Pacificenter Drive, Suite 200
Anaheim, CA 92806

Alton Memorial Hospital
#1 Memorial Drive
Alton, IL 62002

American Dental Association
211 East Chicago Avenue
Chicago, IL 60611

Anderson Hospital
Route 162 & Old Edwardsville Rd
Maryville, IL 62062

Arboretum View Animal Hospital
2551 Warrenville Road
Downers Grove, IL 60515

Bard Brachytherapy, Inc.
295 East Lies Road
Carol Stream, IL 60188

Barrington Cardiology, S.C.
120 North Northwest Highway
Barrington, IL 60010

Blessing Hospital
1005 Broadway
Quincy, IL 62301

Bromenn Regional Medical Center
Virginia at Franklin
Normal, IL 61761

Cancer Treatment Center
Oncology Care Center
4000 North Illinois
Belleville, IL 62221

Cardiology Consultants, Ltd.
340 West Lincoln Street, Suite 400
Belleville, IL 62220

Cardiology Specialist, Inc.
15 Professional Park Drive
Maryville, IL 62062

Cardio-Med, Ltd.
1675 South Arlington Heights Road
Arlington Heights, IL 60005

Cardiovascular Associates, S.C.
701 Biesterfield Road
Elk Grove Village, IL 60007

Cardiovascular Medicine P.C.
2525 East 24th Street
Rock Island, IL 61201

Carle Clinic Association
602 West University Avenue
Urbana, IL 61801

Carlinville Area Hospital
1001 East Morgan Street
Carlinville, IL 62626

Catholic Health Partners
St. Anthony Hospital
2875 West 19th Street
Chicago, IL 60623

Center for Advance Cardiology
1875 Dempster, Suite 555
Park Ridge, IL 60068

Central DuPage Hospital
25 Winfield Road
Winfield, IL 60190

CGH Medical Center
100 East Lefevre Road
Sterling, IL 61081

Chicago Community Medical Center
2404 East 79th Street
Chicago, IL 60649

Chicago Prostate Cancer Center
One Oak Hill Center
Westmont, IL 60559

Chicago Ridge Radiology
9830 South Ridgeland Avenue
Chicago Ridge, IL 60415

Chicago Ridge Radiology
9830 South Ridgeland Avenue
Chicago Ridge, IL 60415

Christ Hospital and Medical Center
4440 West 95th Street
Oak Lawn, IL 60453

Christie Clinic, P.C.
101 West University
Champaign, IL 61820

Clinical Associates, S.C.
150 North River Road, Suite 300
Des Plaines, IL 60016

Community Hospital of Ottawa
1100 East Norris Drive
Ottawa, IL 61350

Community Medical Center
1000 West Harlem Avenue
Monmouth, IL 61462

Condell Memorial Hospital
801 South Milwaukee Road
Libertyville, IL 60048

Copley Memorial Hospital
2000 Ogden Avenue
Aurora, IL 60505

Crawford Memorial Hospital
1000 North Allen
Robinson, IL 62454

Crossroads Community Hospital
8 Doctors Park Road
Mt. Vernon, IL 62864

Decatur Memorial Hospital
2300 North Edward Street
Decatur, IL 62526

Delnor Community Hospital
300 Randall Road
Geneva, IL 60134

Diagnostic Health Services
311 North 2nd Street, Suite 301
St. Charles, IL 60174

Diagnostic Imaging Center
9680 Golf Road
Des Plaines, IL 60016

Digirad Imaging Solutions, Inc.
P. O. Box 340
Bemus Point, NY 14712

Doctors General Laboratory
9243 South Roberts Road
Hickory Hills, IL 60457

Doctors Hospital
5230 South Sixth Street
Springfield, IL 62794

Dor Heart & Vascular, P.C.
20 Tower Court, Suite F
Gurnee, IL 60031

DuPage Nuclear Medicine Clinic
710 East Ogden Avenue, #450
Naperville, IL 60563

Edward Cardiovascular Institute
120 Spalding Drive
Naperville, IL 60566

Edward Hospital
801 South Washington Street
Naperville, IL 60566

Elmhurst Memorial Hospital
200 Berteau
Elmhurst, IL 60126

Endocrine and Diabetes, S.C.
3308 Chartwell Road
Peoria, IL 61614

Evanston Northwestern Healthcare
Glenbrook Hospital
2650 Ridge Avenue
Evanston, IL 60201

Evanston Northwestern Healthcare
Evanston Hospital
2650 Ridge Avenue
Evanston, IL 60201

Evanston Northwestern Healthcare
718 Glenview Avenue
Highland Park, IL 60035

Fairfield Memorial Hospital
Northwest 11th Street
Fairfield, IL 62837

Family Medicine Specialists, Inc.
P. O. Box 6037, 431 West Liberty Street
Wauconda, IL 60084

Forest City Diagnostic Center
461 North Mulford Road, Suite 6
Rockford, IL 61107

Freeport Memorial Hospital
1045 West Stephenson Street
Freeport, IL 61032

Future Diagnostics Group, L.L.C.
254 Republic Avenue
Joliet, IL 60435

Galesburg Cottage Hospital
695 North Kellogg Street
Galesburg, IL 61401

Gateway Cardiology, P.C.
270 Maple Summit Road
Jerseyvile, IL 62050

Gateway Regional Medical Center
2100 Madison Avenue
Granite City, IL 62040

Genesis Clinical Laboratory
3231 South Euclid Avenue
Berwyn, IL 60402

Gibson Area Hospital
1120 North Melvin
Gibson City, IL 60935

Glass Clinical Laboratory
2711 West 183rd Street, Suite 204
Homewood, IL 60430

Glen Oaks Medical Center
701 Winthrop Avenue
Glendale Heights, IL 60139

Glenwood Medical
2000 Glenwood Avenue, Suite 102
Joliet, IL 60435

Global P.E.T. Imaging
Grand Oaks Health Center
1800 Hollister Drive, Suite G-18
Libertyville, IL 60048

Good Samaritan Hospital
3815 Highland Avenue
Downers Grove, IL 60515

Good Samaritan Reg Health Center
605 North 12th
Mt. Vernon, IL 62864

Good Shepherd Hospital
450 West Highway 22
Barrington, IL 60010

Gottlieb Memorial Hospital
701 West North Avenue
Melrose Park, IL 60160

Graham Hospital
210 West Walnut Street
Canton, IL 61520

Grant Square Imaging
333 Chestnut Street
Hinsdale, IL 60521

Gurnee Radiology Center
Greenleaf Center
25 Tower Court, Suite A
Gurnee, IL 60031

Harrisburg Medical Center
100 Hospital Drive
Harrisburg, IL 62946

Healthwise Medical Center
5154 North Clark Street, Suite 231
Chicago, IL 60640

Heart Care Center
9011 South Commercial Avenue
Chicago, IL 60617

Heart Centers of Ilinois
3611 West 183rd Street
Hazel Crest, IL 60429

Heartcare Midwest
5401 North Knoxville Avenue, Suite 28
Peoria, IL 61614

Heartland Cardiovascular Center, L.L.C.
1200 Maple Road, Suite 3030
Joliet, IL 60432

Heartland Regional Medical Center
3333 Deyoung Street
Deyoung, IL 62959

Hektoen Institute for Medical Research
2100 West Harrison
Chicago, IL 60612

Herrin Hospital
201 South 14th Street
Herrin, IL 62948

High Tech Medical Imaging
721 West Main Street
Lake Zurich, IL 60067

Highland Nuclear Imaging LLP
2340 Highland Avenue, Suite 160
Lombard, IL 60148

Hillsboro Area Hospital
1200 East Tremont
Hillsboro, IL 62049

Hinsdale Hospital
120 North Oak Street
Hinsdale, IL 60521

Holy Cross Hospital
2701 West 68th Street
Chicago, IL 60629

Holy Family Hospital
100 North River Road
Des Plaines, IL 60016

Horizons, L.L.C.
2020 Ogden Avenue, Suite 335
Aurora, IL 60504

Illini Hospital
801 Hospital Road
Silvis, IL 61282

Illinois Heart & Lung Associates, S.C.
1302 Franklin Avenue, Suite 4500
Normal, IL 61761

Illinois Valley Community Hospital
925 West Street
Peru, IL 61354

Ingalls Memorial Hospital
1 Ingalls Drive
Harvey, IL 60426

Intercommunity Cancer Center of Western IL
450 Mayo Drive
Galesburg, IL 61401

Iroquois Memorial Hospital
Nuclear Medicine Department
200 Fairman Ave.
Watseka, IL 60970

Jackson Park Hospital
7531 South Stony Island Avenue
Chicago, IL 60649

Jersey-Calhoun Veterinary Hospital
1201 South State
Jerseyville, IL 62052

John H. Stroger Hospital of Cook County
(Formerly Cook County Hospital)
1901 West Harrison Street
Chicago, IL 60612

John Warner Hospital
422 West White Street
Clinton, IL 61723

Kane County Cardiology, S.C.
302 Randall Road, Suite 106
Geneva, IL 60134

Katherine Shaw Bethea Hosp.
403 East First Street
Dixon, IL 61021

Kishwaukee Community Hospital
Box 707, Bethany Road & Route 23
DeKalb, IL 60115

LaGrange Memorial Hospital
5101 South Willowsprings Road
LaGrange, IL 60525

Lake Forest Hospital
660 North Westmoreland Road
Lake Forest, IL 60045

Lake Heart Specialists
35 Tower Court, Suite F
Gurnee, IL 60031

Lakeshore P.E.T. Imaging, L.L.C.
4932 West 95th Street
Oak Lawn, IL 60453

Lifescan Chicago
2242 West Harrison Street, Suite 100A
Chicago, IL 60612

Little Company of Mary Hospital
2800 West 95th Street
Evergreen Park, IL 60642

Loretto Hospital
645 South Central Avenue
Chicago, IL 60644

Louis A. Weiss Memorial Hospital
Nuclear Medicine Dept.
4646 North Marine Drive
Chicago, IL 60640

Loyola University Medical Center
2160 South First Avenue
Maywood, IL 60153

Lutheran General Hospital
1775 West Dempster Street
Park Ridge, IL 60068

MacNeal Hospital
3249 South Oak Park Avenue
Berwyn, IL 60402

Marshall Browning Hospital
900 North Washington
DuQuoin, IL 62832

Marvin Rosecan, M.D.
29 North 64th Street
Belleville, IL 62223

Mason District Hospital
615 North Promenade, P. O. Box 530
Havana, IL 62644

McDonough District Hospital
525 East Grant Street
Macomb, IL 61455

Medical Diagnostics
c/o Suburban Heights Medical Center
333 Dixie Highway
Chicago Heights, IL 60411

Medical Outsourcing Services
1315 Macom Drive, Suite 103
Naperville, IL 60564

Medx Incorporated
3456 Ridge Avenue
Arlington Heights, IL 60004

Memorial & St. Elizabeth's Healthcare Svcs, LLP
(Formerly Pet Imaging of Southern Illinois)
4972 Benchmark Centre Drive, Suite 200
Swansea, IL 62226

Memorial Hospital
1900 State Street, Box 609
Chester, IL 62233

Memorial Hospital
4500 Memorial Drive
Belleville, IL 62226

Memorial Hospital of Carbondale
405 W. Jackson
Carbondale, IL 62902

Memorial Medical Center
3701 Doty Road, P. O. Box 1990
Woodstock, IL 60098

Memorial Medical Center
701 North First Street
Springfield, IL 62781

Mercy Hospital Medical Center
Stevenson Expressway at King Drive
Chicago, IL 60616

Merit Lincoln Park, L.L.C.
(Formerly Grant Hospital)
550 West Webster
Chicago, IL 60614

Merritt & Associates Equine Hospital
26996 North Darrell Road
Wauconda, IL 60084

Methodist Hospital of Chicago
5025 North Paulina
Chicago, IL 60640

Methodist Medical Center of IL
221 N.E. Glen Oak Avenue
Peoria, IL 61636

Metrocardiovascular Consultants
9115 South Cicero Avenue
Chicago, IL1 60453

Michael Reese Hospital
2929 South Ellis Avenue
Chicago, IL 60616

MidAmerica Cardiovascular Consultants, Ltd.
Physician's Pavilion
4400 West 95th Street, Suite 407
Oak Lawn, IL 60453

Midway Cardiovascular Diagnostics, Ltd.
5255 South Cicero Avenue
Chicago, IL 60632

Midwest Cardiac Consultants, S.C.
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310 North Seven Hills Road
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912 Northwest Highway, Suite G16W
Fox River Grove, IL 60021

Midwest Heart Specialists
3825 Highland Avenue, Suite 400
Downers Grove, IL 60515

Midwest Heart Specialists-Carol Stream
25 North Winfield Road
Winfield, IL 60190

Midwest Heart Specialists-Elmhurst
429 North York Road
Elmhurst, IL 60126

Midwest Imaging Consultants
1232 Foxpointe Drive
Sycamore, IL 60178

Midwest Open MRI, Inc.
8319 West North Avenue
Melrose Park, IL 60160

Midwestern Regional Medical Center
2520 Elisha Avenue
Zion, IL 60099

MIE America Inc.
420 Bennett Road
Elk Grove Village, IL 60007

Mohammed Mehahy, M.D., Ltd.
6820 State Route 162
Maryville, IL 62062

Morris Hospital
150 West High Street
Morris, IL 60450

MRI Lincoln Imaging Center
5023 North Lincoln Avenue
Chicago, IL 60625

Mt. Sinai Hospital Medical Center
California Avenue at 15th Street
Chicago, IL 60608

Naeem A. Khan, M.D.
1050 Martin Luther King, Suite 108
Centralia, IL 62801

New Perspectives Lab
659 Ridgeview
McHenry, IL 60050

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2151 Waukegan Road, Suite 100
Bannockburn, IL 60019

North Shore Cardiology Consultants
7447 West Talcott, Suite 200
Chicago, IL 60631

North Suburban Cardiology Group, Ltd.
800 Austin, Suite 408
Evanston, IL 60202

Northern Illinois Imaging Services
222 Colorado Avenue, Suite B
Frankfort, IL 60451

Northern Illinois Medical Center
4201 Medical Center Drive
McHenry, IL 60050

Northern Shared Medical Services
4253 Argosy Court
Madison, WI 53714

Northshore Regional Pet Scan, L.L.C.
4400 Renaissance Parkway, Suite L
Warrensville Heights, OH 44128

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1100 West Central Road, Suite 301
Arlington Heights, IL 60005

Northwest Community Hospital
800 West Central Road
Arlington Heights, IL 60005

Northwest Heart Specialists
1632 West Central Road
Arlington Heights, IL 60005

Northwest Medical Specialists
8915 West Golf Road
Niles, IL 60714

Northwest Suburban Medical Center
201 South Milwaukee
Lake Villa, IL 60046

Northwestern Memorial Hospital
251 East Huron
Chicago, IL 60611

Norwegian American Hospital
1044 North Francisco Avenue
Chicago, IL 60622

Nuclear Diagnostics Inc.
18158 Country Club Road
Girard, IL 62640

Nuclear Oncology, S.C.
ON126 Winfield Road
Winfield, IL 60190

O.S.F. St. Francis, Inc.
8001 North University, Suite C
Peoria, IL 61615

Oak Forest Hospital of Cook County
15900 South Cicero
Oak Forest, IL 60452

Opus Diagnostic Imaging, Inc.
7530 Woodward Avenue
Woodridge, IL 60540

Orland Park Equine Hospital, Ltd.
15715 Wolf Road
Orland Park, IL 60462

Our Lady of the Resurrection
5645 West Addison
Chicago, IL 60634

Palatine Heart Center
523 Old Northwest Highway, Suite 101
Barrington, IL 60010

Palos Community Hospital
80th And Mccarthy Road
Palos Heights, IL 60463

Passavant Memorial Hospital
1600 West Walnut Street
Jacksonville, IL 62650

Pekin Memorial Hospital
600 South 13th Street
Pekin, IL 61554

Pinckneyville Community Hospital
101 North Walnut Street
Pinckneyville, IL 62274

Prairie Cardiovascular Consultants
619 East Mason
Springfield, IL 62701

Proctor Hospital
5409 North Knoxville
Peoria, IL 61614

Pronger Smith Clinic
2320 West High Street
Blue Island, IL 60406

Provena Covenant Medical Center
1400 West Park
Urbana, IL 61801

Provena Mercy Center For Health Care Services
1325 North Highland Avenue
Aurora, IL 60506

Provena St. Mary's Hospital
500 West Court Street
Kankakee, IL 60901

Provena United Samaritan Medical Center
812 North Logan Avenue
Danville, IL 61832

Provident Hospital of Cook County
500 East 51st Street
Chicago, IL 60615

Quad City Heart Center
350 John Deere Road
Moline, IL 61265

Quality Medical Lab Inc.
318 West Madison
Maywood, IL 60153

Quest Diagnostics
Metpath, Corning Clinical Laboratories
1355 Mittel Boulevard
Wood Dale, IL 60191

Quincy Medical Group
1118 Hampshire
Quincy, IL 62301

Radiation Protection Services, Ltd
1405 Stevenson Drive
Springfield, IL 62703

Radiocat L.L.C.
372 South Milwaukee Avenue
Wheeling, IL 60090

Radiology Corporation of America
(RCOA)
7900 Glades Road, Suite 400
Boca Raton, FL 33434

Rand Imaging Center
1051 West Rand Road
Arlington Heights, IL 60004

Resurrection Health Care
2900 North Lake Shore Drive
Chicago, IL 60657

Resurrection Health Care
St. Francis Hospital
355 Ridge Avenue
Evanston, IL 60202

Resurrection Medical Center
7435 West Talcott Avenue
Chicago, IL 60631

Richland Memorial Hospital
800 East Locust Street
Olney, IL 62450

Riverside Medical Center
350 North Wall Street
Kankakee, IL 60901

Rockford Health Systems
Rockford Memorial Hospital
2400 North Rockton Avenue
Rockford, IL 61114

Roseland Community Hospital
45 West 111th Street
Chicago, IL 60628

Rush-North Shore Medical Center
9600 Gross Point Road
Skokie, IL 60076

Rush-Oak Park Hospital
(Formerly Oak Park Hospital)
520 South Maple Avenue
Oak Park, IL 60304

Rush-Presbyterian-St. Luke's Medical Center
1653 West Congress Parkway
Chicago, IL 60612

S.J. Hasanain, M.D., P.C.
1440 North Avenue, Suite 101
Melrose Park, IL 60160

Sacred Heart Hospital
3240 West Franklin Boulevard
Chicago, IL 60624

Sarah Bush Lincoln Health Center
East Route 16, P. O. Box 372
Mattoon, IL 61938

Shared P.E.T. Imaging, L.L.C.
4912 Higbee Avenue, N.W.
Canton, OH 44718

Shelby Memorial Hospital
200 South Cedar Street
Shelbyville, IL 62565

Sherman Hospital
934 Center Street
Elgin, IL 60120

Silver Cross Hospital
1200 Maple Road
Joliet, IL 60432

South Shore Hospital
8015 South Luella Ave.
Chicago, IL 60617

South Suburban Hospital
178th & Kedzie Avenue
Hazel Crest, IL 60429

South Suburban Nuclear & Card. Diag., Ltd.
17577 South Kedzie, Suite 110
Hazel Crest, IL 60429

Sparta Community Hospital
818 East Broadway
Sparta, IL 62286

Springfield Imaging Center, Ltd
319 East Madison Street
Springfield, IL 62701

St Anthony's Health Center
St. Anthony's Way
Alton, IL 62002

St. Alexius Medical Center
1555 North Barrington Road
Hoffman Estates, IL 60194

St. Anthony Cancer Care Center
5666 East State Street
Rockford, IL 61108

St. Anthony Medical Center
5666 East State Street
Rockford, IL 61108

St. Anthony's Memorial Hospital
503 North Maple
Effingham, IL 62401

St. Bernard Hospital
6326 West 64th Street
Chicago, IL 60621

St. Elizabeth Hospital
1431 North Claremont Avenue
Chicago, IL 60622

St. Elizabeth's Hospital
211 South Third Street
Belleville, IL 62222

St. Francis Hospital
1215 Franciscan Drive, P.O. Box 1215
Litchfield, IL 62056

St. Francis Hospital
12935 South Gregory Street
Blue Island, IL 60406

St. Francis Medical Center
530 North East Glen Oak Avenue
Peoria, IL 61637

St. James Hospital Medical Center
Chicago Road at Lincoln Highway
Chicago Heights, IL 60411

St. James Hospital Olympia Fields Campus
20201 South Crawford Avenue
Olympia Fields, IL 60461

St. James John Albright Medical Center
610 East Water Street
Pontiac, IL 61764

St. John Heart Clinic
2222 West Division Street
Chicago, IL 60622

St. John's Hospital
800 East Carpenter
Springfield, IL 62769

St. Joseph Hospital
77 North Airlite Street
Elgin, IL 60123

St. Joseph Medical Center
2200 East Washington Street
Bloomington, IL 61701

St. Joseph Medical Center
Cancer Care Center
333 North Madison Street
Joliet, IL 60435

St. Joseph's Hospital
1515 Main Street
Highland, IL 62249

St. Joseph's Hospital
9519 Holy Cross Lane
Breese, IL 62230

St. Louis Cardiovascular Center
509 Hamacher
Waterloo, IL 62298

St. Louis Heart & Vascular, P.C.
2118 Washington Street
Granite City, IL 62040

St. Margaret's Hospital
600 East First Street
Spring Valley, IL 61362

St. Mary Medical Center
3333 North Seminary Street
Galesburg, IL 61401

St. Mary of Nazareth Hospital
2233 West Division Street
Chicago, IL 60622

St. Mary's Hospital
111 East Spring Street
Streator, IL 61364

St. Mary's Hospital
129 North Eighth Street
East St. Louis, IL 62201

St. Mary's Hospital
1800 East Lake Shore Drive
Decatur, IL 62525

St. Mary's Hospital
400 North Pleasant
Centralia, IL 62801

St. Therese Medical Center
2615 Washington Street
Waukegan, IL 60085

St. Vincent Memorial Hospital
201 East Pleasant Street
Taylorville, IL 62568

Swedish American Hospital
1401 East State Street
Rockford, IL 61104

Swedish Covenant Hospital
5145 North California Avenue
Chicago, IL 60625

The Children's Memorial Hospital
2300 Children's Plaza
Chicago, IL 60614

Thorek Hospital and Medical Center
850 West Irving Park Road
Chicago, IL 60613

Touchette Regional Hospital
5900 Bond Avenue
East St. Louis, IL 62207

Trinity Medical Center
2701 17th Street
Rock Island, IL 61201

Trinity Medical Center
500 John Deere Road
Moline, IL 61265

Triumph Radiology, Inc.
2121 Oneida Street, Suite 005
Joliet, IL 60435

Unilab, Inc.
418 North Austin, 2A
Oak Park, IL 60302

University of Chicago Physicians Group
222 North LaSalle Street, Suite 250
Chicago, IL 60601

Valent Biosciences Corporation
6131 Oakwood Road
Long Grove, IL 60047

Valley Cancer Center
600 East First Street
Spring Valley, IL 61362

Value Diagnostics
3235 Vollmer Road
Flossmoor, IL 60422

Varian Medical Systems
Remanufacturing Center
200 East Howard Street, Suite 230
Des Plaines, IL 60191

VCA Clinipath Labs, Inc.
Antech Diagnostics
5701 West 120th Street
Alsip, IL 60803

VCA Franklin Park Animal Hospital
9846 West Grand Avenue
Franklin, IL 60131

Veterinary Specialty Center
1515 Busch Parkway
Buffalo Grove, IL 60089

Victory Memorial Hospital
1324 North Sheridan Road
Waukegan, IL 60085

Victory Surgery & Treatment Center
1050 Red Oak Lane
Lindenhurst, IL 60046

Vishnu D. Gaiha, M.D., S.C.
800 Austin Avenue, Suite 602
Evanston, IL 60202

Wabash General Hospital
1418 College Drive
Mount Carmel, IL 62863

Washington County Hospital
705 South Grand
Nashville, IL 62263

West Suburban Cardiologists, Ltd
5201 South Willow Springs Road
Suite 280
LaGrange, IL 60925

West Suburban Hospital Medical Center
Erie at Austin
Oak Park, IL 60302

Westlake Community Hospital
1225 Superior Street
Melrose Park, IL 60160

Willowbrook Cancer Imaging
6747 Kingery Highway (Rte 83)
Willowbrook, IL 60527

Yousef Darwish, M.D., P.C.
800 Austin Street, East Tower, Suite 163
Evanston, IL 60202

REACTOR

Amergen Energy Company, LLC
Clinton Power Station
R.R. 3, Box 228
Clinton, IL 61727

Exelon Generation Company LLC
Braidwood Nuclear Power Station
35100 South Route 53, Suite 84
Braceville, IL 60407

Exelon Generation Company LLC
Byron Station
4450 N. Germanchurch Road
Byron, IL 61010

Exelon Generation Company LLC
LaSalle County Nuclear Station
2601 North 21st Road
Marseilles, IL 61341

Exelon Generation Company LLC
Zion Nuclear Generating Station
101 Shiloh Blvd.
Zion, IL 60099

Exelon Generation Company LLC
Quad-Cities Station
2271 206th Avenue North
Cordova, IL 61242

Exelon Generation Company LLC
Dresden Nuclear Power Facility
6500 N. Dresden Road
Morris, IL 60450

APPENDIX C
List of LLRW Brokers Returning Surveys in 2003

ADCO Services, Inc.
P. O. Box 1129
17650 Duvan Drive
Tinley Park, IL 60477

Alaron Corporation
Rd 2, Box 2140A
Wampum, PA 16157-9320

Pacific EcoSolutions, L.L.C.
2025 Battelle Blvd.
Richland, WA 99352

ATG Catalytics
1556 Bear Creek Road
Kingston, TN 37763

Applied Health Physics, Inc.
2986 Industrial Boulevard
Bethel Park, PA 15102

Bionomics, Inc.
P. O. Box 817
Kingston, TN 37763

Chase Environmental Group, Inc.
3501 Workman Road, Suite H
Knoxville, TN 37921

Diversified Scientific Services, Inc.
657 Gallaher Road
Kingston, TN 37763

Duratek Consolidation & Services Facility
16403 Dunbarton Boulevard
Barnwell, SC 29812

Duratek Field Services, Inc.
628 Gallaher Road
Kingston, TN 37763

Duratek Memphis Group, LLC
1790 Dock Street
Memphis, TN 38113

Duratek Radwaste Processing, Inc.
P. O. Box 2530
1560 Bear Creek Road
Oak Ridge, TN 37831-2530

Manufacturing Sciences Corporation
804 South Illinois Avenue
Oak Ridge, TN 37830

Materials and Energy Corporation
2010 Highway 58, Suite 1020
Oak Ridge, TN 37830-1020

NSSI
5711 Etheridge Street
Houston, TX 77087

PERMA-FIX
Environmental Services
1940 N.W. 67th Place
Gainesville, FL 32653

RACE, L.L.C.
2550 Channel Avenue
Somerville, TN 38113

Studsvik Processing Facility, L.L.C.
151 T. C. Runion Road
Erwin, TN 37650

R. M. Wester, Inc.
215 Indacom
St. Peters, MO 63376

Waste Control Specialists
P. O. Box 1129
Andrews, TX 79714

APPENDIX D
Historical Volume and Activity Shipped by Illinois Nuclear Power Facilities
1970-1985

Historical Disposal Volume of LLRW
Generated by Illinois Nuclear Power Facilities
1970-1985

Year	Dresden (BWR) (ft³)	Quad Cities (BWR) (ft³)	Zion (PWR) (ft³)	LaSalle (BWR) (ft³)	Byron (PWR) (ft³)	Braidwood (PWR) (ft³)	Clinton (BWR) (ft³)	Total (ft³)
1970	22,786	0	0	0	0	0	0	22,786
1971	42,135	2,110	0	0	0	0	0	44,245
1972	56,224	37,953	0	0	0	0	0	94,177
1973	78,037	35,597	14,708	0	0	0	0	128,342
1974	105,342	19,811	57,038	0	0	0	0	182,191
1975	209,659	48,854	52,901	0	0	0	0	311,414
1976	250,235	35,464	72,427	0	0	0	0	358,126
1977	79,562	48,553	69,684	0	0	0	0	197,799
1978	64,413	47,427	57,421	0	0	0	0	169,261
1979	36,727	27,616	21,083	0	0	0	0	85,426
1980	40,894	58,974	57,915	0	0	0	0	157,783
1981	40,205	60,576	54,095	0	0	0	0	154,876
1982	31,634	51,340	31,120	0	0	0	0	114,094
1983	50,146	55,736	32,525	24,091	0	0	0	162,498
1984	44,492	47,485	22,712	29,647	0	0	0	144,336
1985	79,421	46,890	23,512	42,730	6,278	0	0	198,831

Depaoli, S.M. and A.H. Kibbey, Oak Ridge National Laboratory. *A Compilation of the Electricity Generated and Low-Level Radioactive Wastes Shipped for Disposal by U.S. Nuclear Power Plants, 1959-1985.* Washington, D.C.: U.S. Department of Energy, December 1987.

Historical Disposal Volume of LLRW
Generated by Illinois Nuclear Power Facilities
1970-1985

Year	Dresden (BWR) (m^3)	Quad Cities (BWR) (m^3)	Zion (PWR) (m^3)	LaSalle (BWR) (m^3)	Byron (PWR) (m^3)	Braidwood (PWR) (m^3)	Clinton (BWR) (m^3)	Total (m^3)
1970	645	0	0	0	0	0	0	645
1971	1,193	60	0	0	0	0	0	1,253
1972	1,592	1,075	0	0	0	0	0	2,667
1973	2,210	1,008	417	0	0	0	0	3,635
1974	2,983	561	1,615	0	0	0	0	5,160
1975	5,938	1,384	1,498	0	0	0	0	8,819
1976	7,087	1,004	2,051	0	0	0	0	10,142
1977	2,253	1,375	1,973	0	0	0	0	5,602
1978	1,824	1,323	1,626	0	0	0	0	4,793
1979	1,040	782	597	0	0	0	0	2,419
1980	1,158	1,670	1,640	0	0	0	0	4,468
1981	1,139	1,716	1,532	0	0	0	0	4,386
1982	896	1,454	881	0	0	0	0	3,231
1983	1,420	1,578	921	682	0	0	0	4,602
1984	1,260	1,345	643	840	0	0	0	4,088
1985	2,249	1,328	666	1,210	178	0	0	5,631

Depaoli, S.M. and A.H. Kibbey, Oak Ridge National Laboratory. *A Compilation of the Electricity Generated and Low-Level Radioactive Wastes Shipped for Disposal by U.S. Nuclear Power Plants, 1959-1985.* Washington, D.C.: U.S. Department of Energy, December 1987.

Historical Disposal Activity of LLRW
Generated by Illinois Nuclear Power Facilities
1970-1985

Year	Dresden (BWR) (Ci)	Quad Cities (BWR) (Ci)	Zion (PWR) (Ci)	LaSalle (BWR) (Ci)	Byron (PWR) (Ci)	Braidwood (PWR) (Ci)	Clinton (BWR) (Ci)	Total (Ci)
1970	12	0	0	0	0	0	0	12
1971	45	<1	0	0	0	0	0	45
1972	124	9	0	0	0	0	0	133
1973	150	293	<1	0	0	0	0	443
1974	755	735	5	0	0	0	0	1,495
1975	7,201	2,374	16	0	0	0	0	9,591
1976	4,302	2,351	68	0	0	0	0	6,721
1977	11,317	8,221	225	0	0	0	0	19,763
1978	1,878	3,270	1,862	0	0	0	0	7,010
1979	845	4,260	2,690	0	0	0	0	7,795
1980	4,461	4,070	2,550	0	0	0	0	11,081
1981	4,592	5,161	3,441	0	0	0	0	13,194
1982	2,920	3,958	2,170	0	0	0	0	9,048
1983	2,854	5,847	2,970	30	0	0	0	11,701
1984	4,360	1,661	2,617	180	0	0	0	8,818
1985	3,092	2,522	688	487	14	0	0	6,803

Depaoli, S.M. and A.H. Kibbey, Oak Ridge National Laboratory. *A Compilation of the Electricity Generated and Low-Level Radioactive Wastes Shipped for Disposal by U.S. Nuclear Power Plants, 1959-1985.* Washington, D.C.: U.S. Department of Energy, December 1987.

Historical Disposal Activity of LLRW
Generated by Illinois Nuclear Power Facilities
1970-1985

Year	Dresden (BWR) (TBq)	Quad Cities (BWR) (TBq)	Zion (PWR) (TBq)	LaSalle (BWR) (TBq)	Byron (PWR) (TBq)	Braidwood (PWR) (TBq)	Clinton (BWR) (TBq)	Total (TBq)
1970	0.4	0	0	0	0	0	0	0.4
1971	1.7	<1	0	0	0	0	0	1.7
1972	4.6	0.3	0	0	0	0	0	4.9
1973	5.6	10.8	<1	0	0	0	0	16.4
1974	27.9	27.2	0.2	0	0	0	0	55.3
1975	266.4	87.8	0.6	0	0	0	0	354.8
1976	159.2	87.0	2.5	0	0	0	0	248.7
1977	418.7	304.2	8.3	0	0	0	0	732.2
1978	69.5	121.0	68.9	0	0	0	0	239.4
1979	31.3	157.6	99.5	0	0	0	0	288.4
1980	165.1	150.6	94.3	0	0	0	0	410.0
1981	169.9	191.0	127.3	0	0	0	0	488.2
1982	108.0	146.4	80.3	0	0	0	0	334.7
1983	105.6	216.3	109.9	1.1	0	0	0	432.9
1984	161.3	61.5	96.8	6.7	0	0	0	326.3
1985	114.4	93.3	25.5	18.0	0.5	0	0	251.7

Depaoli, S.M. and A.H. Kibbey, Oak Ridge National Laboratory. *A Compilation of the Electricity Generated and Low-Level Radioactive Wastes Shipped for Disposal by U.S. Nuclear Power Plants, 1959-1985*. Washington, D.C.: U.S. Department of Energy, December 1987.

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