Illinois Department of Nuclear Safety

1997 Annual Survey Report

DECEMBER 1998

George H. Ryan
Governor

Thomas W. Ortciger
Director

Illinois Department of Nuclear Safety

1997 Annual Survey Report

DECEMBER 1998

George H. Ryan
Governor

Thomas W. Ortciger
Director

TABLE OF CONTENTS

TABLE OF CONTENTS
(cont.)

Page

LIST OF TABLES

LIST OF TABLES
(cont.)

LIST OF TABLES
(cont.)

LIST OF FIGURES

PREFACE

The Illinois Department of Nuclear Safety (IDNS) is the state agency with the responsibility for managing low-level radioactive waste (LLRW) issues in Illinois. The IDNS was established in 1980 to protect the public from the potential hazards associated with radiation and radioactive materials.

The Illinois Low-Level Radioactive Waste Management Act of 1983 (as amended) mandates an annual survey of all LLRW generators in Illinois. The IDNS requires all LLRW generators to complete a questionnaire requesting the following information: 1) the types and quantities of LLRW which 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 report is the fourteenth report based on information provided by Illinois LLRW generators.

Chapter 1 contains an introduction to LLRW, defense and civilian radioactive waste information, LLRW disposal facility history, IDNS 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 IDNS database.

Chapter 3 compares Illinois LLRW volume and activity final disposal figures with the rest of the nation. It also gives the final disposal volume and activity for Kentucky and compares Illinois and Kentucky volume and activity

figures for waste disposed from the Lockheed-Martin Idaho Technologies Co. (LMITCO) database.

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 1996. Comments on this report and suggestions for preparing future reports are welcome and should be addressed to:

Chief, Division of Low-Level Radioactive Waste Management
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

Additional information about LLRW is available by writing to the above address.

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, radiopharmaceuticals, 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 Department of Nuclear Safety. 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, the disposal facility located in Clive, Utah, began accepting naturally occurring radioactive materials (NORM). In 1992, the Beatty disposal facility closed. The Barnwell facility closed on July 1, 1994, and reopened on July 1, 1995.

Today there are three commercial LLRW disposal facilities open: Barnwell, Richland, and Clive.

AGENCY 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 furthur 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 compacts to regulate and be responsible for the availability of disposal capacity of non-federal LLRW 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 agency's mission was to provide radiation protection for individuals in Illinois, with a goal to manage, establish, implement, and enforce LLRW issues in Illinois.

IDNS RESPONSIBILITIES

The Illinois Low-Level Radioactive Waste Management Act of 1983 expanded Illinois' responsibilities to include a LLRW management program with requirements for generators and transporters of LLRW to register and report activities and needs, created fees to fund the program, and called for development of a tracking system to control waste disposal.

In late 1984, Illinois and Kentucky formed the Central Midwest Interstate Low-Level Radioactive Waste Compact to develop and implement a solution to LLRW disposal issues. The federal Low-Level Radioactive Waste Policy Amendments Act of 1985 was adopted setting 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 facil[illegible].

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.

ANNUAL SURVEYS

To facilitate compliance with the Management Act, IDNS 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 IDNS with information (by completing a standard questionnaire) about the types, quantities, and activity of LLRW generated, stored, treated, and disposed 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 1997 Generators' Annual Survey. A copy of this standard survey questionnaire is found in appendix A. 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.

One other data source is in this report used and is discussed in chapter 3. This source is the final disposal data recorded by the disposal facilities and after-treatment volumes received from Lockheed-Martin Idaho Technologies Co. (LMITCO). LMITCO gathers data from the manifests received by the commercial disposal sites. The differences between data sources will be discussed in chapter 3.

TRACKING SYSTEM

New 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 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 enforce and verify 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 IDNS a Tracking System Permit Application Form for approval. The department reviews the application, and if approved, issues a permit number. Prior to making a shipment, the shipper calls the tracking system operator (TSO) and provides a limited amount of shipment information. The TSO issues a transaction reference number that follows that specific shipment until final disposition. At the time of shipment, 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.). Once a facility receives this shipment, they must contact the TSO and report the receipt.

The information derived from the tracking system will simplify the current reporting process mandated by the department for Illinois LLRW generators and brokers by eliminating the off-site waste management and shipping tables on the annual surveys. Delays in submitting yearly information can be eliminated if the

reporting process is streamlined so that registrants only need to verify information gathered by the Tracking System. Very few registrants will be non-compliant to department regulations or state laws under the tracking system because if they fail to register with the tracking system they will not receive a permit, which prevents them from shipping or receiving any LLRW.

CHAPTER TWO-1997--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 1997. Of the 377 registered or reactivated Illinois generators of LLRW, 375 (99 percent), responded to the 1997 IDNS survey. One Illinois generator did not return its questionnaire, while one Illinois generator registered but did not produce, possess, or ship any LLRW during 1997. Two federal government generators in Illinois refused to participate in the survey process.

A LLRW "broker" refers to any entity that takes possession of LLRW for the purposes of consolidation and shipment. The department has registered 16 brokers that receive Illinois waste at the time of this report. Fourteen, or 88 percent, of the registered brokers responded to the 1997 survey. One broker that reactivated its registration earlier this year was granted an extension by the department to complete and return its survey. One out-of-state broker is late in returning its questionnaire.

The Generator Management Section of the Division of Low-Level Radioactive Waste Management uses radioactive materials licenses, broker reports, disposal records, and tracking system permits to identify new or cancelled registrants. During the 1997 reporting period, there were 19 new or reactivated registrations and 36 cancellations. A listing of the 1997 generators that responded to IDNS' survey, including facility names and addresses, can be found in appendix B.

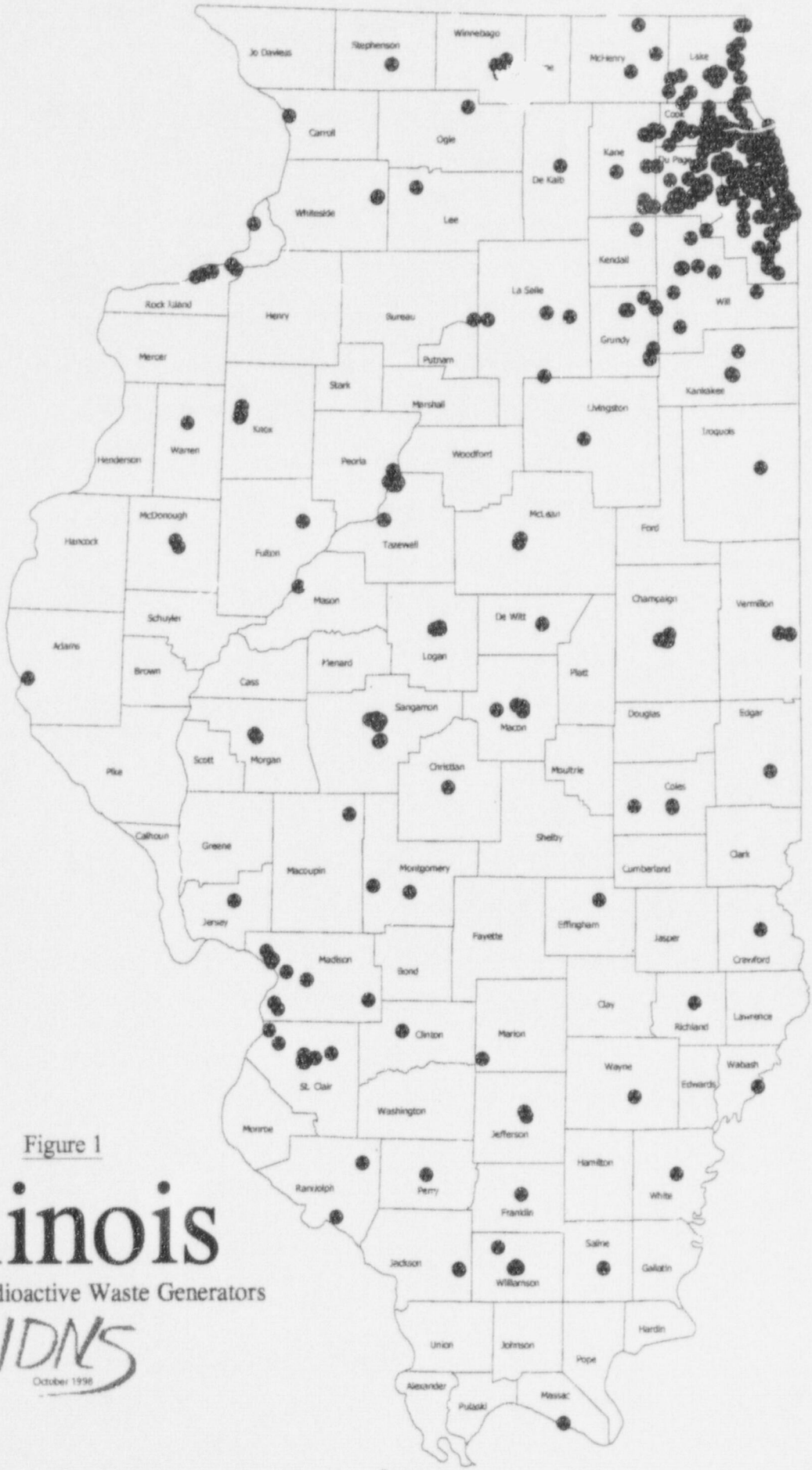

Figure 1

Illinois

Low Level Radioactive Waste Generators

IDNS

October 1998

CATEGORIES AND DEFINITIONS

LLRW generators are designated into categories according to the activities that generate LLRW. IDNS assigns LLRW generators into one of six categories.

Academic - Includes LLRW generators from 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 process. 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. During 1997, there were 12 operating reactors at seven stations. Each reactor facility (Braidwood, Byron,

Clinton, Dresden, LaSalle, Quad Cities, and Zion) has a single radioactive waste processing facility where LLRW is prepared for transportation and disposal.

Table 1 illustrates the number of generators included in the IDNS categories for the years 1993 through 1997. From 1993 until 1995 there was a 1 percent increase in the number of generators; in 1996 there was a 6 percent increase, but in 1997, there was a 2 percent decrease.

TABLE 1
Illinois LLRW Generator Survey Response
by Generator Category
1993-1997

Generator Category	1993 Generators	1994 Generators	1995 Generators	1996 Generators	1997 Generators
Academic	30	28	29	35	37
Fuel-Cycle	2	2	2	2	2
Governmental	23	22	21	20	24
Industrial	73	74	75	89	76
Medical	221	224	227	229	229
Reactor	7	7	7	7	7
Total	356	357	361	382	375

LLRW VOLUME AND ACTIVITY SHIPPED BY CATEGORY

The breakdown by generator category of the volume and activity of all LLRW shipped in Illinois during 1997 is summarized in Table 2. The volume and activity figures in this table represents all LLRW shipped directly for disposal and to brokerage/processing facilities. Nuclear power reactor facilities shipped 95 percent of the total LLRW volume (342,449 cubic feet) with more than 98 percent of the total radioactivity (17,766 curies).

TABLE 2
1997 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	602	17	3	<1
Fuel-Cycle	2,660	75	135	5
Governmental	1,722	49	19	1
Industrial	11,726	332	179	7
Medical	490	14	<1	<1
Reactor	342,449	9,698	17,766	657
Totals	359,649	10,185	18,102	670

Totals may not add due to rounding.

Table 3 through table 7 present detailed volume and activity data for each of the IDNS generator categories that shipped LLRW in 1997 except for fuel-cycle. Both of the fuel-cycle generators, G. E. Nuclear Energy and AlliedSignal, shipped LLRW to Envirocare of Utah. Waste shipped to Envirocare is not included in these tables, but is included in table 26. These tables contain data for respondents that reported shipping LLRW during either 1996 or 1997. 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, due to the higher activity of the waste shipped by reactor generators. Millicurie figures are used for the other generator categories. 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 - Twelve out of 37 academic generators shipped waste for treatment or disposal in 1997. 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 was one academic generator that shipped LLRW in 1996 but not in 1997. Seven academic generators who reported shipping waste in 1997 were not registered in 1996, whereas five academic generators shipped LLRW and terminated their registration in 1996. Table 3 represents the academic generators' shipping activity. Between 1996 and 1997, the total volume slightly increased by 21 cubic feet (<1 cubic meter), however, there was a significant increase in the activity, by 2,412 millicuries (89,244 megabecquerels).

TABLE 3
Academic LLRW Shipped
1996–1997

Academic Generator	1996 Volume (ft^3)	1996 Volume (m^3)	1996 Activity (mCi)	1996 Activity (MBq)	1997 Volume (ft^3)	1997 Volume (m^3)	1997 Activity (mCi)	1997 Activity (MBq)
Abbott Middle School	*	*	*	*	1	<1	<1	<1
Augustana College	1	<1	<1	<1	**	**	**	**
Benedictine University	*	*	*	*	4	<1	2,351	86,987
Champaign Community School	*	*	*	*	1	<1	1	37
Charleston Schools	*	*	*	*	<1	<1	1	37
Finch Univ. of Health Sciences The Chicago Medical School	76	2	8	296	151	4	64	2,368
Homewood-Flossmoor H.S.	*	*	*	*	1	<1	<1	<1
Illinois College	*	*	*	*	1	<1	6	222
Joliet Jr. College	1	<1	<1	<1	**	**	**	**
Lincoln Jr. H.S.	*	*	*	*	1	<1	1	37
Lyons Township H.S.	1	<1	<1	<1	**	**	**	**
Northeastern Illinois University	0	0	0	0	1	<1	<1	<1
Northwestern University	371	11	167	6,179	278	8	165	6,105
Rich Central H.S.	1	<1	<1	<1	**	**	**	**
St. Joseph H.S.	1	<1	<1	<1	**	**	**	**
SIU School of Medicine	15	<1	2	74	0	0	0	0
The University of Chicago	31	1	30	1,110	30	1	27	999
University of Illinois at Chicago	84	2	19	703	133	4	22	814
Total	582	16	226	8,362	602	17	2,638	97,606

Fractions are used in conversions.
Totals may not add due to rounding.
*Not registered in 1996.
**Registration canceled.

GOVERNMENTAL - Five out of the 24 registered governmental generators reported shipping LLRW in 1997. Two governmental generators shipped LLRW in 1996 but not in 1997, and one governmental generator shipped LLRW in 1997 but not in 1996. One governmental generator reactivated their registration in 1997. Most governmental generators ship LLRW to a broker/processor for treatment. The Navy Drug Screening Laboratory historically has always shipped LLRW to a broker/processor for treatment by decay in storage. One governmental generator shipped LLRW directly to the Envirocare disposal facility in 1997. This data is not included in this section, but will be detailed later. Table 4 shows governmental shipping activity for 1996 and 1997.

TABLE 4
Governmental LLRW Shipped
1996–1997

Governmental Generator	1996 Volume (ft^3)	1996 Volume (m^3)	1996 Activity (mCi)	1996 Activity (MBq)	1997 Volume (ft^3)	1997 Volume (m^3)	1997 Activity (mCi)	1997 Activity (MBq)
Department of the Army Rock Island	450	13	88,594	3,277,978	0	0	0	0
Department of the Army Savanna Army Depot	0	0	0	0	1,248	35	18,720	692,640
IDNS	23	1	133	4,921	0	0	0	0
Navy Drug Screening Laboratory	684	19	36	1,332	368	10	17	629
V.A. Lakeside	30	1	1	37	75	2	25	925
V.A. Westside	45	1	3	111	30	1	1	37
U. S. Customs Laboratory	*	*	*	*	1	<1	<1	<1
Total	1,232	35	88,767	3,284,379	1,722	48	18,763	694,231

Totals may not add due to rounding.
*Not registered in 1996.

INDUSTRIAL - Thirty percent of the industrial LLRW generators shipped in 1997 compared to 38 percent in 1996. G.D. Searle contributed over 59 percent of the industrial LLRW volume shipped for disposal in 1997. Amersham Corporation contributed most of the activity. Two industrial facilities, Alliant Techsystems and Primex Technologies, Inc. (formerly Olin Corporation), shipped waste directly to the Envirocare disposal facility in 1997. These data are not included in this section, but will be detailed later. Table 5 shows the industrial generators and the LLRW volume and activity figures for waste shipped in 1996 and 1997.

TABLE 5
Industrial LLRW Shipped
1996–1997

Industrial Generator	1996 Volume (ft^3)	1996 Volume (m^3)	1996 Activity mCi	1996 Activity (MBq)	1997 Volume (ft^3)	1997 Volume (m^3)	1997 Activity (mCi)	1997 Activity (MBq)
Abbott Laboratories	949	27	551	20,387	940	26	1,381	51,097
Alliant Techsystems	7,857	223	1	37	***	***	***	***
Amersham Corporation	135	4	20	740	477	13	175,877	6,507,449
Amersham Healthcare	210	6	182	6,234	0	0	0	0
Amoco Corporation	0	0	0	0	30	<1	15	555
Baxter Healthcare Corporation	0	0	0	0	61	1	10	370
Beloit Corporation	23	1	2,269	83,953	**	**	**	**
BetzDearborn, Inc.	1	<1	<1	<1	1	<1	<1	<1
Brach & Brock Conf. Inc.	*	*	*	*	8	<1	<1	<1
Clark Refining & Marketing, Inc.	1	<1	<1	<1	**	**	**	**
A. B. Dick Company	*	*	*	*	1	<1	<1	<1
Domino Amjet, Inc.	1	<1	<1	<1	**	**	**	**
EPL Bio-Analytical Service	0	0	0	0	27	<1	3	111
Equistar Chemicals, LP	*	*	*	*	1	<1	<1	<1
Fuchs Lubricant Company	1	<1	15	555	**	**	**	**
Fujisawa U.S.A., Inc.	10	<1	4	148	**	**	**	**
G. D. Searle	2,493	71	514	19,018	6,925	196	25	925
Gallagher Corporation	1	<1	20	740	**	**	**	**
Geomet Corporation	1	<1	<1	<1	0	0	0	0
Helene Curtis	16	1	<1	<1	16	<1	<1	<1
Henkel Adhesive Corporation	*	*	*	*	1	<1	1	37
Heritage Environmental	0	0	0	0	193	5	1	37
Honeywell, Inc.	498	14	52	1,924	0	0	0	0
Institute of Gas Technology	8	<1	<1	<1	0	0	0	0
Interstate Nuclear Services	2,560	72	200	7,400	2,560	72	1,172	43,364
Kay-Ray/Sensall	18	1	<1	<1	0	0	0	0
Keystone Steel & Wire	90	3	16	592	**	**	**	**
Koppers Industries, Inc.	*	*	*	*	12	<1	112	4,144

Leiner Health Products	*	*	*	*	1	<1	<1	<1
Marathon Oil Company	38	1	40	1,480	**	**	**	**
National Steel Corporation	1	<1	<1	<1	**	**	**	**
Nuclin Diagnostics Inc.	4	<1	15	555	0	0	0	0
NutraSweet Company	23	1	<1	<1	0	0	0	0
Ozark-Mahoning Company	1	<1	1	37	**	**	**	**
Packard Instrument Company	12	<1	3	111	54	2	54	1,998
Panduit Corporation	1	<1	250	9,250	**	**	**	**
Primex Technologies, Inc. Formerly Olin Corporation	1	<1	15	555	***	***	***	***
Professional Laundry Mgmt, Inc.	392	11	190	7,030	301	8	190	7,030
Refractory Products Company	*	*	*	*	<1	<1	<1	<1
Regis Technical, Inc.	1	<1	<1	<1	**	**	**	**
Sandoz Agro	64	<1	<1	<1	113	3	14	518
Sanford LP	*	*	*	*	1	<1	9	333
Shell Oil Company	1	<1	20	740	0	0	0	0
Siemens Medical Systems	23	1	1,039	38,443	0	0	0	0
Star Jet Oil Well Service	*	*	*	*	4	<1	111	4,107
System Sensor	22	1	2	74	0	0	0	0
Zellweger Analytics, Inc.	8	<1	<1	<1	**	**	**	**
Total	15,465	438	5,419	200,003	11,727	332	178,976	6,622,078

Totals may not add due to rounding.
*Not registered in 1996.
**Registration canceled.
***Shipped waste to Envirocare of Utah. This waste is reported in table 26.

MEDICAL - Seven medical generators shipped LLRW in 1997, which represents less than one percent of the total number of medical generators registered. Historically, all medical waste is shipped to brokers or processors, and the overall volume and activity 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 radioimmuassay testing (RIA) testing procedures for medical diagnosis. Table 6 shows 1996 and 1997 medical data.

TABLE 6
Medical LLRW Shipped
1996–1997

Medical Generator	1996 Volume (ft^3)	1996 Volume (m^3)	1996 Activity (mCi)	1996 Activity (MBq)	1997 Volume (ft^3)	1997 Volume (m^3)	1997 Activity (mCi)	1997 Activity (MBq)
Advocate Medical Group Formerly Lutheran Gen Med Ctr	53	2	2	74	8	<1	4	148
Bromenn Health Care	1	<1	<1	<1	0	0	0	0
Carle Foundation Hosp.	1	<1	<1	<1	0	0	0	0
Children's Mem. Hosp.	45	1	1	37	199	6	20	740
Cook County Hospital	23	1	3	111	0	0	0	0
Covenant Medical Center	1	<1	<1	<1	0	0	0	0
Holy Cross Hospital	12	<1	763	28,231	0	0	0	0
Loyola Univ. Med. Ctr.	119	3	44	1,628	113	2	92	3,404
Mercy Center for Health	1	<1	<1	<1	0	0	0	0
Memorial Med. Ctr.	8	<1	2	74	0	0	0	0
Michael Reese Hospital and Medical Center	0	0	0	0	94	3	11	407
Molecular Geriatrics Corp	4	<1	2	74	0	0	0	0
Northwestern Mem. Hosp.	53	2	5	185	38	1	21	777
Reg. Organ Bank of IL	4	<1	1	37	8	<1	2	74
Rush-Pres. St. Luke's Med. Ctr.	368	10	65	2,405	32	1	53	1,961
Total	693	19	888	32,856	492	14	203	7,511

Fractions are used in conversions.
Totals may not add due to rounding.

REACTOR - Table 7 contains a comparison of 1996 and 1997 volumes and activities shipped by reactor generators. Activity figures in table 7 are given in curies rather than in millicuries. The Braidwood, Byron, and Clinton facilities also shipped reactor waste to Envirocare. All LLRW shipped to Envirocare is included in table 26.

TABLE 7
Reactor LLRW Shipped
1996–1997

Reactor Generator		1996 Volume (ft^3)	1996 Volume (m^3)	1996 Activity (Ci)	1996 Activity (TBq)	1997 Volume (ft^3)	1997 Volume (m^3)	1997 Activity (Ci)	1997 Activity (TBq)
Braidwood	(CECo)	16,037	454	195	7	10,025	284	93	3
Byron	(CECo)	8,313	235	3,388	125	16,354	463	290	11
Dresden	(CECo)	87,128	2,467	886	33	204,608	5,795	12,252	453
LaSalle	(CECo)	29,254	828	2,402	89	30,484	863	1,139	42
Quad Cities	(CECo)	88,244	2,499	52,723	1,951	54,370	1,540	2,956	109
Zion	(CECo)	14,779	419	256	9	14,602	414	76	3
Clinton	(IPC)	13,034	369	247	9	12,006	340	962	36
Total		256,789	7,271	60,097	2,223	342,449	9,699	17,768	657

Totals may not add due to rounding.
Note: CECo - Commonwealth Edison Company
IPC - Illinois Power Company

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 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 any significant environmental or safety hazard.

Table 8 illustrates by generator category, the classifications of waste shipped both directly to disposal facilities and to brokers/processors. As you will note from table 8, the majority of waste shipped (98.6 percent by volume) was Class A waste. Only 1 percent was classified as Class B waste and 0.4 percent was classified as Class C waste.

TABLE 8
Distribution of Class of LLRW Shipped
by Generator Category in 1997

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	602	17	0	0	0	0	602	17
Fuel-Cycle	2,560	73	100	3	0	0	2,660	76
Government	1,722	49	0	0	0	0	1,722	49
Industrial	11,715	332	4	<1	8	<1	11,727	332
Medical	490	14	0	0	0	0	490	14
Reactor	337,566	9,565	3,478	99	1,406	40	342,450	9,704
Total	354,655	10,050	3,582	102	1,414	40	359,651	10,192

Totals may not add due to rounding.

In addition to class A, B, and C waste, some waste is noted as being a special type of waste that is 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 9 illustrates by generator category the number of generators shipping such materials.

Table 9
Number of Generators Shipping
Special Waste by Category in 1997

Generator Category	NARM/ NORM	Special Nuclear Material	Source material	TRU	Chelating Agents
Academic	1	0	2	0	0
Fuel-Cycle	0	1	2	1	0
Government	3	0	0	0	0
Industrial	6	2	3	2	0
Medical	1	0	0	0	0
Reactor	0	6	0	6	1
Total	11	9	7	9	1

SPECIFIC WASTE

The NRC and Illinois have designated certain waste 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. Waste of this sort is defined in 32 Illinois Administrative Code 340.1050 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.

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 10 shows the number of generators that stored waste for decay. Fuel-cycle generators did not store LLRW for decay in 1997. Table 11 shows the radionuclides with half-lives less than 65 days held for decay and the number of generators that stored these radionuclides. Table 12 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 10
Number of Generators Storing for Decay to Background
By Waste Type in 1997

Waste Type	Academic	Governmental	Industrial	Medical	Reactor	Total
Charcoal	0	0	3	54	1	58
Incinerator Ash	0	0	0	1	0	1
Gas	0	0	2	6	0	8
Cont. Aqueous Liquids	11	4	13	50	0	78
Filter Media	2	0	4	9	0	15
Mechanical Filter	0	0	1	0	0	1
EPA or State Hazardous	1	0	3	0	0	4
Exchange Media	1	0	0	0	0	1
Cont. Equipment	1	0	4	12	0	17
Organic Liquid	2	0	2	1	0	5
Glassware/Labware	4	1	6	9	0	20
Sealed Sources	0	0	5	9	0	14
Evaporator (Bottoms/Sludges/Concentrates)	0	0	1	0	0	1
Dry Active Waste (Compactible & Noncompactible)	21	12	15	191	0	239
Animal Carcass	2	1	2	1	0	6
Biological Material	3	1	3	9	0	16
Activated Material	0	0	1	1	0	2
Medical Generators	0	1	3	20	0	24
Other	0	0	0	1	0	1

Table 11
Radionuclides held for decay <65 days
By Waste Type in 1997

Waste Type	Academic	Governmental	Industrial	Medical	Total
Au-198	0	0	0	1	1
Ba-137	1	0	0	0	1
Bi-212	1	0	0	0	1
Ce-141	1	2	0	0	3
Cr-51	8	4	5	16	33
F-18	1	0	5	3	9
Fe-59	1	0	0	3	4
Ga-67	2	5	17	185	209
I-123	1	2	12	120	135
I-125	17	8	23	42	90
I-131	2	5	14	130	151
In-111	2	4	13	129	148
Mo-99	0	0	4	20	24
Nb-95	2	2	0	0	4
P-32	32	8	18	26	84
P-33	8	1	5	2	16
Pb-212	1	0	0	0	1
Pd-103	0	0	0	5	5
Ra-224	1	0	0	0	1
Rb-86	5	0	1	1	7
Re-186	0	0	1	0	1
Sm-153	0	0	1	6	7
Sr-85	0	3	0	2	5
Sr-89	1	1	3	42	47
Tc-99m	5	5	18	256	284
Tl-201	3	4	18	212	237
Tl-202	0	0	9	0	9
Xe-133	1	2	6	96	105
Y-90	0	0	0	1	1

Table 12
Radionuclides held for decay >60 days and <120 days
By Waste Type in 1997

Waste Type	Academic	Governmental	Industrial	Medical	Reactor	Total
As-73	1	0	0	0	0	1
Co-58	0	0	0	1	1	2
Ir-192	0	0	0	2	0	2
S-35	27	2	9	11	0	49
Se-75	1	0	0	0	0	1
Sn-113	0	0	0	1	0	1

MIXED WASTE

Waste shown to contain radioactive components and meet the U. S. Environmental Protection Agency (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 hazardous 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 13 shows the cumulative total of mixed waste in storage in both 1996 and 1997.

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.

TABLE 13
Types of Mixed Waste Stored On-Site--1996-1997
1996–1997

Waste Type	1996 Volume (ft^3)	1996 Volume (m^3)	1997 Volume (ft^3)	1997 Volume (m^3)	1997 Radionuclides
Lead					
Contaminated Lead	5.0	0.1	12.5	0.3	Co-60, Cs-137, Mn-54, Ra-226
Metals					
Mercury	1.0	<0.1	<1.0	<0.1	C-60
Barium	340.0	9.6	310.0	8.7	Co-60, Cs-137
Scintillation Fluids					
Toluene	28.2	1.0	14.8	0.4	Am-241, C-14, Cd-109, H-3, Hg-203, Na-22, Sr-85, Tc-99, Th-232, U-238
Xylene	7.5	0.2	7.5	0.2	Co-57, Co-60, Cs-134, Cs-137, Mn-54
Solvents & Other Organic Fluids					
Freon	550.0	15.5	1470.7	41.6	Co-57, Co-60, Cs-134, Cs-137, Mn-54, Uranium
Other	22.5	1.0	104.0	2.9	C-14, Co-60, Cs-134, Cs-137, H-3
Alkaline Liquids	127.5	3.6	127.5	3.6	Co-60, Cs-137, Mn-54
Acidic Liquids	2.0	<0.1	----	----	
Other	478.8	13.4	276.2	7.8	C-14, Co-60, Cs-137, Ga-67, H-3, I-123, In-111, Mn-54, S-35, Tl-201, Uranium
Total	1562.50	44.4	2323.2	65.5	

Totals may not add due to rounding.

Note: The volume represents the total of all mixed waste indicated in table 4 of the 1997 Annual Generators' Survey as being stored in 1997.

Generators are required to project the amount of mixed waste volume they expect to produce or possess between 1998 and 2004. According to these projections, the total annual mixed waste volume possessed and produced is expected to drop from 1,616 cubic feet to 1,603 cubic feet, a decrease of 1 percent over a seven year period. This decrease could be due to improved treatment processes or changing the processes that now produce mixed waste. The activity projected during this same period, however, indicate an increase of 1 percent over the same period. Tables 14 and 15 detail the volume projections by generator category, while tables 16 and 17 detail activity projections.

Table 14
Mixed Waste Volume Projections by Generator Category
1998-2004

Projection Year	Academic Volume (ft^3)	Fuel-Cycle Volume (ft^3)	Gov't Volume (ft^3)	Industrial Volume (ft^3)	Medical Volume (ft^3)	Reactor Volume (ft^3)	Total Volume (ft^3)
1998	310	23	16	803	308	154	1,614
1999	310	23	16	814	308	25	1,496
2000	320	23	16	824	308	23	1,514
2001	330	23	16	834	308	20	1,531
2002	340	23	16	849	308	17	1,553
2003	350	23	16	864	308	16	1,577
2004	360	23	16	879	308	16	1,602

Table 15
Mixed Waste Volume Projections by Generator Category
1998-2004

Projection Year	Academic Volume (m^3)	Fuel-Cycle Volume (m^3)	Gov't Volume (m^3)	Industrial Volume (m^3)	Medical Volume (m^3)	Reactor Volume (m^3)	Total Volume (m^3)
1998	8	<1	<1	22	8	4	42
1999	8	<1	<1	23	8	<1	39
2000	9	<1	<1	23	8	<1	40
2001	9	<1	<1	23	8	<1	40
2002	9	<1	<1	24	8	<1	41
2003	9	<1	<1	24	8	<1	41
2004	10	<1	<1	24	8	<1	42

Table 16
Mixed Waste Activity Projections by Generator Category
1998-2004

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)
1998	48	200	13	505	62	154	982
1999	48	200	13	516	62	25	864
2000	49	200	13	526	62	23	873
2001	49	200	13	536	62	20	880
2002	50	200	13	551	62	17	893
2003	50	200	13	566	62	16	907
2004	51	200	13	581	62	16	923

Table 17
Mixed Waste Activity Projections by Generator Category
1998-2004

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)
1998	1,776	7,400	481	18,685	2,294	5,698	36,334
1999	1,776	7,400	481	19,092	2,294	925	31,968
2000	1,813	7,400	481	19,462	2,294	851	32,301
2001	1,813	7,400	481	19,832	2,294	740	32,560
2002	1,850	7,400	481	20,387	2,294	629	33,041
2003	1,850	7,400	481	20,942	2,294	592	33,559
2004	1,887	7,400	481	21,497	2,294	592	34,151

LLRW PROJECTIONS

The 1997 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 1998 and 2004. Because reactors produce the most waste, each station is given a separate projection breakdown. Tables 18 and 19 show projected reactor volumes and historical final disposal volumes. Tables 20 and 21 show projected reactor activity and historical activity disposed. As you will notice on these tables, Zion nuclear power station does not have any projections after 1999 due to the closure of this facility. Appendix C gives

a history of LLRW volume and activities disposed by reactors from 1970 to 1985. Tables 22 and 23 show projected non-reactor generator activity and historical activity disposed and tables 24 and 25 shows the activity and historical activity disposed.

Table 18
Historical and Projected Annual Disposal Volume of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2004

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	114,123
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	47,393
1997	1,668	1,720	10,648	9,301	6,805	2,681	3,097	35,920
1998	**16,500**	**18,620**	**50,600**	**10,330**	**7,526**	**2,740**	**3,293**	**109,609**
1999	**10,000**	**16,241**	**48,100**	**10,330**	**6,826**	**1,370**	**3,293**	**96,160**
2000	**9,500**	**16,120**	**45,725**	**10,330**	**7,026**	*	**3,293**	**91,994**
2001	**9,500**	**13,241**	**43,600**	**10,330**	**6,826**	*	**3,293**	**86,790**
2002	**9,500**	**13,120**	**41,450**	**10,330**	**7,026**	*	**3,293**	**84,719**
2003	**9,500**	**13,241**	**39,400**	**10,330**	**6,826**	*	**3,293**	**82,590**
2004	**9,500**	**13,120**	**37,460**	**10,330**	**7,026**	*	**3,293**	**80,729**

Note: The volume is in English Unis.
Actual volumes are in regular print.
Projected volumes are in bold print.
Actual volumes given are final disposal volume.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Survey.
*No projections due to closure of this facility.

Table 19
Historical and Projected Annual Disposal Volume of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2004

Year	Braidwood (m^3)	Byron (m^3)	Dresden (m^3)	LaSalle (m^3)	Quad Cities (m^3)	Zion (m^3)	Clinton (m^3)	Total Volume (m^3)
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	**467**	**527**	**1,432**	**292**	**213**	**77**	**93**	**3,101**
1999	**283**	**459**	**1,362**	**292**	**193**	**38**	**93**	**2,720**
2000	**269**	**456**	**1,294**	**292**	**198**	*	**93**	**2,602**
2001	**269**	**374**	**1,234**	**292**	**193**	*	**93**	**2,455**
2002	**269**	**371**	**1,173**	**292**	**198**	*	**93**	**2,396**
2003	**269**	**374**	**1,115**	**292**	**193**	*	93	**2,336**
2004	**269**	**371**	**1,060**	**292**	**198**	*	93	**2,283**

Note: The volume is in English Unis.
Actual volumes are in regular print.
Projected volumes are in bold print.
Actual volumes given are final disposal volume.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Survey.
*No projections due to closure of this facility.

Table 20
Historical and Projected Annual Disposal Activity of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2004

Year	Braidwood (Ci)	Byron (Ci)	Dresden (Ci)	LaSalle (Ci)	Quad Cities (Ci)	Zion (Ci)	Clinton (Ci)	Total Volume (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	**1,775**	**1,652**	**85**	**73,410**	**4,350**	**56**	**5,200**	**86,528**
1999	**990**	**2,402**	**82**	**73,410**	**3,185**	*	**5,200**	**85,269**
2000	**990**	**1,651**	**79**	**73,410**	**4,305**	*	**5,200**	**85,635**
2001	**990**	**2,401**	**79**	**73,410**	**3,185**	*	**5,200**	**85,265**
2002	**990**	**1,651**	**73**	**73,410**	**4,305**	*	**5,200**	**85,629**
2003	**990**	**2,401**	**71**	**73,410**	**3,185**	*	**5,200**	**85,257**
2004	**990**	**1,651**	**69**	**73,410**	**4,305**	*	**5,200**	**85,625**

Totals may not add due to rounding.
Note: The activity is in English Units.
Actual activity is in regular print.
Projected activity is in bold print.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Surveys.
*No projections due to closure of this facility.

Table 21
Historical and Projected Annual Disposal Activity of LLRW
Generated by Illinois Nuclear Power Facilities
1986-2004

Year	Braidwood (TBq)	Byron (TBq)	Dresden (TBq)	LaSalle (TBq)	Quad Cities (TBq)	Zion (TBq)	Clinton (TBq)	Total Volume (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	1,377
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	**65**	**61**	**3**	**2,716**	**160**	**2**	**192**	**3,199**
1999	**36**	**88**	**3**	**2,716**	**117**	**1**	**192**	**3,153**
2000	**36**	**61**	**2**	**2,716**	**159**	*	**192**	**3,166**
2001	**36**	**88**	**2**	**2,716**	**117**	*	**192**	**3,151**
2002	**36**	**61**	**2**	**2,716**	**159**	*	**192**	**3,166**
2003	**36**	**88**	**2**	**2,716**	**117**	*	**192**	**3,151**
2004	**36**	**61**	**2**	**2,716**	**159**	*	**192**	**3,166**

Fractions are used in conversions.
Totals may not add due to rounding.
Note: The activity is in System International Units.
Actual activity is in regular print.
Projected activity is in bold print.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Surveys.
*No projections due to closure of this facility.

Table 22
Historical and Projected Annual Volume of LLRW
Generated by Non-Reactor Generators

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	40,415
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	6,333
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	**2,564**	**650**	**215**	**147,493**	**477**	**151,399**
1999	**2,569**	**650**	**213**	**9,656**	**376**	**13,464**
2000	**2,579**	**650**	**108**	**9,596**	**385**	**13,318**
2001	**2,584**	**134,600**	**108**	**9,745**	**382**	**147,419**
2002	**2,544**	**600**	**93**	**9,705**	**366**	**13,308**
2003	**2,549**	**600**	**96**	**9,855**	**370**	**13,470**
2004	**2,559**	**600**	**93**	**9,802**	**374**	**13,428**

Note: The volume is in English Units.
Actual volumes are in regular print.
Projected volumes are in bold print.
Actual volumes given are final disposal volume.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Survey.

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

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	36
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	146
1993	32	40	106	3	4	57
1994	11	102	3	35	5	179
1995	1	27	<1	8	1	38
1996	3	66	6	43	3	124
1997	2	8	11	21	1	43
1998	**36**	**92**	**4**	**395**	**17**	**544**
1999	**35**	**92**	**4**	**269**	**17**	**417**
2000	**34**	**92**	**4**	**270**	**17**	**417**
2001	**32**	**92**	**4**	**270**	**16**	**414**
2002	**32**	**92**	**4**	**271**	**14**	**413**
2003	**33**	**92**	**4**	**273**	**14**	**416**
2004	**33**	**92**	**4**	**274**	**14**	**417**

Note: The volume is in English Unis.
Actual volumes are in regular print.
Projected volumes are in bold print.
Actual volumes given are final disposal volume.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Survey.

Table 24
Historical and Projected Annual Activity of LLRW
Generated by Non-Reactor Generators

Projection Year	Academic (mCi)	Fuel-Cycle (mCi)	Governmental (mCi)	Industrial (mCi)	Medical (mCi)	Total Volume (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	**2,564**	**650**	**215**	**147,493**	**477**	**151,399**
1999	**2,569**	**650**	**213**	**9,656**	**376**	**13,464**
2000	**2,579**	**650**	**108**	**9,596**	**385**	**13,318**
2001	**2,584**	**134,600**	**108**	**9,745**	**382**	**147,419**
2002	**2,544**	**600**	**93**	**9,705**	**366**	**13,308**
2003	**2,549**	**600**	**96**	**9,855**	**370**	**13,470**
2004	**2,559**	**600**	**93**	**9,802**	**374**	**13,428**

Totals may not add due to rounding.
Note: The activity is in English Units.
Actual activity is in regular print.
Projected activity is in bold print.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Surveys.

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

Projection Year	Academic (MBq)	Fuel-Cycle (MBq)	Governmental (MBq)	Industrial (MBq)	Medical (MBq)	Total Volume (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	2,479,000
1990	370,000	1,714,210	11,507,000	1,060,790	74,000	14,356,000
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	2,023,000	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	**94,893**	**24,050**	**7,955**	**5,457,241**	**17,649**	**5,601,788**
1999	**95,078**	**24,050**	**7,881**	**357,272**	**13,912**	**498,193**
2000	**95,448**	**24,050**	**3,996**	**355,052**	**14,245**	**492,791**
2001	**95,633**	**4,980,200**	**3,996**	**360,565**	**14,134**	**5,454,528**
2002	**94,153**	**22,200**	**3,441**	**359,085**	**13,542**	**492,421**
2003	**94,338**	**22,200**	**3,552**	**364,635**	**13,690**	**498,415**
2004	**94,708**	**22,200**	**3,441**	**362,674**	**13,838**	**496,861**

Fractions are used in conversions.
Totals may not add due to rounding.
Note: The activity is in System International Units.
Actual activity is in regular print.
Projected activity is in bold print.
Source: Disposal facilities' databases.
Projected volumes from the 1997 Generators' Surveys.

ENVIROCARE OF UTAH

The Envirocare of Utah facility, located near Clive, Utah, takes only low-activity, high-volume waste. The shipment information for waste disposed at the Envirocare facility is provided in table 26. Seven Illinois facilities (Alliant Techsystems; AlliedSignal, Inc.; Braidwood Nuclear Power Station; Byron Nuclear Power Station; Clinton Nuclear Power Station; Department of the Army; G. E. Nuclear Energy; and Primex Technologies Inc.) shipped waste to Envirocare in 1997. All of the waste was Class A, consisting of dry active waste (DAW), EPA or state hazardous media, filter media, mixed bed ion-exchange media, soil, and sealed sources. Envirocare's data are included separately because it is a specialized facility, so that the continuity with previously reported data will not be lost.

TABLE 26

LLRW Shipped in 1996 and 1997 by Generator Category
(Direct Shipments to Envirocare, Utah)

Generator Category	1996 Volume (ft^3)	1996 Volume (m^3)	1996 Activity (mCi)	1996 Activity (MBq)	1997 Volume (ft^3)	1997 Volume (m^3)	1997 Activity (mCi)	1997 Activity (MBq)
Academic	--	--	--	--	--	--	--	--
Fuel-Cycle	5,480	155	1	37	24,714	698	2	74
Governmental	*	*	--	--	10,069	285	151	5
Industrial	--	--	--	--	4,410	124	<1	<1
Medical	--	--	--	--	--	--	--	--
Reactor	265,728	7,525	2	74	2,619	73	≤1	≤1
Total	271,208	7,680	3	111	41,812	1,180	153	79

CHAPTER THREE

NATIONAL AND COMPACT DATA

Lockheed Martin Idaho Technologies Company (LMITCO) gathers data from the manifests received by the commercial disposal sites. Table 27 shows the final (after treatment) disposal volumes of LLRW as recorded by the disposal facilities.

TABLE 27
1997 Volume and Activity by Generator Category
(Final Disposal Figures)

Generator Category	Volume (ft^3)	Volume (m^3)	Activity (Ci)	Activity (TBq)
Academic	83	2	2	<1
Fuel-Cycle	279	8	146	5
Governmental	390	11	25	1
Industrial	743	21	142	5
Medical	33	1	3	<1
Reactor	35,921	1,017	18,068	669
Totals	37,449	1,060	18,386	681

Source: LMITCO.
Fractions are used in conversions.
Totals may not add due to rounding.

As shown in tables 28 and 29, Illinois ranked second in the nation in LLRW volume disposed and in activity disposed, based on the LMITCO database. The number one volume shipper, Oregon, did not rank in the top ten of activity shipped. Vermont, the number one activity-producing state, did not rank in the top ten volume shippers.

Table 28
Volume of LLRW Disposed by the Top Ten Volume Producing States in 1997
as Reported by Disposal Facility Operators

State of Origin	Final Disposal Volume (ft^3)	Final Disposal Volume (m^3)
1. Oregon	52,991	1,501
2. Illinois	37,449	1,061
3. Washington	27,467	778
4. New Jersey	25,355	718
5. Tennessee	23,589	668
6. Pennsylvania	14,605	414
7. Michigan	13,390	379
8. Georgia	13,135	372
9. Massachusetts	10,645	301
10. New York	9,973	282

Source: LMITCO

Table 29
Activity of LLRW Disposed by the Top Ten Activity Producing States in 1997 as Reported by Disposal Facility Operators

State of Origin	Final Activity Disposed (Ci)	Final Activity Disposed (TBq)
1. Vermont	37,677	1,394
2. Alabama	25,408	940
3. Illinois	18,385	680
4. Pennsylvania	8,247	305
5. Michigan	7,611	282
6. Virginia	4,214	156
7. Georgia	3,209	119
8. Massachusetts	3,143	116
9. Wisconsin	2,652	98
10. Texas	2,544	94

Source: LMITCO

KENTUCKY VOLUME AND ACTIVITY SHIPMENTS-1994 through 1997

Kentucky and Illinois comprise the Central Midwest Interstate LLRW Compact. Kentucky LLRW generators are not required to complete the Illinois Generators' Annual Survey form. Therefore, shipment information has not been documented in prior annual survey reports, and only final disposal figures have been reported. Past Kentucky LLRW disposal volumes are discussed in this section. No waste shipment projections are included since all Kentucky data is taken from the LMITCO database. Table 30 illustrates the volume disposed by Kentucky generators, by category, for the years 1994 to 1997 while table 31 shows the activity contained in that waste for the same period.

LMITCO assigns generator waste into one of five categories by typical wastestreams.

Academic - Compacted trash or solids, institutional laboratory or biological waste, absorbed liquids, and animal carcasses.

Government - Compacted trash or solid, contaminated plant hardware, and absorbed liquids.

Industrial - Depleted uranium, compacted trash or solids, contaminated plant hardware, absorbed liquids, and sealed sources.

Medical - Compacted trash or solids, institutional laboratory or biological waste, absorbed liquids, and sealed sources.

Utilities - Spent resins, evaporator bottoms and concentrated waste, filter sludge, dry compressible waste, irradiated components, and contaminated plant hardware.

Table 30
Kentucky Volume Shipped by Category
1994-1997

Generator	1994		1995		1996		1997	
Category	(ft^3)	(m^3)	(ft^3)	(m^3)	(ft^3)	(m^3)	(ft^3)	(m^3)
Academic	65.7	1.9	0.0	0.0	135.7	3.8	28	0.7
Governmental	115.1	3.3	77.8	2.2	76.9	2.2	0.0	0.0
Industrial	152.1	4.3	1.3	<0.1	210.0	5.9	0.6	<0.1
Medical	0.1	<0.1	11.6	0.3	19.3	1.0	0.0	0.0
Non-Reactor Utility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	333.0	9.5	90.7	2.5	441.9	12.9	28.6	0.7

Source: LMITCO
Totals may not add due to rounding

Table 31
Kentucky Activity Shipped by Category
1994-1997

Generator	1994		1995		1996		1997	
Category	(Ci)	(TBq)	(Ci)	(TBq)	(Ci)	(TBq)	(Ci)	(TBq)
Academic	0.1	<0.1	0.0	0.0	4.7	0.2	28	1.0
Governmental	282.0	10.4	19.7	1.0	457.6	16.9	0.0	0.0
Industrial	2.6	0.1	0.1	<0.1	<0.1	<0.1	0.6	<0.1
Medical	<1.0	<0.1	<1.0	<0.1	<0.1	<0.1	0.0	0.0
Non-Reactor Utility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	284.7	10.5	19.8	1.0	462.3	17.1	28.6	1.0

Source: LMITCO
Totals may not add due to rounding

Over the past six years, the Kentucky contribution to the waste stream averaged less than one percent of the total waste volume. The Kentucky activity contribution also averaged less than one percent of the total activity. Kentucky academic generators

contributed the most volume and activity. Tables 32 and 33 give a comparison by volume and activity of Kentucky and Illinois LLRW disposal between 1986 and 1997, and also illustrate the Kentucky percentage of waste and activity.

Table 32
Kentucky and Illinois Volume
1986-1997

	Kentucky		Illinois		Total		% KY
	(ft^3)	(m^3)	(ft^3)	(m^3)	(ft^3)	(m^3)	Volume
[illegible]	2,288	65	202,703	5,740	204,991	5,805	1%
[illegible]	877	25	183,218	5,189	184,095	5,214	<1%
	2,122	60	112,529	3,187	114,651	3,247	2%
1989	10,047	285	134,787	3,817	144,834	4,102	7%
1990	4,616	131	98,360	2,785	102,976	2,916	5%
1991	2,348	66	101,949	2,887	104,297	2,954	2%
1992	2,195	62	285,023	8,072	287,218	8,134	<1%
1993	468	13	66,515	1,884	66,983	1,897	<1%
1994	333	9	61,224	1,734	61,557	1,743	<1%
1995	91	3	57,762	1,636	57,853	1,638	<1%
1996	442	13	51,771	1,466	52,213	1,479	<1%
1997	29	1	37,449	1,061	37,478	1,062	<1%

Source: LMITCO
Totals may not add due to rounding

Table 33
Kentucky and Illinois Activity
1986-1997

	Kentucky		Illinois		Total		% KY
Year	(Ci)	(TBq)	(Ci)	(TBq)	(Ci)	(TBq)	Activity
1986	5	<1	41,955	1,552	41,960	1,552	<1%
1987	40	2	33,687	1,246	33,727	1,248	<1%
1988	762	28	8,936	331	9,698	359	8%
1989	21	1	147,115	5,443	147,136	5,444	<1%
1990	61	2	8,254	305	8,315	308	<1%
1991	631	23	9,713	359	10,344	383	6%
1992	26	1	103,273	3,821	103,299	3,822	<1%
1993	514	19	37,718	1,396	38,232	1,415	<1%
1994	285	11	32,137	1,189	32,422	1,200	<1%
1995	20	1	7,044	261	7,064	261	<1%
1996	462	17	57,328	2,121	57,790	2,138	<1%
1997	29	1	18,385	680	18,414	681	<1%

Source: LMITCO
Totals may not add due to rounding

BIBLIOGRAPHY

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.

EG&G Idaho, Inc. *The 1997 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, September 1998.

EG&G Idaho, Inc. *The 1996 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, September 1997.

EG&G Idaho, Inc. *The 1995 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, September 1996.

EG&G Idaho, Inc. *The 1994 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, September 1995.

EG&G Idaho, Inc. *The 1988 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, December 1989.

EG&G Idaho, Inc. *The 1987 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, December 1988.

EG&G Idaho, Inc. *The 1986 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, December 1987.

EG&G Idaho, Inc. *The 1985 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites.* Washington, D.C.: U.S. Department of Energy, December 1986.

EG&G Idaho, Inc. *The 1984 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites*. Washington, D.C.: U.S. Department of Energy, December 1985.

EG&G Idaho, Inc. *The 1983 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites*. Washington, D.C.: U.S. Department of Energy, December 1984.

EG&G Idaho, Inc. *The 1982 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites*. Washington, D.C.: U.S. Department of Energy, December 1983.

EG&G Idaho, Inc. *The 1981 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites*. Washington, D.C.: U.S. Department of Energy, December 1982.

EG&G Idaho, Inc. *The 1980 State-by-State Assessment of Low-Level Radioactive Wastes Received at Commercial Disposal Sites*. Washington, D.C.: U.S. Department of Energy, June 1982.

Guilveault, B.D., NUS Corporation for EG&G Idaho, Inc. *The 1979 State-by-State Assessment of Low-Level Radioactive Wastes Shipped to Commercial Burial Grounds*. San Francisco: NUS Corporation, November 1980.

Illinois Department of Nuclear Safety. *1996 Annual Survey Report,* Springfield, Illinois: State of Illinois, December 1997.

Illinois Department of Nuclear Safety. *1995 Annual Survey Report,* Springfield, Illinois: State of Illinois, December 1996.

Illinois Department of Nuclear Safety. *1994 Annual Survey Report,* Springfield, Illinois: State of Illinois, December 1995.

Illinois Department of Nuclear Safety. *1993 Annual Survey Report*, Springfield, Illinois: State of Illinois, September 1994.

Illinois Department of Nuclear Safety. *1992 Annual Survey Report*, Springfield, Illinois: State of Illinois, July 1993.

Illinois Department of Nuclear Safety. *1991 Annual Survey Report*, Springfield, Illinois: State of Illinois, November 1992.

Illinois Department of Nuclear Safety. *Annual Report on the Survey of Low-Level Radioactive Waste Generators in Illinois for 1985*. Springfield, Illinois: State of Illinois, September 1986.

Wiltshire, Susan D., for the League of Women Voters Education Fund. *The Nuclear Waste Primer: A Handbook for Citizens*. League of Women Voters Education Fund, 1993 (revised edition).

Walker, Richard, *Radiation in Illinois: A Chronology of Selected Events 1700-1980*, Springfield, Illinois: State of Illinois, September 1988.

APPENDIX A
1997 LLRW Generators' Annual Survey

STATE OF ILLINOIS
Generators' Annual Survey
1997

GENERAL INSTRUCTIONS

Survey Completion

1. The survey for calendar year 1997 must be completed and submitted no later than **February 2, 1998** 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:

Chief, Division of Low-Level Radioactive Waste Management
Illinois Department of Nuclear Safety
Office of Environmental Safety
1035 Outer Park Drive
Springfield, Illinois 62704

If you require assistance, call Vera 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 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
1997

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 office: 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 1997 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 Media						
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 or Labware						
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 (except animal carcass)						
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 1997 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:_____

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

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 1997? (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 1997 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, such as scintillation fluids, as defined in 32 Ill. Adm. Code 340.1050.

   _____NO
   _____YES – Complete a, b, and TABLE 2 (page 14).

   a) Total volume remaining in storage (awaiting disposal) as of 12/31/97 that was placed in storage during 1997: 2a._____cu.ft.

   b) Portion of waste for which a storage fee was previously paid. 2b._____cu.ft.

3. Do you plan to generate LLRW at any time during 1998 through 2004 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 1998? (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 definition)? (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 1997 **only**.

   _____ cu.ft.

   Enter the total volume of mixed waste presently in storage as of 12/31/97.

   _____ 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 1998 through 2004 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 1997?

   _____NO
   _____YES – Complete the remainder of this question.

   a) List the total volume of mixed waste shipped for treatment, storage, and/or disposal during 1997. (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.

Type of Chelating Agent – _____

Percent by weight – _____

8. Did you dispose of LLRW for any other person, company, or entity in 1997?

_____NO

_____YES – Provide the name and address below.

NAME: _____

ADDRESS: _____

CITY/ST/ZIP: _____

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

_____

_____

RETURN ENTIRE REPORT TO:

Chief, Division of Low-Level Radioactive Waste Management
Illinois Department of Nuclear Safety
Office of Environmental Safety
1035 Outer Park Drive
Springfield, Illinois 62704

COMMENTS:

ILLINOIS DEPARTMENT 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 Department of Nuclear Safety to inspect shipments at times and locations determined to be convenient by the Department.

Name/Title: _____

Signature: _____ Date: _____

Completed Applications shall be sent to:

Chief, Division of Low-Level Radioactive Waste Management
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

The Department 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 the issuing authority. Shipping waste without securing 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: _____

IL 473-0320 (3/97)

TABLE 1: Waste Stored On-site for Decay to Background during 1997

Provide the waste type, the maximum volume in cubic feet, and the associated radionuclide(s) for each type of LLRW generated in Illinois and stored on-site for decay to background at any given time during 1997. 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 1997							
Waste Type	Volume (cu.ft.)	Radionuclides					
Total Volume:							

Instructions:

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

Volume – Enter the maximum volume in cubic feet of each type of waste that was in storage for decay at any one time.

Radionuclides – 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 1997 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 1997. See Appendix I for waste type codes. All waste types listed on Table 2 also must be listed in Part II. Attach additional sheets as necessary.

TABLE 2: Waste Stored On-Site During 1997 for Future Disposal							
Waste Type	Volume (cu.ft.)	Activity (mCi)	Waste Class	Treatment Code	Primary Radionuclide(s)		
Total Volume:							

Instructions:

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

Volume – Enter the volume in cubic feet for each type of waste that was in a form suitable for disposal (after treatment).

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

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 this column..

Treatment Code - 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 treatment methods.

Radionuclides – List the radionuclides present in the waste for each type of waste stored on-site for future disposal.

TABLE 3: LLRW Generation Projections (1998–2004)

Enter the estimated volume in cubic feet and radioactivity content in millicuries of waste in each class projected to be generated in Illinois during 1998 through 2004 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)
1998						
1999						
2000						
2001						
2002						
2003						
2004						

Instructions:

Volume – Enter the volume of waste anticipated to be generated for disposal either directly or via a broker/processor during each year from 1998 through 2004.

Activity – Enter the activity content in millicuries of waste anticipated to be shipped for disposal during each year from 1998 through 2004.

TABLE 4: Storage of Mixed Wastes during 1997

Provide the IDNS 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 radionuclide(s), and the practice used to generate the waste for each type of mixed waste generated in Illinois and stored on-site during 1997. Attach additional sheets as necessary.

TABLE 4: Storage of Mixed Wastes during 1997											
IDNS 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 waste types and hazardous waste codes in the first two columns. Appendix III contains a list of codes describing various IDNS mixed waste types and RCRA hazardous waste codes.

Volume – Enter the total volume in cubic feet of each type of mixed waste in storage during 1997.

Activity – Enter the activity content in millicuries of each type of mixed waste.

Waste Class – The state of Illinois' requirements, as reflected in 32 Ill. Adm. Code 340.1052, determine the projected 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 (1998–2004)

Provide the IDNS mixed waste types, the RCRA hazardous waste codes, the estimated generated volume in cubic feet, the waste class, and the radioactivity content in millicuries for each type of mixed waste projected to be generated in Illinois during 1998 through 2004 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	IDNS Mixed Waste Type	RCRA Waste Code	Volume (cu.ft.)	Waste Class	Activity (mCi)
1998					
1999					
2000					
2001					
2002					
2003					
2004					

Instructions:

Waste Type /Waste Code – Enter the appropriate codes. Appendix III contains a list of codes describing various IDNS 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 1998 through 2004.

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 1998 through 2004.

TABLE 6: Destination of Waste Shipped Directly to LLRW Disposal Sites in 1997

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 1997. 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 1997												
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 total sum of the total volume (individual container disposal volume) x (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 1997

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 LLW Disposal Sites During 1997

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 1997

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 1997. 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 or Processors

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 sum of 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 Brokers(s) or LLRW Processors(s) for Treatment and/or Disposal During 1997

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 LLW Broker(s) or Processor(s) for Treatment and/or Disposal During 1997

(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 Sorb
	f.) Safe N Dri
	g.) Florco
	h.) Florco X
	i.) Solid A Sorb
	j.) Chemcil 30
	k.) Chemcil 50
	l.) Chemcil 3030
	m.) 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
	y.) Other
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: IDNS Mixed Waste Types/RCRA Hazardous Waste Codes

IDNS CODE CODES	WASTE TYPE	RCRA
1	Lead*	
	a) activated lead	D008
	b) contaminated lead	D008
	c) lead containers (pigs)	D008
2	Chromium*	
	a) corrosion-inhibiting chromates	D007
	b) incidental corrosion products	D007
	c) Cr-51 carrier	D007
	d) other:	**
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 long-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 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 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 1, 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	8.00
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 2, 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 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 340.1080.

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 is assumed. For the biowaste stream, a volume increase factor of 1.92 is 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 (LLW).

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 LLW 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 LLW.

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 LLW. "Facility" does not include lands, sites, structures, or equipment used by a generator in the generation of LLW.

Drums: Commonly used to ship and dispose of low-level radioactive waste, drums are usually made of steel, 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, institutional trash.

Electropolishing: Any electrochemical process in which radioactive contamination is removed from the surface of a metal object by the removal of ions 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 LLW 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 disposal 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 LLW 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, LLW includes "mixed waste".

Medical generators: Separation columns that generate liquids containing radionuclides such as technetium-99m or krypton-81, for use in diagnostic imaging.

Mixed waste: Waste that is 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.

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 LLW 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-238 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 LLW or that prevent the generation of additional LLW.

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; plutonium 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 1997

ACADEMIC

Abbott Middle School
949 Van Street
Elgin, IL 60123

Belleville Area College
2500 Carlyle Road
Belleville, IL 62221

Benedictine University
Physics Department
5700 College Road
Lisle, IL 60532

Champaign Community Schools
Unit District #4
1400 North Hogan Drive
Champaign, IL 61820

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

College of DuPage
425 ?2nd Street
Glen Ellyn, IL 60137

Community Unit District #1
Charleston Schools
410 West Polk Avenue
Charleston, IL 61920

DePaul University
2219 N. Kenmore Avenue
Chicago, IL 60614

District 233
Homewood-Flossmoor High School
999 Kedzie Avenue
Flossmoor, IL 60422

Eastern Illinois University
Charleston, IL 61920

Field Museum of Natural History
Biochemistry Laboratories
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605

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

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

Illinois College
1101 West College Avenue
Jacksonville, IL 62650

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

Knox College
2 East South Street
Galesburg, IL 61401

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

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

Lyons Township H.S., District 204
North Campus
100 South Brainard Avenue
LaGrange, IL 60525

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

Mount Prospect School District 57
Lincoln Junior High School
700 West Lincoln
Mount Prospect, IL 60056

National College of Chiropractic
200 East Roosevelt Road
Lombard, IL 60148

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

Northern Illinois University
Biological Sciences Building
DeKalb, IL 60115

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

Oswego High School
4250 Route 71
Oswego, IL 60543

SIU at Carbondale
Center for Environmental Health & Safety
1400 Poultry Center Drive
Carbondale, IL 62901

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

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

The University of Chicago
Office of Radiation Safety
1101 East 57th Street, Room Z-11
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

AlliedSignal, Inc.
Metropolis Works
U S Hwy 45 North, P. O. Box 430
Metropolis, IL 62960

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

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
Savanna Army Depot Activity
Attn: SIOSV-SAF
Savanna, IL 61074

Department of Veterans Affairs
Edward Hines, Jr Hospital
Hines, IL 60141

Department of the Army
Rock Island Arsenal
SOPRI-SEL Building 210, Room 407
Rock Island, IL 61299

Illinois Dept of Public Health
2121 West Taylor Street
Chicago, IL 60612

Illinois Department of Nuclear Safety
1301 Knotts Street
Springfield, IL 62703

Illinois State Police
Spgfld Forensic Science Lab
2060 Hill Meadows Drive
Springfield, IL 62704

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

Illinois State Police - Forensic
2040 Hill Meadows Drive
Springfield, IL 62702

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
2701 Sheridan Road
Great Lakes, IL 60088

Navy Drug Screening Laboratory
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. Customs Laboratory
610 South Canal St, Ste 1100
Chicago, IL 60607

Abbott Laboratories
One Abbott Park Road
Abbott Park, IL 60064

V.A. Lakeside Medical Center
Lakeside Medical Center
333 East Huron Street
Chicago, IL 60611

V.A. Westside Medical Center
820 South Damen Avenue
Chicago, IL 60612

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

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

U.S. Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, IL 60532

INDUSTRIAL

Abbott Laboratories
1 Abbott Park Road
Abbott Park, IL 60064

Alliant Techsystems
Lap Facility
29745 Alliant Drive
Wilmington, IL 60481

Alnor Instrument Company
7555 North Linder Avenue
Skokie, IL 60077

Amersham Corporation
2636 South Clearbrook Drive
Arlington Heights, IL 60005

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

Amoco Corporation
Amoco Research Center
150 W. Warrenville Rd.
Naperville, IL 60563

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

APL Engineered Materials, Inc.
2401 North Willow Road
Urbana, IL 61801

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

Austeel Lemont Company, Inc.
New Avenue at Ceco Road
Lemont, IL 60439

Barber-Colman Company
1354 Clifford Avenue, P. O. Box 2940
Loves Park, IL 61111

Baxter Healthcare Corporation
Fenwal & Life Sciences Division
Route 120 & Wilson Road Wg3-2s
Round Lake, IL 60073

BetzDearborn Inc.
300 Genesee Street
Lake Zurich, IL 60047

Brach & Brock Conf. Incorporation
401 North Cicero Avenue
Chicago, IL 60644

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

Centeon, L. L. C.
Armour Pharmaceutical Company
Route 50 North
Bradley, IL 60915

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

CMI International Corporation
945 Busse Road
Elk Grove Village, IL 60007

Commonwealth Edison Company
1400 Opus Place - Suite 800
Downers Grove, IL 60515

CPC International
6400 Archer Road
Argo, IL 60501

A. B. Dick Company
5700 West Touhy Avenue
Niles, IL 60714

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

Equistar Chemicals, LP
8805 North Tabler Road
Morris, IL 60450

G. D. Searle & Company
4901 Searle Parkway
Skokie, IL 60077

Hanson Engineers Incorporated
1525 South 6th Street
Springfield, IL 62703

Helene Curtis Industries, Inc.
3100 Golf Road, Room F-109
Rolling Meadows, IL 60008

Henkel Adhesives Corporation
740 Tollgate Road
Elgin, IL 60123

Heritage Environmental Services, Inc.
1319 Marguette Drive
Romeoville, IL 60446

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

Honeywell, Inc.
1500 West Dundee Road
Arlington Heights, IL 60004

Indicator Lites, Inc.
500 North Rt. 53
Gardner, IL 60424

Institute of Gas Technology
Corporate Headquarters
1700 South Mt. Prospect Road
Des Plaines, IL 60018

Interstate Nuclear Services, Inc.
1006 Third Avenue
Morris, IL 60450

K. K. Bioscience
500 South Clinton Street
Chicago, IL 60607

Kay-Ray/Sensall, Inc.
1400 Business Center Drive
Mount Prospect, IL 60056

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

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

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

Leiner Health Products
3532 West 47th Place
Chicago, IL 60632

Lixi, Inc.
1438 Brook Drive
Downers Grove, IL 60515

Mallinckrodt Inc.
Nuclear Medicine Division
4100 North Elston Avenue
Chicago, IL 60618

Monsanto Research Farm/Monmouth
700 Chesterfield Parkway North, M.Z.
BB5G
St. Louis, MO 63198

MPI Pharmacy Services
Medi-Physics, Inc.
1053 West Grand Avenue
Chicago, IL 60622

Nalge Nunc International
2000 North Aurora
Naperville, IL 60563

Northwestern Steel And Wire
121 Wallace Street
Sterling, IL 61081

Novartis Crop Protection, Inc.
CIBA-GEIGY Corp., MW Res Sta
P. O. Box 18300
Greensboro, NC 27419

Nuclear Data Systems
Canberra/NSD
150 Spring Lake Drive
Itasca, IL 60143

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

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

Packard Instrument Company, Inc.
2200 Warrenville Road
Downers Grove, IL 60515

Petnet Pharmaceutical Services
Cti Services, Inc. Chicago Pet
Compound
200 East Howard
Des Plaines, IL 60016

Pharmacy Services Of Peoria
920 Main Street
Peoria, IL 61602

Primex Technologies, Inc.
Olin Ordnance, Marion Op.
8820 Route 148
Marion, IL 62959

Professional Laundry Management, Inc.
113 South Route 53
Gardner, IL 60424

Quaker Oats Company (The)
John Stuart Research Laboratory
617 West Main Street
Barrington, IL 60010

Recra Lab Net-Chicago
Weston Environmental Metrics, Inc.
2417 Bond Street
University Park, IL 60466

Refractory Products Companyu
770 Tollgate Road
Elgin, IL 60123

Regis Technologies, Inc.
8210 North Austin Avenue
Morton Grove, IL 60053

Reliable Electric/Utility Products
1019 Entry Drive
Bensenville, IL 60106

Sandoz Agro, Inc.
1300 East Touhy Avenue
Des Plaines, IL 60018

Sanford LP
2711 Washington Blvd.
Bellwood, IL 60104

Shell Oil Products Company
Shell Wood River Refining Company
900 South Central Avenue
Roxana, IL 62084

Sherwin Williams Automotive Finishes Corporation
Automotive Technical Center
10909 South Cottage Grove Avenue
Chicago, IL 60628

Siemens Medical Systems
2501 Barrington Road
Hoffman Estates, IL 60195

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

Standard Nuclear Consultants, Ltd.
1 South 016 Donny Hill Road
Elburn, IL 60119

Star Jet Oil Well Service
P. O. Box 291
Mt. Carmel, IL 62863

Syncor Corporation
614 East Carpenter Street
Springfield, IL 62701

Syncor International
25 North May Street
Chicago, IL 60607

Syncor International
25 North May Street
Chicago, IL 60607

Syncor International Corporation
200 East Howard, Suite 204b
Des Plaines, IL 60018

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

TEST-ER, Inc.
225 Mitchell Court, A10
Addison, IL 60101

The Nutrasweet Company
601 Kensington
Mt. Prospect, IL 60056

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

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

MEDICAL

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

ACGT, Inc.
1955 Raymond Drive, Suite 104
Northbrook, IL 60062

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

Advocate Health Care
Bethany Hospital
3435 West Van Buren
Chicago, IL 60624

Advocate Medical Group
Formerly Lutheran General Medical Group
1875 Dempster Street, Suite 585
Park Ridge, IL 60068

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

Alton Memorial Hospital
#1 Memorial Drive
Alton, IL 62002

American Dental Association
211 East Chicago Avenue
Chicago, IL 60611

American Diagnostic Medicine
950 Industrial Drive, Suite 7
Elmhurst, IL 60126

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

Bio-Med Labs, Inc.
P. O. Box 905
Matteson, IL 60443

Biomedical Scanning Services
9445 Chavez Drive
Sunset Hills, MO 63127

Blessing Hospital
1005 Broadway
Quincy, IL 62301

Bromenn Health Care
Virginia at Franklin
Normal, IL 61761

Cardio-Med, Ltd.
121 South Wilke Road, Suite 110
Arlington Heights, IL 60005

Carle Clinic Association
602 West University Avenue
Urbana, IL 61801

Carle Foundation Hospital
611 West Park Street
Urbana, IL 61801

Catholic Health Partners
St. Anthony Hospital
19th Street and California Avenue
Chicago, IL 60623

Central DuPage Hospital
025 Winfield Road
Winfield, IL 60190

CGH Medical Center
100 East Lefevre Road
Sterling, IL 61081

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

Clybourn Clinical Laboratory Corp.
5545 North Milwaukee Avenue
Chicago, IL 60630

Columbia Michael Reese Osteo Fam Hlth Ctr
Formerly Chicago Michael Reese Osteo Fam Hlth Ctr
5200 South Ellis Avenue
Chicago, IL 60615

Columbus-Cabrini Medical Center
2520 North Lakeview Avenue
Chicago, IL 60614

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

Community Memorial Hospital
1000 West Harlem Avenue
Monmouth, IL 61462

Condell Memorial Hospital
900 Garfield Avenue
Libertyville, IL 60048

Cook County Hospital
1835 W. Harrison Street
Chicago, IL 60612

Copley Memorial Hospital
2000 Ogden Avenue
Aurora, IL 60505

Covenant Medical Center
1400 West Park
Urbana, IL 61801

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
840 West Bartlett Road
Bartlett, IL 60103

Diagnostic Health Services
800 East Locust Street
Olney, IL 62450

Diagnostic Imaging Center
9680 Golf Road
Des Plaines, IL 60016

Diagnostica, P.C.
2000 Glenwood Ave., Suite 102
Joliet, IL 60435

Doctor's Clinic
4325 Alby Street, P. O. Box 617
Alton, IL 62002

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

Doctors Hospital
5230 South Sixth Street
Springfield, IL 62794

Doctors Hospital of Hyde Park
5800 Stony Island Avenue
Chicago, IL 60637

Dreyer Medical Clinic
1221 North Highland Avenue
Aurora, IL 60506

DuPage Imaging Center
908 N. Elm Street, Suite 404
Hinsdale, IL 60521

DuPage Nuclear Medicine Clinic
710 East Ogden Avenue, #207
Naperville, IL 60563

Edgewater Medical Center
5700 North Ashland Avenue
Chicago, IL 60660

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.
900 Main Street, #400
Peoria, IL 61603

Evangelical Hospitals Corp.
Trinity Hospital
2320 East 93rd Street
Chicago, IL 60617

Evanston & Glenbrook Hospitals
2650 Ridge Avenue
Evanston, IL 60201

Fairfield Memorial Hospital
Northwest 11th Street
Fairfield, IL 62837

Family Medicine Specialist, Inc.
Formerly B.I.O.Y.A
109 West Bangs Street
Wauconda, IL 60084

Fox Valley Ear, Nose, and Throat
Associates, S.C.
1015 Summit Street
Elgin, IL 60120

Fox Valley Equine Clinic
26996 North Darrell Road
Wauconda, IL 60084

Franklin Hospital
201 Bailey Lane
Benton, IL 62812

Freeport Memorial Hospital
1045 West Stephenson Street
Freeport, IL 61032

Galesburg Cottage Hospital
695 North Kellogg Street
Galesburg, IL 61401

Genesis Clinical Laboratory
3231 South Euclid Avenue
Berwyn, IL 60402

Glass Clinical Laboratory
19150 South Kedzie, #205
Homewood, IL 60430

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

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 Hospital
550 West Webster
Chicago, IL 60614

Greenberg Radiology Institute
1535 Park Avenue West
Highland Park, IL 60035

Gynecologic Oncology, Ltd
8780 Golf Road, Suite 304
Niles, IL 60714

Harrisburg Medical Center
17 Country Club Court
Harrisburg, IL 62946

Heart Care Center
9011 South Commercial Avenue
Chicago, IL 60617

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

Hektoen Institute For Medical Research
627-637 South Wood Street
Chicago, IL 60612

Herrin Hospital
201 South 14th Street
Herrin, IL 62948

Highland Park Hospital
718 Glenview Avenue
Highland Park, IL 60035

Hillsboro Area Hospital
1200 East Tremont
Hillsboro, IL 62049

Hinsdale Hospital
120 North Oak Street
Hinsdale, IL 60521

Hoffman Estates Medical Center
Formerly Humana Hospital - Hoffman Estates
1555 North Barrington Road
Hoffman Estates, IL 60194

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

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

Illini Hospital
801 Hospital Road
Silvis, IL 61282

Illinois Masonic Medical Center
836 West Wellington Avenue
Chicago, IL 60657

Illinois Valley Community Hospital
925 West Street
Peru, IL 61354

Ingalls Memorial Hospital
1 Ingalls Drive
Harvey, IL 60426

Intercommunity Cancer Center of
Western Illinois
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 Community Hospital
400 Maple Summit Road
Jerseyville, IL 62052

Joliet Imaging Services
2435 Glenwood Avenue
Joliet, IL 60435

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

Lab Corp Of America
Lab Corp Bloomington
1703 Clearwater Avenue
Bloomington, Il 61704

Laboratory Corporation of America
321 West Lake Street
Elmhurst, IL 60126

LaGrange Memorial Hospital
5101 South Willowsprings Road
LaGrange, IL 60525

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

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

Marion Memorial Hospital
917 West Main Street
Marion, IL 62959

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

Mason District Hospital
520 E. Franklin St., Box 530
Havana, IL 62644

McDonough District Hospital
525 East Grant Street
Macomb, IL 61455

Medcentre Laboratories
555 West Court Street, Suite 300
Kankakee, IL 60901

Medical World Laboratory
7716 Madison
River Forest, IL 60305

Medway Diagnostic Labs, Inc.
3138 West Cermak Road
Chicago, IL 60623

Memorial Hospital
4500 Memorial Drive
Belleville, IL 62226

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

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

Memorial Medical Center
800 North Rutledge
Springfield, IL 62781

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

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

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

Methodist Hospital of Chicago
5025 North Paulina
Chicago, IL 60640

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

Metromed Laboratory Inc.
5330 North Elston Avenue
Chicago, IL 60630

Metropolitan Medical Laboratory
1520 7th Street
Moline, IL 61265

Michael Reese Hospital & Medical Center
2929 South Ellis Avenue
Chicago, IL 60616

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

Midwestern Regional Medical Center
Formerly American International Hospital
2520 Elisha Avenue
Zion, IL 60099

Midwestern Regional Medical Center
Shiloh & Emmaus Blvd.
Zion, IL 60099

MIE America Inc.
2340 Brickvale
Elk Grove Village, IL 60007

Misbah Uddin Ahmed
475 West Merchant, Suite 4031
Kankakee, IL 60901

Mc lar Geriatrics Corporation
50 Lakeview Parkway, Ste 111
Vernon Hills, IL 60061

Morris Hospital
150 West High Street
Morris, IL 60450

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

North Suburban Cardiology Group, Ltd.
800 Austin, Suite 3408
Evanston, IL 60202

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

Northwest Cardiovascular Assocs
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 Suburban Medical Center
140 West Higgins Road
Hoffman Estates, IL 60195

Northwestern Memorial Hospital
250 East Superior Street, Room 398
Chicago, IL 60611

Norwegian American Hospital
1044 North Francisco Avenue
Chicago, IL 60622

Nuclear Diagnostics Inc.
13158 Country Club Road
Girard, IL 62640

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

Oak Park Hospital
520 South Maple Avenue
Oak Park, IL 60304

Oncology Therapy Services
Oncology Care Center
4000 North Illinois
Belleville, IL 62226

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

Palos Community Hospital
80th and McCarthy Road
Palos Heights, IL 60463

Paris Community Hospital
East Court Street
Paris, IL 61944

Passavant Memorial Hospital
1600 West Walnut Street
Jacksonville, IL 62650

Pekin Memorial Hospital
1317 Court Street
Pekin, IL 61554

Pinckneyville Community Hospital
101 North Walnut Street
Pinckneyville, IL 62274

Prairie Cardiovascular Consultants
401 North 14th Street, Suite 2a
Springfield, IL 62702

Prairie Cardiovascular Consultants
301 North 8th Street, Suite 3-B 301
Springfield, IL 62701

Proctor Hospital
5409 North Knoxville
Peoria, IL 61614

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

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

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

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

Ravenswood Hospital Medical Center
4550 North Winchester
Chicago, IL 60640

Regional Organ Bank of Illinois
800 South Wells St., Suite 190
Chicago, IL 60607

Resurrection Medical Center
7435 West Talcott Avenue
Chicago, IL 60631

Riverside Medical Center
350 North Wall Street
Kankakee, IL 60901

Rockford Health Systems
Rockford Clinic
2300 North Rockton Avenue
Rockford, IL 61103

Rockford Health Systems
Rockford Memorial Hospital
2400 North Rockton Avenue
Rockford, IL 61103

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

Royal Crown Lab, Inc.
720 N. Dearborn, 3rd Flr
Chicago, IL 60610

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

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

S. K. Diagnostic Group, Inc.
1018 East Schaumburg Road
Streamwood, IL 60107

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

Schering-Plough Animal Health
Formerly Malinckrodt Veterinary, Inc.
909 Orchard Street
Mundelein, IL 60060

Shaukat Ali Shah, M.D.
9029 South Western Avenue
Chicago, IL 60620

Sherman Hospital
934 Center Street
Elgin, IL 60120

Silver Cross Hospital
1200 Maple Road
Joliet, IL 60432

South Shore Hospital
8015 South Crandon 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

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

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
64th Street & Dan Ryan Expr.
Chicago, IL 60621

St. Elizabeth Medical Center
2100 Madison Avenue
Granite City, IL 62040

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

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

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 Hospital
355 Ridge Avenue
Evanston, IL 60202

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

St. James Hospital
610 East Water Street
Pontiac, IL 61764

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

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

St. Joseph Hospital
2900 North Lake Shore Drive
Chicago, IL 60657

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. 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
400 North Pleasant
Centralia, IL 62801

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

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

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

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

Standard Clinical Laboratory, Inc.
1524 Bonaventure
Naperville, IL 60563

Steriods, Ltd.
Chicago Technology Park
2201 West Campbell Park Drive
Chicago, IL 60612

Suburban Hospital
55th Street & County Line Road
Hinsdale, Il 60521

Swedish American Hospital
1400 Charles Street
Rockford, IL 61104

Swedish Covenant Hospital
5145 North California Avenue
Chicago, IL 60625

The Center For Human Reproduction
750 North Orleans Street
Chicago, IL 60610

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

Tree Towns Clinical Laboratory
4154 North Lincoln
Chicago, IL 60618

Trinity Medical Center
500 John Deere Road
Moline, IL 61265

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

U.S. Clinical Lab., Inc.
621 North Lincoln Avenue
Chicago, IL 60659

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

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

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

Value Diagnostics
3235 Vollmer Road
Flossmoor, IL 60422

Vencor Hospital - North
2544 West Montrose Avenue
Chicago, IL 60618

Victory Memorial Hospital
1324 North Sheridan Road
Waukegan, IL 60085

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

Washington County Hospital
705 South Grand
Nashville, IL 62263

Welborn White County Medical Center
Formerly White County Hospital
Plum and Webb Streets
Carmi, IL 62821

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

Westlake Community Hospital
1225 Superior Street
Melrose Park, IL 60160

Wood River Township Hospital
Edwardsville Road
Wood River, IL 62095

REACTOR

Commonwealth Edison Company
Braidwood Nuclear Power Station
RR#1, Box 84
Braceville, IL 60407

Commonwealth Edison Company
Byron Station
4450 N. Germanchurch Road
Byron, IL 61010

Commonwealth Edison Company
Dresden Nuclear Power Facility
6500 N. Dresden Road
Morris, IL 60450

Commonwealth Edison Company
LaSalle County Nuclear Station
2601 N. 21st Road
Marseilles, IL 61341

Commonwealth Edison Company
Quad-Cities Station
22710 206th Avenue N.
Cordova, IL 61242

Commonwealth Edison Company
Zion Nuclear Generating Station
101 Shiloh Blvd.
Zion, IL 60099

Illinois Power Company
Clinton Power Station
P. O. Box 678
Clinton, IL 61727

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

APPENDIX C
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) (ft^3)	Quad Cities (BWR) (ft^3)	Zion (PWR) (ft^3)	LaSalle (BWR) (ft^3)	Byron (PWR) (ft^3)	Braidwood (PWR) (ft^3)	Clinton (BWR) (ft^3)	Total (ft^3)
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

Source: DePaoli, S.M., and A.H. Kibbey. A *Compilation of the Electricity Generated and Low-Level Radioactive Wastes Shipped for Disposal by U.S. Nuclear Power Plants, 1959-1985*. Oak Ridge, Tennessee: Oak Ridge National Laboratory. 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

Source: DePaoli, S.M., and A.H. Kibbey. A *Compilation of the Electricity Generated and Low-Level Radioactive Wastes Shipped for Disposal by U.S. Nuclear Power Plants, 1959-1985*. Oak Ridge, Tennessee: Oak Ridge National Laboratory. 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

Source: DePaoli, S.M., and A.H. Kibbey. A *Compilation of the Electricity Generated and Low-Level Radioactive Wastes Shipped for Disposal by U.S. Nuclear Power Plants, 1959-1985*. Oak Ridge, Tennessee: Oak Ridge National Laboratory. 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	87.0	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

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