**Utah State Briefing Book
for
Low-Level Radioactive
Waste Management**

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

The following pages are an exact
representation of what is in the original
document folder.

NOTICE
PORTIONS OF THIS REPORT ARE ILLEGIBLE.
It has been reproduced from the best available
copy to permit the broadest possible availability.

UTAH STATE BRIEFING BOOK FOR
LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

Prepared for
EG&G Idaho, Inc.

DOE/ID/01570--T24

DE82 015250

DISCLAIMER

This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Prepared by
Stafoo
P. O. Box 2249
Idaho Falls, Idaho 83401
Under Subcontract No. K-1812

October 1981

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the Department of Energy, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed or represents that its use would not infringe privately owned rights.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED
MGEW

CONTENTS

1.	INTRODUCTION	1-1
1.1	History and Background of Low-Level Radioactive Waste Disposal	1-1
1.1.1	Government Low-Level Radioactive Waste Disposal	1-3
1.1.2	Commercial Low-Level Radioactive Waste Disposal	1-3
1.2	Regulatory Authority of Federal Agencies	1-4
1.3	References	1-6
2.	GEOGRAPHY	2-1
2.1	Physiography	2-1
2.2	Drainage Patterns	2-1
2.3	Climate	2-4
3.	DEMOGRAPHY	3-1
3.1	Population	3-1
3.2	Universities and Hospitals	3-11
3.3	References	3-19
4.	ECONOMY	4-1
4.1	Economic Indicators	4-1
4.2	Nonagricultural Industries	4-1
4.3	Agriculture	4-9
4.4	Per Capita Income	4-9
4.5	Energy Consumption	4-10
4.6	Electrical Generation by Nuclear Power	4-10
4.7	References	4-15

5.	GOVERNMENT AND PUBLIC ATTITUDES	5-1
5.1	State Government	5-1
5.2	Statutes and Regulations	5-4
5.3	Congressional Representatives	5-5
5.4	Interested Parties	5-10
5.5	Media	5-12
6.	SURVEY RESULTS	6-1
6.1	Summary of Results	6-1
6.2	Medical Licensees	6-5
6.2.1	Licensed Activities	6-5
6.2.2	Generation and Characteristics of Waste	6-10
6.2.3	Waste-Disposal Methods	6-10
6.2.4	Waste-Processing Methods	6-10
6.2.5	Radionuclides and Total Activity Levels of the Waste Shipped	6-10
6.2.6	Shipping Containers	6-14
6.2.7	Commercial Disposal Sites and Disposal Services Used	6-14
6.2.8	Expected Trends in Future Shipment	6-14
6.3	Academic Licensees	6-14
6.3.1	Licensed Activities	6-14
6.3.2	Generation and Characteristics of Waste	6-14
6.3.3	Waste-Disposal Methods	6-19
6.3.4	Waste-Processing Methods	6-19
6.3.5	Radionuclides and Total Activity Levels of the Waste Shipped	6-19
6.3.6	Shipping Containers	6-19
6.3.7	Commercial Disposal Sites and Disposal Services Used	6-19
6.3.8	Expected Trends in Future Waste Shipment	6-22
6.4	Industrial Licensees	6-22
6.4.1	Licensed Activities	6-22
6.4.2	Generation and Characteristics of Waste	6-22
6.4.3	Waste-Disposal Methods	6-22

6.4.4	Waste-Processing Methods	6-25
6.4.5	Radionuclides and Total Activity Levels of the Waste Shipped	6-25
6.4.6	Shipping Containers	6-25
6.4.7	Commercial Disposal Sites and Disposal Services Used	6-25
6.4.8	Expected Trends in Future Waste Shipment	6-25
6.5	Governmental Licensees	6-25
6.5.1	Licensed Activities	6-26
6.5.2	Generation and Characteristics of Waste	6-26
6.5.3	Waste-Disposal Methods	6-26
6.5.4	Waste-Processing Methods	6-26
6.5.5	Radionuclides and Total Activity Levels of the Waste Shipped	6-27
6.5.6	Shipping Containers	6-27
6.5.7	Commercial Disposal Sites and Disposal Services Used	6-27
6.5.8	Expected Trends in Future Waste Shipment	6-27

APPENDICES

APPENDIX A--Licensees	A-1
APPENDIX B--Survey Methodology	B-1
APPENDIX C--State Rules and Regulations for Radioactive Waste Management in Utah	C-1
APPENDIX D--Media	D-1

FIGURES

2-1	Utah State and County Boundaries	2-2
2-2	Utah Physiographic Regions	2-3
3-1	Utah's Two SMSAs	3-4
3-2	Locations of Utah's General and Specialized Hospitals	3-28
4-1	Utah's Energy Supply and Use	4-12
4-2	Utah's Total Energy Consumption and Projection	4-13
5-1	Utah's Congressional District Boundaries	5-9

TABLES

3-1	Utah Population, by County	3-2
3-2	Population Density by County, 1970 to 1980	3-5
3-3	Components of Population Change, 1970 to 1980	3-7
3-4	Population of Utah Counties, by Age Group (1970 Census)	3-8
3-5	Percentage of Utah and United States Population, by Age Groups (1970, 1978)	3-9
3-6	Population Projections for Utah Through the Year 2000	3-10
3-7	Population Impacts of Energy Development in Eastern Utah	3-12
3-8	Enrollments and Graduates of Utah Institutions of Higher Education, 1978 to 1979	3-13
3-9	Hospital Discharges, Patient Days, Average Length of Stay, and Percent of Occupancy, 1979	3-15
4-1	Growth Index of Population	4-2
4-2	Growth Index of Nonfarm Wage and Salary Employment	4-2
4-3	Growth Index of Personal Income	4-2
4-4	Recorded and Projected Growth of Nonfarm Income	4-3
4-5	Percentage Distribution of Nonagricultural Employment	4-5
4-6	Nonagricultural Payroll Employment in Utah by District, County, and Major Industry, 1979	4-6
4-7	Nonagricultural Payroll Wages in Utah by District, County and Major Industry, 1979	4-7
4-8	Realized Gross and Net Income From Farming, 1950 to 1977	4-8
4-9	Per Capita Personal Income for Utah, Western States, and the United States, 1970 and 1979	4-11
4-10	Percentage Distribution by Source of Income in Utah and the United States	4-11
5-1	Elected Officials	5-1
5-2	Agency Heads, Utah Department of Health	5-3
5-3	Goals of the Nuclear Waste Repository Task Force	5-6

5-4	Nuclear Waste Repository Task Force Members	5-7
5-5	Utah's Senators and Representatives	5-8
6-1	Summary of Licensees	6-2
6-2	Summary of Low-Level Radioactive Waste Volume Shipped for Disposal	6-3
6-3	Summary of Activity Levels of Low-Level Radioactive Waste Shipped for Disposal	6-4
6-4	Summary of Disposal Costs for Low-Level Radioactive Waste Shipped Offsite	6-6
6-5	Summary of Disposal Methods	6-7
6-6	Summary of Waste Processing Before Shipping For Disposal	6-8
6-7	Licensed Activities	6-9
6-8	Generation of Low-Level Radioactive Waste	6-11
6-9	Type and Percentage of Low-Level Radioactive Waste	6-12
6-10	Low-Level Radioactive Waste Disposal Methods	6-13
6-11	Licensed Activities	6-15
6-12	Generation of Low-Level Radioactive Waste	6-16
6-13	Type and Percentage of Low-Level Radioactive Waste	6-17
6-14	Chemical Form of Low-Level Radioactive Waste	6-18
6-15	Low-Level Radioactive Waste Disposal Methods	6-20
6-16	Radionuclides and Activity of Waste Shipped for Disposal	6-21
6-17	Licensed Activities	6-23
6-18	Generation of Low-Level Radioactive Waste	6-24

1. INTRODUCTION

The U.S. Department of Energy (DOE) is the lead federal agency for commercial low-level radioactive waste management. Several national groups and organizations, including the State Planning Council, the National Governors' Association, and the National Conference of State Legislatures, have endorsed a position of state responsibility for commercial low-level radioactive waste management. The concept that individual states be allowed to enter into regional compacts to meet their responsibilities for disposal of low-level radioactive waste has also been strongly endorsed. This policy of state responsibility for commercial low-level radioactive waste disposal is now formalized in Federal law through the passage of the "Low-Level Radioactive Waste Policy Act," P.L. 96-573.

The Utah State Briefing Book has been prepared to assist DOE in its efforts to help states institute a workable waste-management system. This briefing book gives relevant background information on the state's geography, demography, economy, government structure and regulations, public attitudes, and media coverage of radiation issues. In addition, information is presented on low-level radioactive waste generation and disposal practices in Utah, the volume and nature of waste generated, and the institutions and industries using radioactive materials. This book is one of a series produced by the Department of Energy's Low-Level Radioactive Waste Management Program.

1.1 History and Background of Low-Level Radioactive Waste Management

Low-Level radioactive waste includes all waste that is not otherwise legally defined, and would therefore exclude high-level radioactive waste, spent reactor fuel, uranium mill tailings, and transuranic wastes containing more than 10 nanocuries of activity per gram. The Nuclear Regulatory Commission has issued a proposed regulation, 10 CFR Part 61, that defines low-level radioactive waste as that waste suitable for disposal in near-surface facilities.

The sources of low-level radioactive waste are divided into five categories: medical institutions, academic institutions, industrial facilities, governmental activities, and commercial power reactors. All these sources produce radioactive waste consisting of used glassware, protective clothing, rags, tools, paper, and plastics.

Institutional wastes, which come from educational and medical research, medical diagnosis, and radiological therapy, also include organic wastes such as contaminated chemicals and animal carcasses. Industrial wastes are derived from the manufacture of pharmaceuticals, smoke detectors, luminous dials, emergency exit signs, measuring and testing devices, and other similar activities. The types of waste produced vary for each manufacturing process but include residual raw material, sludge, contaminated equipment, and various chemicals and cleaning agents. Commercial power reactors generate low-level radioactive wastes from everyday operation and maintenance activities at the facility. These wastes include materials such as filter sludges, resins, solidified water solutions, and filter bottoms. Defense and research activities of the federal government also generate low-level radioactive waste, which vary in form and characteristics but are similar to the wastes produced by the other sources.

Presently, the Department of Energy manages the waste generated by its facilities and disposes of this waste by shallow land burial at DOE disposal sites. All other generators, including other government agencies, dispose of their waste by shallow land burial at commercial disposal facilities. These commercial facilities are licensed by the Nuclear Regulatory Commission or by an agreement state.

As of January 1981, approximately 2.7 million cubic meters^{1,2,3} of low-level radioactive waste have been disposed of in shallow land disposal facilities, operated by commercial companies and the DOE.

1.1.1 Government Low-Level Radioactive Waste Disposal

The federal government has been generating low-level radioactive waste in defense and research programs since the nuclear weapons program started in World War II. About 50,000 cubic meters of this waste is disposed of annually at Department of Energy facilities.¹ In 1980, DOE generated approximately 57,000 cubic meters of low-level radioactive waste.²

Until October 1979, when a serious shortage of commercial disposal capacity had developed, Department of Energy facilities without onsite disposal capability used commercial sites for low-level radioactive waste disposal. Since then, all of the DOE's low-level radioactive waste has been disposed of at one of its sites. Other government (non-DOE) facilities still send low-level radioactive waste to commercial disposal sites.

1.1.2 Commercial Low-Level Radioactive Waste Disposal

Six commercial facilities have been established for the disposal of low-level radioactive waste. The first opened at Beatty, Nevada, in 1962. During the next ten years, five more facilities were opened in Kentucky, New York, Washington, Illinois, and South Carolina. Three of these six sites are still operating while three have been closed for various reasons. Disposal operations at Sheffield, Illinois, were suspended when the licensed capacity was reached. Disposal operations at West Valley, New York, and Maxey Flats, Kentucky, were suspended because of operating problems. As of January 1, 1981, approximately 776,000 cubic meters of waste had been disposed of at the six commercial sites.³

The facilities at Beatty, Nevada; Richland, Washington; and Barnwell, South Carolina, are still operating.

In 1979, the Richland and Beatty sites were temporarily closed by the governors of Washington and Nevada, respectively, to protest infractions of packaging and transportation regulations in some shipments. The sites were

reopened after corrective action was taken. South Carolina has imposed a decreasing annual limit on the amount of out-of-state waste to be accepted at the Barnwell facility.

In 1979, approximately 80,000 cubic meters⁴ of radioactive low-level wastes was disposed at the three operating sites; in 1980, total waste disposed at these three commercial sites increased to over 106,000 cubic meters.³ Of the 1979 waste disposed of at commercial facilities, approximately 50 percent was generated from commercial power reactor operations, 19 percent from institutional activities, 22 percent from industrial operations, and 9 percent non-DOE from government activities.⁴

All three states with operating sites have urged that additional regional disposal sites be developed. The Low-Level Radioactive Waste Policy Act of 1980 makes the states responsible for providing disposal capacity for nondefense low-level wastes generated within their boundaries. It also provides a framework for establishing regional disposal sites.

1.2 Regulatory Authority of Federal Agencies

The Department of Energy is the lead federal agency to assist states in the development of a commercial low-level radioactive-waste management system. However, the Department has no regulatory responsibility in the commercial sector. The Nuclear Regulatory Commission, Environmental Protection Agency, Department of Transportation, and Agreement States have the regulatory responsibility for management of commercial low-level radioactive waste.

The Nuclear Regulatory Commission has overall regulatory responsibility for all types of radioactive waste as defined in Title 10 of the Code of Federal Regulations, Part 50. The Commission is responsible for establishing performance and licensing criteria for facilities that generate and dispose of commercial low-level radioactive waste. The Commission is developing procedures for licensing disposal facilities in 10 CFR Part 61, which has recently been issued as a proposed regulation.

While the licensing and regulation of low-level radioactive waste generators and disposal sites are responsibilities of the Nuclear Regulatory Commission, states may enter into agreements with the commission. Under such an agreement the NRC confers upon the state responsibility and authority to license and regulate by-product, source, and special nuclear materials (as defined in the Atomic Energy Act of 1954 as amended) in quantities not insufficient to form a critical mass.

The Environmental Protection Agency is responsible for the preservation and enhancement of the environment, and issues regulations for that purpose. This agency is responsible for developing the basic criteria and standards for the management of low-level radioactive waste. All Federal and state agencies must use these criteria and standards as the basis for regulating and rulemaking.

The Department of Transportation develops vehicle and package requirements for the transportation of hazardous wastes, including radioactive waste. However, regulations for the transport of radioactive waste are set and enforced by the Nuclear Regulatory Commission. Through a memorandum of understanding, these two agencies have delineated their responsibilities in the area of transportation safety.

1.3 References

1. U.S. Department of Energy, Oak Ridge Operations Office, Spent Fuel and Waste Inventories and Projections, ORO-778, Oak Ridge, Tennessee, August 1980.
2. Department of Energy, Idaho Operations Office, Solid Waste Information Management System Data Summary Fiscal Year 1980, IDO-10086(80), May 1981.
3. Information provided to the Low-Level Radioactive Waste Management Program from Chem-Nuclear Systems and U.S. Ecology, 1981.
4. NUS Corporation, 1979 State-by-State Assessment of Low-Level Radioactive Wastes Shipping to Commercial Burial Grounds, LLWMP-2, 1979.

2. GEOGRAPHY

Utah is located in the mountain census region of the western U.S. It is bordered on the north by Idaho and Wyoming, on the east by Colorado, on the southwest by Arizona, and on the west by Nevada. The state's area totals 84,916 square miles, making it the eleventh largest state in the U.S. Figure 2-1 is a Utah state map showing state and county boundaries.

2.1 Physiography

Portions of three physiographic provinces extend into Utah. The western border region of the state lies in the Basin and Range Province, an arid region characterized by alternating fault-block mountains and undrained basins. The eastern and southcentral portions of the state lie in the Colorado Plateau Province, a semiarid region of high tableland cut by many canyons. The state's third physiographic subdivision is the Rocky Mountain Province, represented by the Wasatch and Uinta ranges of northeast Utah. The physiographic regions are shown in Figure 2-2.

Elevations in the state range from less than 2500 feet in southwestern Washington county to nearly 13,500 feet in the Uinta range. The general elevation of the state's plateaus is 4000 to 6000 feet. About 90% of Utah's population lives at elevations between 4250 and 4650 feet.

2.2 Drainage Patterns

Practically all of eastern Utah is drained by the Colorado River and its principal tributary within the state, the Green River, although neither river begins within the state. Western Utah is almost entirely within the Great Basin, which has no drainage outlet. The major rivers in this area are the Bear, Weber, and Jordan, which empty into the Great Salt Lake, and the Provo and Sevier. The Sevier River drains the westcentral part of the state and empties into Sevier Lake, a brackish saline basin in southwest Utah.

Figure 2-1. Utah state and county boundaries.

INEL-A-19 936

Figure 2-2. Utah physiographic regions.

The Great Salt Lake, at an elevation of 4200 feet in northwestern Utah, lies in the Great Basin, which is the largest closed basin in North America. It stretches east to west between the Wasatch Range in Utah and the Sierra Nevada range and north to south from the Great Salt Lake to Death Valley, California. In glacial times the Great Salt Lake was a freshwater lake 346 miles long and 145 miles wide, but it has gradually shrunk to its present size. Since the lake has no outlet, the salt content is high, averaging about 25 percent.

Major freshwater lakes in Utah are Bear Lake, Utah Lake, Panguitch Lake, and Fish Lake. The total lake surface area in the state, including Great Salt Lake, is 2570 square miles, or 3 percent of the state's area.

2.3 Climate

Utah has a semiarid continental climate, with four well-defined seasons. Local climates vary by latitude, elevation, proximity to dominant storm paths, and distance from the Pacific Ocean and the Gulf of Mexico.

Annual precipitation varies greatly, from an average of less than 5 inches over the Great Salt Lake Desert in western Utah to more than 40 inches in some parts of the Wasatch Mountains in northeastern Utah. The average annual precipitation in the leading agricultural areas is between 10 and 15 inches. Areas below 4000 feet in southern Utah generally receive less than 10 inches of moisture per year.

Northern Utah, receives more precipitation in the mountains, primarily due to the direction of storm tracks (northwest to southeast). In summer western Utah is dry, while the eastern portion receives appreciable rain from thunderstorms associated with air masses from the Gulf of Mexico. Snowfall amounts range from under 2.5 inches in southwestern Utah, about 60 inches in Salt Lake City, and up to over 400 inches in the Wasatch Range.

Temperatures above 100°F occur occasionally in summer in all parts of the state. Maximum temperatures can exceed 110°F. Temperatures below zero during winter occur in most parts of the state, but prolonged periods of extremely cold weather are rare. The lowest temperature of record is -50°F. Utah experiences strong insolation during the day and, because of low relative humidity, rapid cooling at night. Because of these conditions, the daily temperature range exceeds 30°F in summer and about 15°F in winter.

Winds are usually light to moderate, ranging below 20 miles per hour. Tornadoes are rare. Local winds of damaging velocities sometimes occur at canyon mouths along the western slopes of the Wasatch Mountains.

3. DEMOGRAPHY

This section identifies those demographic factors and trends that affect or can be related to the quantity and nature of low-level radioactive wastes within the State of Utah to assist with an assessment of the state as a potential producer of radioactive wastes. This section also identifies those institutions including colleges, universities, and hospitals that are potential major users of radionuclides that may ultimately become radioactive wastes.

3.1 Population

Population trends offer a broad-gauge measure of isotope utilization in medicine, educational and research activities, and industry. A trend revealing an increase in a state's population may imply increasing isotope use and, in turn, waste generation.

Utah's population has been increasing rapidly. The state was the fifth fastest growing in the nation during the past decade. The population count as of April 1, 1980, was 1,461,037. This figure represents an increase of 401,764 over that recorded in the 1970 U.S. census. The state's population grew 37.9% compared to a national growth rate of 11% for the same ten years.

Table 3-1 presents county population data for Utah's 29 counties based on 1970 and 1980 census counts. During the past decade, the largest percentage of population change occurred in the rural counties: Emery County had a 123% increase, Washington, 91%; Summit, 74%; Duchesne, 72%; Kane, 66%; and Uintah, 62%. Energy development, coal mining, and electrical power generation stimulated growth in Emery County, and oil and gas exploration contributed to growth in Uintah and Duchesne counties. Growth in Summit, Kane, and Washington counties is attributed to tourism and recreational development.²

TABLE 3-1. UTAH POPULATION, BY COUNTY

<u>County</u>	<u>1980</u>	<u>1970</u>	<u>% Change</u>	<u>% Total Growth</u>
Beaver	3,800	4,378	15.2	0.14
Box Elder	28,129	33,222	18.1	1.27
Cache	42,331	57,176	35.1	3.69
Carbon	15,647	22,179	41.7	1.63
Daggett	666	769	15.5	0.03
Davis	99,028	146,520	48.0	11.83
Duchesne	7,299	12,565	72.1	1.31
Emery	5,137	11,451	122.9	1.57
Garfield	3,157	3,673	16.3	0.13
Grand	6,688	8,241	23.2	0.39
Iron	12,177	17,349	42.5	1.29
Juab	4,574	5,530	20.9	0.24
Kane	2,421	4,024	66.2	0.40
Millard	6,988	8,970	28.4	0.49
Morgan	3,983	4,917	23.4	0.23
Piute	1,164	1,329	14.2	0.04
Rich	1,615	2,100	30.0	0.12
Salt Lake	458,607	619,066	35.0	39.94
San Juan	9,607	12,253	27.6	0.66
Sanpete	10,976	14,620	33.2	0.91
Sevier	10,103	14,727	45.8	1.15
Summit	5,879	10,198	73.5	1.08
Tooele	21,545	26,033	20.8	1.12
Uintah	12,684	20,506	61.7	1.95
Utah	137,776	218,106	58.3	19.99
Wasatch	5,863	8,523	45.4	0.66
Washington	13,669	26,065	90.7	3.09
Wayne	1,483	1,911	28.9	0.11
Weber	126,278	144,616	14.5	4.56
	1,461,037	1,059,273		

Source: 1980 census of population and housing, PHC80-V-46.

Over three-fourths of the state's population is concentrated in two Standard Metropolitan Statistical Areas (SMSA): Salt Lake-Ogden and Provo-Orem (Figure 3-1). In the Salt Lake-Ogden SMSA are Davis, Salt Lake, Toole, and Weber counties, which make up 64% of the total population and represent 57.45% of the total population growth. Only one county (Utah) is in the Provo-Orem SMSA, representing 14.93% of the state's population and 19.9% of the population growth.¹ The average population density of these five counties is 346.7 people per square mile. The remaining 24 counties have an average density of 4.3 people per square mile. Table 3-2 compares the 1970 and 1980 state population densities by county. As shown, the state average density of 17.7 people per square mile is considerably lower than the national average of 64.0. Although Utah has a low population density, it is relatively more urbanized than the nation as a whole. In 1970, Utah was ranked eleventh in the nation in the percentage of people living in urban areas.³

Much of Utah's population growth is attributed to the state's birth rate, which is the highest in the nation (29.9 per 1000 population in 1977, almost twice the national average of 15.5). In the past decade, there were 326,897 births and 75,214 deaths; the net natural increase was 251,683 or 63% of the total change in population. The remaining 37% growth rate (150,081 people) was the result of immigration (see Table 3-3). Although the state has been increasing rapidly, Utah ranked 36th in the nation in total population.

Utah has a young population. In 1970, the median age was 22.1 years. Table 3-4 gives the population of Utah counties by age group. Table 3-5 compares the distribution of age groups of Utah with that of the United States.

Projections of the state's population growth through the year 2000 are presented in Table 3-6, based on a U.S. Bureau of the Census study.⁴ Data used for the projections were altered to reflect actual statistics through 1979. These projections are conservative assuming that (a) the

Figure 3-1. Utah's two SMSAs.

TABLE 3-2. POPULATION DENSITY BY COUNTY, 1970 TO 1980

	Land Area (square miles)	1970 Population per Square Mile	1980 Population per Square Mile	1970 to 1980 Percent Change
Bear River MCD ^a	7,792	9.2	11.9	28.3
Box Elder	5,595	4.0	5.9	18.1
Cache	1,175	36.0	48.7	35.1
Rich	1,022	1.6	2.1	31.0
Wasatch Front MCD	9,102	77.9	103.4	32.7
Davis	268	369.5	546.8	45.0
Morgan	610	6.5	8.1	23.4
Salt Lake	764	600.3	810.3	34.9
Tooele	6,911	3.1	3.8	20.8
Weber	549	230.0	263.4	14.5
Mountain Lands MCD	5,049	29.6	46.9	58.4
Summit	1,857	3.2	5.5	73.5
Utah	1,998	69.0	109.2	58.3
Wasatch	1,194	4.9	7.1	45.4
Six County MCD	16,831	2.1	2.8	33.8
Juab	3,412	1.3	1.6	20.9
Millard	6,648	1.1	1.3	28.4
Piute	753	1.5	1.8	14.2
San Pete	1,597	6.9	9.2	45.1
Sevier	1,932	5.2	7.6	45.8
Wayne	2,489	0.6	0.8	28.8
Five County MCD	17,634	2.0	3.1	57.5
Beaver	2,587	1.5	1.7	16.3
Garfield	5,217	0.6	0.7	16.3
Iron	3,300	3.7	5.3	42.5
Kane	4,105	0.6	1.0	66.2
Washington	2,425	5.6	10.7	90.7
Uintah Basin MCD	8,444	2.4	4.0	63.9
Daggett	708	0.9	1.1	15.5
Duchesne	3,260	2.2	3.9	72.1
Uintah	4,476	2.8	4.6	61.7

TABLE 3-2. (continued)

	Land Area (square miles)	1970 Population per Square Mile	1980 Population per Square Mile	1979 to 1980 Percent Change
Southeast MCD	17,488	2.1	3.1	46.0
Carbon	1,470	10.6	15.1	40.7
Emery	4,442	1.2	2.6	122.9
Grand	3,692	1.8	2.2	23.2
San Juan	7,884	1.2	1.6	27.6
State Total	82,340	12.9	17.7	37.9
United States	3,540,000	58.0	64.0	10.0

a. MCD = Multicounty District.

Source: U.S. Bureau of the Census.

TABLE 3-3. COMPONENTS OF POPULATION CHANGE, 1970 TO 1980

<u>Year</u>	<u>Births^a</u>	<u>Deaths^a</u>	<u>Net Natural Increase</u>
1970 (Apr-Dec) ^b	20,570	5,302	15,268
1971	27,552	7,245	20,307
1972	26,911	7,323	19,588
1973	27,978	7,573	20,405
1974	29,946	7,380	22,566
1975	30,667	7,519	23,148
1976	35,310	7,472	27,838
1977	37,956	7,612	30,344
1978	38,811	7,871	30,940
1979	41,078	7,871	33,207
1980 (Jan-Mar) ^b	10,118	2,046	8,072
Total	326,897	75,214	251,683
	<u>1970 to 1980 Actual Change</u>	<u>1970 to 1980 % of Actual Change</u>	
Births	326,879 ^a	--	
Deaths	75,214 ^a	--	
Net natural increase	251,683	62.7	
Migration	150,081	37.2	
Total Change	401,764 ^c	100.0	

Sources:

- a. Utah State Department of Health, Bureau of Health Statistics.
- b. Provisional.
- c. U.S. Bureau of the Census.

TABLE 3-4. POPULATION OF UTAH COUNTIES, BY AGE GROUP (1970 CENSUS)

County	0-4	5-14	15-19	20-24	25-34	35-44	45-64	65 and Over	Total
Beaver	319	820	400	196	351	380	894	440	3,800
Box Elder	3,038	7,201	2,931	1,671	3,247	3,137	4,802	2,102	28,129
Cache	4,181	8,486	5,310	6,094	5,068	3,435	6,092	3,665	42,331
Carbon	1,167	3,151	1,784	920	1,310	1,540	4,068	1,707	15,647
Daggett	92	161	43	35	104	84	101	40	666
Davis	11,624	27,092	11,698	6,844	12,918	11,813	13,590	3,449	99,028
Duchesne	777	1,851	745	406	799	710	1,430	581	7,299
Emery	454	1,233	491	231	535	536	1,080	577	5,137
Garfield	258	780	355	139	304	327	685	309	3,157
Grand	704	1,790	649	381	883	870	1,114	297	6,688
Iron	1,273	2,441	1,661	1,433	1,274	1,172	1,994	929	12,177
Juab	468	949	475	278	469	417	961	557	4,574
Kane	244	569	233	98	263	235	538	241	2,421
Millard	647	1,605	773	272	619	688	1,507	877	6,988
Morgan	440	1,038	451	205	464	473	660	252	3,983
Piute	115	240	108	43	125	87	297	149	1,164
Rich	163	384	162	72	187	145	347	155	1,615
Salt Lake	48,727	103,134	46,081	39,751	60,604	47,402	77,901	35,007	485,607
San Juan	1,334	2,810	1,021	615	1,183	907	1,299	437	9,606
Sanpete	910	2,190	1,368	701	884	894	2,416	1,613	10,976
Sevier	863	2,218	1,064	443	935	1,049	2,248	1,283	10,103
Summit	606	1,439	573	327	693	607	1,127	507	5,879
Tooele	2,320	5,328	2,090	1,594	2,725	2,434	3,909	1,145	21,545
Uintah	1,378	3,314	1,318	695	1,513	1,436	2,153	877	12,684
Utah	15,067	27,780	18,245	21,620	16,187	11,676	19,038	8,163	137,776
Wasatch	589	1,428	625	308	630	621	1,141	521	5,863
Washington	1,388	3,054	1,848	967	1,240	1,192	2,297	1,683	13,669
Wayne	102	332	167	58	116	149	378	181	1,483
Weber	12,550	27,927	13,938	11,462	14,331	13,132	23,121	9,817	126,278
State of Utah	111,798	240,751	116,607	97,359	129,961	107,548	117,188	77,561	1,059,273

Source: U.S. Bureau of the Census, Census of Population: 1970, Utah: General Population Characteristics (Washington, D.C.: U.S. Government Printing Office, 1971).

TABLE 3-5. PERCENTAGE OF UTAH AND UNITED STATES POPULATION BY AGE GROUPS^a
(1970, 1978)

Age	1970		1978	
	Utah	United States	Utah	United States
Under 5 years	10.6	8.4	12.3	7.0
5 to 17 years	29.5	25.8	24.7	22.0
18 to 44 years	35.9	35.3	39.5	39.9
45 to 64 years	16.7	20.6	15.7	20.1
65 years and over	7.3	9.8	7.8	11.0

a. Figures may not total 100 percent due to rounding.

Source: U.S. Bureau of the Census, Population Estimates and Projections, Series P-25, No. 794 (Washington, D.C.: Government Printing Office, 1979).

TABLE 3-6. POPULATION PROJECTIONS FOR UTAH THROUGH THE YEAR 2000

<u>Year</u>	<u>Projected Population</u>	<u>Year</u>	<u>Projected Population</u>
1980	1,407,000	1990	1,857,000
1981	1,451,000	1991	1,903,000
1982	1,495,000	1992	1,949,000
		1993	1,996,000
1983	1,540,000	1994	2,043,000
1984	1,585,000	1995	2,090,000
1985	1,630,000	1996	2,137,000
1986	1,675,000	1997	2,184,000
1987	1,720,000	1998	2,231,000
1988	1,765,000	1999	2,279,000
1989	1,811,000	2000	2,327,000

current survival rates remain constant, (b) fertility rates follow a national pattern of decline, (c) migration rates reflect those of the 1970s, and (d) employment growth averages an annual 4.4% rate increase through the mid-1980s.

Some potential developments, such as synthetic fuels and energy projects, could alter these projections significantly. Possible population impacts of the energy development projects are shown in Table 3-7.²

Synthetic fuels development would affect the population of northeastern Utah (Daggett, Duchesne, and Uintah counties). This area contains an estimated 50 billion barrels of recoverable oil from shale and 25 billion barrels of recoverable oil from tar sands, an amount nearly three times the proven U.S. petroleum reserves and more than a 10-year U.S. oil supply at current energy consumption rates. Major oil shale development could result in a doubling of the population of these three counties by 1990.

3.2 Universities and Hospitals

Several institutions in Utah are potential sources of radioactive waste resulting from the use of radionuclides. Utah has eleven universities and colleges with a total enrollment of approximately 85,000 in 1979, representing 6.2% of Utah's population. Table 3-8 provides a listing of these institutions, with the city in which each is located and the enrollment figures for the 1978-1979 academic year.

Hospitals are also potential producers of radioactive waste. Utah has 38 short-stay general hospitals and seven federal or specialized hospitals. The 38 general hospitals range in size from 14 to 570 beds with an average of 123 beds, considerably less than the national average of 153. According to American Hospital Association statistics,⁴ the

TABLE 3-7. POPULATION IMPACTS OF ENERGY DEVELOPMENT IN EASTERN UTAH^a

	<u>1983</u>	<u>1985</u>	<u>1989</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
<u>Uintah Basin MCD</u>						
Medium development scenario	7,000	11,700	28,300	26,800	21,400	23,400
High development scenario	7,000	11,700	40,500	37,200	30,000	33,300
<u>Southeast MCD</u>						
High development scenario	1,500	2,400	13,400	11,700	12,900	12,900
<u>Total Energy Impacts</u>						
Medium development scenario	7,000	11,700	28,300	26,800	21,400	23,400
High development scenario	8,500	14,100	53,900	48,900	42,900	46,200

a. The impact refers only to the population change attributable to energy development.

TABLE 3-8. ENROLLMENTS AND GRADUATES OF UTAH INSTITUTIONS OF HIGHER EDUCATION, 1978 TO 1979

<u>Institution</u>	<u>Enrollment</u>	<u>Graduates</u>
Public Universities and Colleges		
University of Utah, Salt Lake City	21,045	3,660
Utah State University, Logan	9,228	1,819
Weber State College, Ogden (four-year college)	8,920	1,202
Southern Utah State College, Cedar City (four-year college)	1,798	243
Dixie College, St. George (two-year college)	1,474	337
Snow College, Ephraim (two-year college)	983	303
College of Eastern Utah, Price (two-year college)	969	141
Public Technical Colleges		
Utah Technical College, Salt Lake City	6,487	921
Utah Technical College, Provo	3,990	569
Private Colleges and Universities		
Brigham Young University, Provo	27,390	5,215
Westminster College, Salt Lake City (four-year college)	1,432	220

percentage of Utah's hospitals in the 6-49 bed size category is considerably higher than the U.S. average. This figure perhaps reflects the rural location of these hospitals (Table 3-9) and the extremely low population density of Utah's rural areas.

In 1978, 7% or approximately 11,000 of the admissions to Utah's hospitals came from out of state while 1000 to 2000 (less than 1%) Utah residents sought other states for their care.³ According to 1979 statistics, Utah's hospital utilization rates are lower than other states, as tabulated below.

	<u>Admission Rates Per 1000 Population</u>	<u>Occupancy Rates, %</u>	<u>Average Stay</u>	<u>Inpatient Day Rate, 1000 Population</u>	<u>Beds per 1000 Population</u>
Utah	143	68.1	5.3	749	2.93
U.S.	160	73.9	7.6	1205	4.47

Figure 3-2 shows the location of Utah's general and specialized hospitals. Seventeen of the 45 hospitals are in Utah's two SMSAs and account for over three-fourths of the licensed beds, admissions, and patient days. All but six counties (Daggett, Emery, Morgan, Piute, Rich, and Wayne) have at least one hospital. These six counties have low population densities or are close to hospitals in adjacent counties.

TABLE 3-9. HOSPITAL DISCHARGES, PATIENT DAYS, AVERAGE LENGTH OF STAY, AND PERCENT OF OCCUPANCY, 1979

<u>Hospital</u>	<u>Discharges</u>	<u>Patient Days</u>	<u>Average Length of Stay</u>	<u>Average Beds for the Year^a</u>	<u>Percent Occupancy</u>
<u>District I</u>					
Bear River Valley	790	2,819	3.57	20	38.6
Logan	10,490	36,606	3.49	126	79.6
Brigham City	2,821	9,122	3.23	50	50.0
Total	14,101	48,547	3.44	196	67.9
<u>District II-A</u>					
McKay-Dee	16,964	88,713	5.23	360	67.5
St. Benedict's	8,699	47,203	5.43	133	97.2
Lakeview	6,595	28,419	4.31	128	60.8
Davis North	4,775	20,013	4.19	100	54.8
Total	37,033	184,348	4.98	721	70.1
<u>District II-B</u>					
Cottonwood	14,778	66,628	4.51	243	75.1
Holy Cross	16,061 ^a	91,009 ^a	5.67	343	72.7
LDS	26,453	156,842	5.93	570	75.4
Primary Childrens	5,534 ^f	40,943 ^e	7.40	154	72.8 ^f
University Med.	11,718 ^b	90,997 ^b	7.77	310	80.4
St. Marks	15,744	91,736	5.83	306	82.1
Valley West	5,177	22,676	4.38	97	64.0
(S.L. Co. Total)	(95,465)	(560,831)	(5.87)	(2,023)	(76.0)
Tooele Valley	976	4,716	4.83	38	34.0
Total	96,441	565,547	5.86	2,061	75.2
<u>District III</u>					
American Fork	3,760	15,731	4.18	82	52.6
Mountain View	4,461	19,593	4.39	91 ^{c,e}	59.0 ^{c,e}
Utah Valley	20,650	98,529	4.77	389	69.4
(Utah Co. Total)	(28,871)	(133,853)	(4.64)	(562)	(65.3)

TABLE 3-9. (continued)

<u>Hospital</u>	<u>Discharges</u>	<u>Patient Days</u>	<u>Average Length of Stay</u>	<u>Average Beds for the Year^a</u>	<u>Percent Occupancy</u>
<u>District III</u> (continued)					
Summit County	301	1,661	5.52	14	32.5
Wasatch County	<u>1,206</u>	<u>4,593</u>	<u>3.81</u>	<u>25</u>	<u>50.3</u>
Total	30,378	140,107	4.61	601	63.9
<u>District IV</u>					
Juab County	617	2,650	4.29	31	23.4
Fillmore	416	1,862	4.04	22	22.2
West Millard	506	1,538	3.04	16	26.3
Gunnison Valley	888	3,214	3.62	21 ^d	41.9 ^d
Sanpete	861	3,830	4.45	25	43.0
Sevier	<u>1,654</u>	<u>5,896</u>	<u>3.56</u>	<u>28</u>	<u>57.7</u>
Total	4,987	18,990	3.81	143	36.4
<u>District V</u>					
Beaver Valley	714	2,989	4.19	20	40.9
Milford Valley	493	2,103	4.27	14	41.2
Garfield Memorial	526	2,103	4.00	20	28.8
Valley View	2,415	9,568	3.96	56	46.8
Kane County	555	1,931	3.48	20	26.5
Dixie Med. Ctr.	<u>3,976</u>	<u>17,050</u>	<u>4.29</u>	<u>65^d</u>	<u>71.9^d</u>
Total	8,679	35,744	4.12	195	50.2
<u>District VI</u>					
Duchesne County	1,957	6,585	3.36	32	56.4
Uintah County	<u>1,973</u>	<u>5,495</u>	<u>2.79</u>	<u>31</u>	<u>48.6</u>
Total	3,930	12,080	3.07	63	52.5

TABLE 3-9. (continued)

<u>Hospital</u>	<u>Discharges</u>	<u>Patient Days</u>	<u>Average Length of Stay</u>	<u>Average Beds for the Year^a</u>	<u>Percent Occupancy</u>
<u>District VII</u>					
Carbon County	3,476	16,115	4.64	70	63.1
Monument Valley	508	3,489	6.87	27	35.4
San Juan County	1,088	3,633	3.34	36	27.6
Allen Memorial	922	3,510	3.81	38	25.3
Total	5,994	26,747	4.46	171	42.9
State Totals	201,543	1,032,110	5.12	4,151	68.1

a. Average number of licensed beds available during the period of time the specified hospital was in operation during the year.

b. Discharge and patient days represent the total for June 1, 1978 to May 31, 1979.

c. Discharge and patient days represent the total for July 1, 1978 to June 30, 1979.

d. Includes LTC beds used for acute-care patients.

e. In mid-August the hospital increased its bed capacity from 89 to 91.

f. Data for prior years includes outpatient surgeries as a discharge and one day stay. Preceding years will be adjusted.

Figure 3-2. Locations of Utah's general and specialized hospitals.

3.3 References

1. U.S. Department of Commerce, Bureau of the Census, Advance Report, 1980 Census of Population and Housing, PHC80-V-46, U.S. Government Printing Office, Washington, D.C., March 1981.
2. Office of the State Planning Coordinator, Utah 1981 Issues and Illusions, Salt Lake City, Utah, March 1981.
3. Bureau of Economics and Business Center for Economic and Community Development, University of Utah, Utah Facts, An Introductory Handbook to the Industrial Development Information System, prepared for the Utah Industrial Promotion Division, 1980.
4. Utah Foundation (Comp.), Statistical Review of Government in Utah, 1980 Edition, May 1980.
5. American Hospital Association, Guide to the Health Care Field, 1979 Edition, Chicago, Illinois, 1979.

4. ECONOMY

The economic factors and trends discussed in this section may affect or be related to the generation of low-level radioactive waste in Utah. Growth in industry, labor-force distribution, distribution of agricultural acreage income level, and energy consumed are factors that may help state officials in assessing the state as a producer of low-level radioactive waste and in selecting the most viable waste-management options.

4.1 Economic Indicators

Utah's economic base is diverse. In recent years, the state has expanded economic activity beyond agriculture, mining, and military installations toward more manufacturing, scientific and technical research, and tourism.¹

Between 1970 and 1979, Utah's population increased by 30.6 percent, nonagricultural employment rose 58.4 percent, and personal income increased 220.5 percent.² Tables 4-1, 4-2, and 4-3 show Utah's ranking among the ten leading states in the nation in economic growth indicators.

4.2 Nonagricultural Industries

The earnings from labor and proprietor incomes for selected and projected years are shown in Table 4-4.³ The three largest sectors - government, manufacturing, and services - accounted for 54% on nonfarm income in 1978. Earnings in the services sector reflect, in part, the contribution of tourism within the state.

Approximately 90 percent of the total Utah employment is in the nonagricultural section.⁴ The annual employment rate has grown 4.9 percent since 1970, nearly twice the national rate of 2.5 percent. Between 1970 and 1979, Utah gained 195,000 nonagricultural jobs. Trade and services experienced the most rapid growth in absolute terms, 92,090 jobs. Construction had the greatest relative increase in jobs, 138 percent.¹

TABLE 4-1. GROWTH INDEX OF POPULATION

Rank	State	July 1, 1969	July 1, 1979	Percent Change
1.	Arizona	1,737,000	2,631,000	+51.5%
2.	Nevada	480,000	702,000	+46.3
3.	Alaska	296,000	406,000	+37.2
4.	Wyoming	329,000	450,000	+36.8
5.	Florida	6,641,000	8,860,000	+33.4
6.	Utah	1,047,000	1,367,000	+30.6
7.	Idaho	707,000	905,000	+28.0
8.	Colorado	2,166,000	2,772,000	+28.0
9.	New Mexico	1,011,000	1,241,000	+22.7
10.	Oregon	2,062,000	2,527,000	+22.6

TABLE 4-2. GROWTH INDEX OF NONFARM WAGE AND SALARY EMPLOYMENT

Rank	State	1969	1979	Percent Change
1.	Nevada	193,500	383,100	+98.0%
2.	Alaska	83,800	168,300	+93.9
3.	Wyoming	107,600	202,900	+88.6
4.	Arizona	517,200	970,900	+87.7
5.	Colorado	713,200	1,217,300	+70.7
6.	Idaho	201,400	337,200	+67.4
7.	Florida	2,069,900	3,379,700	+63.3
8.	New Mexico	287,600	461,500	+60.5
9.	Utah	349,800	553,900	+58.4
10.	Texas	3,599,200	5,603,200	+55.7

TABLE 4-3. GROWTH INDEX OF PERSONAL INCOME

Rank	State	1969	1979	Percent Change
1.	Wyoming	\$ 1,121,000,000	\$ 4,346,000,000	+287.7%
2.	Alaska	1,245,000,000	4,568,000,000	+266.9
3.	Arizona	5,751,000,000	20,347,000,000	+253.8
4.	Nevada	2,041,000,000	7,163,000,000	+251.0
5.	Florida	22,824,000,000	75,597,000,000	+231.2
6.	Colorado	7,648,000,000	24,795,000,000	+224.2
7.	Utah	3,065,000,000	9,822,000,000	+220.5
8.	Texas	36,171,000,000	115,721,000,000	+219.9
9.	Idaho	2,115,000,000	6,739,000,000	+218.6
10.	New Mexico	2,851,000,000	9,052,000,000	+217.5

TABLE 4-4. RECORDED AND PROJECTED GROWTH OF NONFARM INCOME

	Earnings ^a (millions of 1972 dollars)				Average Annual Growth Rate (percent)	
	1969	1978	1990	2000	1969-1978	1978-2000
Private	2,039	3,572	7,012	10,563	6.4	5.1
Agricultural services, forestry, fisheries, and other	6	9	15	19	4.6	3.5
Mining	133	239	536	839	6.7	5.9
Construction	167	406	664	901	10.4	3.7
Manufacturing	472	787	1,556	2,349	5.8	5.1
Transportation, communication, and public utilities	235	404	742	1,081	6.2	4.6
Wholesale trade	190	322	585	836	6.0	4.4
Retail trade	315	499	903	1,305	5.2	4.5
Finance, insurance, and real estate	132	233	495	768	6.5	5.6
Services	388	674	1,517	2,468	6.3	6.1
Government and government enterprises	765	1,006	1,566	2,111	3.1	3.4
Federal, civilian	386	396	543	674	0.3	2.4
Federal, military	42	54	71	87	2.8	2.2
State and local	338	556	952	1,350	5.7	4.1
TOTAL	2,805	4,578	8,578	12,679	5.6	4.7

a. Earnings consist of income by laborers and proprietors.

Table 4-5 shows the percentage distribution of nonagricultural employment for selected years. The data indicate that construction and trade sectors have increased since 1970, while employment in the government sector has decreased. The relative positions of the other sectors have remained stable.

Table 4-6 presents 1979 employment data. The state average unemployment rate was 4.5 percent in 1979, 1.3 percent below the national rate of 5.8 percent. Table 4-7 gives payroll wages by district, county, and major industry.⁵

Government is the largest employer in Utah, followed closely by trade and services. Manufacturing has experienced only a moderate growth since the 1960s. The more significant industries of the manufacturing sector in terms of total employment are machinery (except electronics), food and primary metals.

Although mining has grown little since 1960, the value of Utah's mineral production has steadily increased, to over \$1 billion in 1979. In 1978, petroleum accounted for approximately 35 percent; copper, 28 percent; and coal, 22 percent. The recent energy crisis stimulated Utah's coal mining industry, increasing employment in bituminous coal mining from 1900 jobs in 1974 to over 4000 in 1979. Expansion in this industry is expected to continue.¹ Utah also produces more than 35 other mineral products including a variety of metals, fuels, and nonmetallic minerals. Mining the Great Salt Lake is becoming a major industry; currently, a million tons of chemicals are being removed from the lake annually at a total value exceeding \$55 million.¹

Another important indicator of Utah's economic growth is increased construction activity. Employment in this sector represented 6.3 percent of the total nonagricultural employment in 1979. The value of total construction exceeded \$1.2 billion. The number of new dwellings authorized for construction during 1980 was 16,767. Population and employment

TABLE 4-5. PERCENTAGE DISTRIBUTION OF NONAGRICULTURAL EMPLOYMENT

Year	Manufacturing	Mining	Construction	Transportation, Communications and Utilities	Trade	Finance, Insurance and Real Estate	Services	Government
1960	17.8	5.2	5.6	8.0	22.5	4.3	12.5	23.6
1970	15.3	3.5	4.1	6.5	22.3	4.2	16.2	27.9
1975	15.3	3.0	5.2	6.1	23.7	4.6	17.1	25.1
1976	15.3	3.0	6.0	6.1	24.2	4.5	16.7	24.2
1977	15.3	3.1	6.5	6.0	24.4	4.6	16.7	23.1
1978	15.1	3.0	6.7	6.0	24.3	4.6	17.2	23.0
1979	15.7	3.2	6.3	6.1	24.0	4.7	17.6	22.3

TABLE 4-6. NONAGRICULTURAL PAYROLL EMPLOYMENT IN UTAH BY DISTRICT, COUNTY, AND MAJOR INDUSTRY, 1979

County	Mining	Construction	Manufacturing	Transportation, Communications and Public Utilities	Trade	Finance, Insurance and Real Estate	Services and Miscellaneous	Government	Total
Box Elder	13	608	4,919	185	2,260	244	956	2,049	11,234
Cache	2	1,343	4,483	532	3,882	624	2,205	6,549	19,620
Rich	1	10	21	4	70	10	108	143	377
Morgan	27	79	321	28	307	41	44	226	1,073
Weber	90	3,044	6,576	2,836	11,499	2,231	8,443	13,824	48,543
Davis	21	2,694	5,864	1,570	8,420	953	5,137	20,008	44,667
Salt Lake	6,606	18,167	44,896	21,830	75,141	17,406	52,457	47,992	284,545
Tooele	757	333	1,147	256	914	203	469	5,720	9,799
Summit	282	245	215	150	938	213	799	654	3,496
Utah	272	4,519	13,474	2,231	12,989	2,135	18,549	10,607	64,776
Wasatch	63	327	141	40	482	71	310	604	2,038
Juab	82	97	441	66	388	38	131	462	1,705
Millard	115	119	239	133	510	49	161	680	2,056
Piute	9	17	30	8	18	7	2	138	229
Sanpete	34	152	865	35	549	86	367	1,207	3,345
Sevier	267	474	537	258	1,149	151	639	1,177	4,652
Wayne	174	55	31	3	70	8	26	234	601
Beaver	40	64	67	178	278	29	108	373	1,137
Garfield	185	54	265	71	140	19	322	437	1,493
Iron	266	384	486	475	1,545	284	635	1,830	5,905
Kane	14	15	66	132	273	42	144	277	933
Washington	64	606	637	179	1,934	345	983	1,564	6,312
Daggett	0	20	0	11	44	0	10	183	268
Duchese	788	182	145	170	897	75	279	977	3,513
Uintah	1,563	500	238	520	1,425	148	1,283	1,297	6,974
Carbon	2,209	307	308	640	1,795	240	852	1,890	8,241
Emery	1,935	916	25	486	353	47	233	655	4,650
Grand	725	188	90	244	755	83	374	601	3,060
San Juan	1,090	123	207	172	353	35	326	871	3,177
State Total	17,694	35,642	86,734	33,573	129,378	25,817	96,352	123,229	548,419

Source: Utah Department of Employment Security.

TABLE 4-7. NONAGRICULTURAL PAYROLL WAGES IN UTAH BY DISTRICT, COUNTY, AND MAJOR INDUSTRY, 1979

County	Mining	Construction	Manufacturing	Transportation, Communications and Public Utilities	Trade	Finance, Insurance and Real Estate	Services and Miscellaneous	Government	Total
Box Elder	\$ 96,640	\$ 8,603,597	\$ 81,617,022	\$ 2,729,029	\$ 15,558,622	\$ 2,220,509	\$ 7,292,044	\$ 21,659,894	\$ 142,777,357
Cache	26,503	18,011,333	51,027,952	7,353,906	25,247,612	5,962,239	17,753,438	62,472,897	187,855,880
Rich	30,360	90,200	288,623	209,408	346,926	76,514	585,679	1,258,653	2,826,363
Morgan	325,521	1,201,643	4,565,742	667,732	2,980,774	433,589	282,351	2,147,401	12,604,753
Weber	2,233,272	42,243,027	85,373,265	47,007,239	87,913,611	23,030,003	75,464,552	166,816,514	530,081,433
Davis	297,015	38,176,552	83,322,935	22,862,249	77,449,317	9,010,544	44,784,594	321,302,870	597,206,076
Salt Lake	145,542,878	275,433,877	603,042,723	401,756,929	779,901,034	215,386,746	536,917,779	600,019,020	3,558,000,986
Tooele	16,150,747	4,598,051	20,414,480	4,235,293	6,644,865	1,598,676	2,922,461	73,926,956	130,491,529
Summit	4,894,396	3,708,778	2,419,496	2,528,955	4,786,584	1,925,607	5,828,026	6,816,804	32,908,646
Utah	4,881,995	66,379,131	225,453,478	35,487,420	92,584,474	19,211,029	160,205,876	108,372,308	712,575,711
Wasatch	818,604	6,492,129	1,171,301	571,255	3,586,392	567,372	1,524,841	5,872,363	20,604,257
Juab	1,757,533	2,013,453	5,026,292	905,429	2,182,465	321,856	740,047	3,834,004	16,781,079
Millard	1,850,825	1,930,767	1,559,307	3,543,876	2,920,529	457,008	824,419	5,784,870	18,871,601
Piute	126,829	227,161	145,103	114,896	67,816	65,128	14,384	1,076,083	1,837,400
Sanpete	712,665	1,824,696	7,886,319	1,069,559	2,746,133	796,678	2,228,169	9,898,020	27,162,239
Sevier	5,781,655	6,839,041	5,786,882	3,839,756	7,334,285	1,366,395	4,149,040	12,967,001	48,064,055
Wayne	2,914,321	935,388	138,353	36,694	259,619	191,714	87,391	1,914,305	6,477,785
Beaver	888,731	826,052	500,785	3,897,738	1,321,509	421,376	460,745	3,361,748	11,678,684
Garfield	2,668,634	797,925	2,876,594	922,259	658,300	172,248	1,842,589	3,940,052	13,878,601
Iron	5,461,893	4,815,222	4,618,616	8,701,029	10,360,616	2,468,057	4,661,145	18,319,911	59,406,489
Kane	116,564	130,354	394,790	1,021,775	1,490,151	264,938	985,081	2,696,389	7,100,042
Washington	899,148	7,769,129	7,619,541	2,664,694	13,753,645	3,245,302	7,196,329	15,444,633	53,592,421
Daggett	0	121,482	0	97,760	254,617	0	53,373	1,874,628	2,401,860
Duchesne	16,873,933	3,122,744	2,105,408	3,200,907	7,009,853	699,533	2,232,666	9,591,784	44,836,828
Uintah	28,618,214	9,825,673	2,466,628	9,180,709	12,993,064	1,527,052	12,056,351	14,249,037	90,916,728
Carbon	48,789,060	4,454,485	3,088,046	12,562,577	15,534,726	2,222,946	6,171,272	17,247,938	110,071,050
Emery	38,987,229	24,139,891	294,849	9,066,052	2,186,442	453,258	1,595,556	6,328,751	83,052,028
Grand	12,303,001	2,689,485	702,078	3,542,472	6,391,062	888,371	2,562,574	7,138,018	36,217,061
San Juan	20,953,145	1,383,795	1,879,833	2,005,356	2,528,784	322,748	2,733,569	8,035,266	39,842,496
State Total	\$ 365,001,311	\$538,785,061	\$1,208,726,441	\$ 591,782,953	\$1,186,993,827	\$ 295,307,436	\$904,156,341	\$1,514,368,118	\$6,605,121,488

Source: Utah Department of Employment.

TABLE 4-8. REALIZED GROSS AND NET INCOME FROM FARMING 1950 TO 1977 (Millions of Dollars)^a

Year	Cash Receipts from Farm Marketings	Government Payments	Nonmoney Income	Other Farm Income	Total Realized Gross Farm Income ^b	Farm Production Expenses	Realized Net Farm Income ^c	Net Change in Farm Inventories	Total Net Farm Income ^d
1950	\$152.5	\$ 2.4	\$13.4	\$0.2	\$168.6	\$108.9	\$ 59.6	\$ 4.4	\$64.0
1951	189.0	3.2	15.5	0.4	208.1	129.0	79.0	11.9	90.0
1952	175.6	2.0	15.9	0.6	194.1	127.1	67.0	11.1	78.1
1953	151.9	2.5	14.7	0.8	169.9	116.6	53.3	0.7	54.0
1954	150.7	2.7	12.7	0.9	166.9	115.8	51.1	-0.4	50.7
1955	152.4	2.7	13.2	1.1	169.3	118.1	51.2	-2.5	48.8
1956	147.7	4.8	12.9	1.2	166.6	120.6	46.0	-0.7	45.2
1957	155.7	8.3	12.4	1.3	177.8	126.9	50.8	3.9	54.7
1958	158.6	5.6	12.9	1.6	178.7	139.2	39.5	-0.8	38.7
1959	159.8	8.9	12.8	1.6	183.1	145.8	37.3	-3.2	34.1
1960	162.8	6.6	13.4	1.6	184.5	148.2	36.2	-5.8	30.4
1961	155.4	8.0	14.9	1.5	179.9	153.4	26.4	-3.7	22.8
1962	167.5	8.9	15.1	1.5	193.1	157.7	35.3	4.9	40.2
1963	164.9	8.6	15.9	1.6	191.0	164.3	26.7	1.8	28.5
1964	152.8	8.5	16.2	1.9	179.4	160.9	18.5	-1.0	17.5
1965	161.5	8.8	16.3	2.1	188.7	163.4	25.4	8.0	33.3
1966	191.9	9.7	16.8	2.1	220.5	176.0	44.5	-7.4	37.2
1967	188.4	9.0	16.8	2.3	216.5	179.0	37.5	10.9	48.4
1968	198.3	10.9	16.5	2.4	228.0	175.3	52.7	-2.3	50.4
1969	206.1	11.8	16.8	2.4	237.0	185.5	51.5	5.2	56.7
1970	222.1	11.1	16.8	2.3	252.4	194.3	58.1	1.9	60.1
1971	230.1	10.3	17.8	2.7	260.9	197.9	63.1	-0.1	63.0
1972	250.8	13.9	20.0	2.8	287.5	202.3	85.2	-5.3	79.9
1973	344.1	8.0	22.0	3.4	377.5	245.0	132.5	1.5	134.0
1974	320.1	2.9	27.9	4.2	355.1	290.8	64.3	16.6	80.9
1975	330.2	3.3	32.6	5.2	371.3	312.2	59.0	-3.0	56.0
1976	361.9	5.6	39.7	5.7	412.8	340.8	72.0	-7.0	65.0
1977	363.5	18.6	41.6	6.5	430.1	358.9	71.2	-6.4	64.8

a. Figures may not add to total due to rounding.

b. Cash receipts plus government payments, nonmoney farm income and other farm income.

c. Realized gross farm income less farm production expenses of farm operators.

d. Realized net farm income plus net change in farm inventories of farm operators.

Source: U.S. Department of Agriculture, Economics, Statistics and Cooperatives Service, Farm Income Statistics, Bulletin No. 609, Supplement 1978 (Washington, D.C.: U.S. Government Printing Office).

projections indicate an increasing need for new houses, commercial buildings, and industrial facilities.¹

4.3 Agriculture

Two-thirds of land in Utah is under federal ownership and control. About 21 percent of the state's total land area is under private ownership. Most of the agricultural land area is only suitable for grazing livestock. Only 4 percent of the land area was used for cropland in 1967.⁶

Although agriculture has been significant in the economic history of the state, its role in recent years has declined. The farm earnings percentage of total labor and proprietor earnings has declined from just over 3 percent in 1970 to 1.7 percent in 1978. Utah has no counties regarded as primarily agricultural.

In 1978, total cash receipts from livestock and crops for Utah farmers were \$456.7 million, a 25.7 percent increase over 1977 (Table 4-8). Cash received from livestock or livestock products was \$352.2 million, or 77 percent of the state total cash receipts; sale of crops totaled \$104.5 million, or 23 percent. The major farm commodities are cattle and calves, dairy products, turkeys, and hay. In 1974, Cache, Sanpete, and Weber were the top three counties in terms of livestock and poultry production. Utah, Box Elder, and Cache Counties were the top producers in value of crops sold.

4.4 Per Capita Income

Total personal income of Utah residents increased from \$7.5 billion in 1977 to \$9.8 billion in 1978. Because of a relatively larger household size, per capita personal income in Utah is lower than the national average. In 1979, Utah's average was \$7,185 compared to a U.S. average of \$8,706.⁷

Since 1969, Utah's per capita personal income has shown an upward trend relative to the average U.S. In 1978, it reached 84 percent of the national average. Table 4-9 shows the per capita personal income for Utah, the western states, and the U.S. in 1970 and 1978; Table 4-10 compares Utah's percentage distribution by source of income with that of the U.S. as a whole.

4.5 Energy Consumption

Economic growth within a state is typically accompanied by increased energy demand. Utah is a net energy exporter, exporting uranium, oil, and coal, while importing natural gas and a small amount of electricity (see Figure 4-1). The industrial sector is the largest energy consumer, followed by the transportation, commercial, and residential sectors. Oil, coal, and natural gas are used about equally by industry while natural gas is the primary energy source for the residential and commercial sectors.⁸

Utah's industries consume about the same percentage of energy as do those of other Intermountain States. The primary metals industry is the major industrial energy consumer (50 percent). However, 25 percent of the remaining energy consumed by industries is for industries that can use low-to-intermediate heat sources.

Utah is expected to increase its industrial base during the next 25 years. This increase, along with residential base growth, should account for the 2.8% per year energy consumption growth rate expected between 1975 to 1985. Extrapolating this percentage increase to the year 2000 shows almost a doubling of the current energy consumption (see Figure 4-2.)⁸

4.6 Electrical Generation by Nuclear Power

Utah has no nuclear power plants. The state, however, is being considered as a possible site for a proposed \$10 billion nuclear park.

TABLE 4-9. PER CAPITA PERSONAL INCOME FOR UTAH, WESTERN STATES, AND THE UNITED STATES, 1970 AND 1979

State	1970	1979 ^a	Percent Change 1970 to 1979
Utah	\$3,227	\$ 7,185	122.6
Arizona	3,665	8,305	126.6
Colorado	3,855	8,945	132.0
Idaho	3,290	7,446	126.3
Montana	3,500	7,412	111.8
Nevada	4,563	10,204	123.6
New Mexico	3,007	7,294	137.0
Wyoming	3,815	9,657	153.1
California	4,493	9,913	120.6
Oregon	3,719	8,842	137.8
Washington	4,053	9,435	132.8
United States	\$3,966	\$ 8,706	119.5

a. Preliminary estimate.

TABLE 4-10. PERCENTAGE DISTRIBUTION BY SOURCE OF INCOME IN UTAH AND UNITED STATES, 1979^a

Sector	Utah	United States
Farms	0.7	1.1
Mining	5.3	1.6
Contract construction	7.3	5.9
Manufacturing	18.2	27.1
Wholesale and retail trades	18.2	16.9
Finance, insurance and real estate	4.5	5.5
Transport, communication and public utilities	9.2	7.7
Services	12.8	15.6
Government	23.7	18.5

a. Total labor and proprietor income.

Energy Supply
(754.1 x 10¹² Btu's — 36% exported, 11% imported)

Energy Use
(472.1 x 10¹² Btu's)

Figure 4-1. Utah's energy supply and use.

Figure 4-2. Utah's total energy consumption and projection.

Officials of the Department of Energy and state government are conducting feasibility and impact studies for a location near Green River, Utah. The Utah complex would include ten nuclear power plants capable of generating up to 10,000 megawatts of power. The studies are expected to be completed in 1981.⁹

4.7. References

1. Bureau of Economic and Business Center for Economic and Community Development, Utah Facts, An Introductory Handbook to the Industrial Development Information System, prepared for the Utah Industrial Promotion Division, 1980.
2. Valley National Bank of Arizona, Economic Research Department, Arizona Statistical Review, Phoenix, Arizona, 1980.
3. U.S. Department of Commerce, Bureau of the Census, State and Metropolitan Area Data Book 1979, U.S. Government Printing Office, Washington, D.C., 1980.
4. Utah Health Systems Agency, 1981 Health Systems Plan.
5. Utah Department of Employment, Volume III, Labor Market, Utah Annual Report 1979.
6. Utah Department of Agriculture, Utah Agricultural Statistics, 1980.
7. U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 101st Edition, U.S. Government Printing Office, Washington, D.C., 1980.
8. Department of Energy, Division of Geothermal Energy, Regional Hydrothermal Commercialization Plan, Idaho Operations Office, July 14, 1978.
9. National Waste Terminal Storage Program, Office of Nuclear Waste Isolation, State Briefing Book, Utah Paradox Basin Salt Deposits, December 1979.

5. GOVERNMENT AND PUBLIC ATTITUDES

This section describes the structure of Utah state and local government and discusses governmental responsibilities related to low-level radioactive waste management. This section also lists Utah's representation in the U.S. Congress and federal activities in the state. Finally, the section considers public attitudes toward waste-management issues.

5.1 State Government

Utah entered the Union in 1896 with a state government divided into the executive, bicameral legislative, and judicial branches. This section describes only those branches that have a role in low-level radioactive-waste management.

Executive Branch The elected officers of the executive branch are the governor, secretary of state (who is ex officio lieutenant governor), state auditor, state treasurer, and attorney general. Each is elected for a four-year term with no constitutional limit on the number of terms. The incumbents of these offices are listed in Table 5-1. The most important elected state officials, relevant to low-level waste management, are the governor and the attorney general.

TABLE 5-1. ELECTED OFFICIALS

Governor	Scott M. Matheson	Democrat
Secretary of State	David S. Monson	Republican
Attorney General	Robert B. Hansen	Republican
Treasurer	Lynn Baker	Democrat
Auditor	Richard Jensen	Republican

The duties and powers of the governor include: ensuring that all laws are faithfully executed; serving as sole point of communication between state and federal government; appointing executive department heads and other state and district officers whose appointment or election is not otherwise provided by law; formulating the annual budget; and communicating with the legislature. The governor has line-item veto power over appropriations and general veto power for all other bills. He must authorize all periodic allotments from agency appropriations and may revise allotments or require agencies to submit revised work programs. Several appointed officials, including the state budget officer, the director of finance, and the executive directors of the Department of Natural Resources and the Department of Health, serve at the pleasure of the governor and may be removed from office at any time.

The attorney general represents the state in all legal actions in which the state or an officer or agency of the state is a party, except in cases where the legislative branch chooses to retain its own counsel. The attorney general has the duty to institute and prosecute proceedings to restrain corporations from acting illegally or in excess of their corporate powers or contrary to public policy.

The Department of Health within the executive branch has responsibilities relating to radiation control and licensing. Specific responsibilities are assigned to the Bureau of Hazardous Waste and Radiation, a subdivision of the Division of Environmental Health. The names, addresses, and phone numbers of agency heads are listed in Table 5-2.

The legislative power of the state is vested in the legislature and in the people of the state. Utah's legislature is bicameral, consisting of the Senate and the House of Representatives. The Senate is restricted to a maximum of 30 members. The House of Representatives must have at least two and no more than three times the number of members in the Senate. Since the latest (1972) reapportionment, the legislature has had 29 senators and 75 representatives.

TABLE 5-2. AGENCY HEADS, UTAH DEPARTMENT OF HEALTH

Department of Health

James O. Mason, M.D., Executive Director
150 West North Temple, Room 280
Salt Lake City, UT 84110
(801) 533-6111

Lee Shaw, Public Information Officer
150 West North Temple
Salt Lake City, UT 84110
(801) 533-6339

Division of Environmental Health

Alvin E. Rickers, Director
150 West North Temple, Room 426
Salt Lake City, UT 84110
(801) 533-6121

Bureau of Hazardous Waste and Radiation

Larry F. Anderson, Director
150 West North Temple, Room 435
Salt Lake City, UT 84110
(801) 533-6734

Members of the House are elected for two-year terms. Members of the Senate serve four terms with approximately half of the members elected every two years.

The legislature meets annually. In odd-numbered years, regular sessions are held for 60 calendar days. In even-numbered years, budget sessions are held for 20 calendar days. During budget sessions, consideration is limited to matters relating to the state budget, unless other matters are approved for consideration by resolution passed by two-thirds of the members of each house. Special legislature sessions may be called by the governor at any time. Special sessions may only consider matters placed before it by the governor and are limited to 30 calendar days. Regular standing committees of the two houses, except the Rules and Appropriations committees, function as study committees between sessions.

The people of Utah may make, repeal, amend, or postpone the effective date of state laws by initiative and referendum. Citizens may petition that new legislation be placed on the ballot of the next general election. If the proposed legislation receives a majority of votes, it is made law. By means of the referendum, an act may be suspended until the people vote upon it at the next general election. If the act fails to receive a majority of votes, it is no longer law. Initiative and referendum have been successfully used in recent years as means of direct legislation by the people.

5.2 Statutes and Regulations

The 1981 General Session of the Utah State Legislature passed, with the governor concurring, a "Low-Level Radioactive Wastes" resolution. The resolution accepts the state's responsibilities for management and disposal of low-level radioactive waste generated by non-federal activities within the state. The resolution directs that Utah seek to enter into a regional compact to resolve political, technical, and financial problems associated with low-level radioactive waste.

The 1981 legislature also enacted SB 18, "Placement of Nuclear Waste," and SB 258, "Hazardous Waste Facility Siting Act." The Placement of Nuclear Waste Act prohibits the placement of high-level nuclear waste, defined as "spent reactor fuel assemblies, dismantled nuclear reactor components, and solid and liquid wastes from fuel reprocessing and defense-related wastes," in Utah unless the governor, after consultation with the county commissioners of the affected county and with concurrence of the legislature, authorizes. Medical or institutional radioactive wastes, naturally occurring radioactive materials, and uranium mill tailings are specifically excluded from requirements of SB 18.

The Hazardous Waste Facility Siting Act states that sites designated for disposal of uranium mill tailings or nuclear wastes must be approved by the affected county.

Under the Radiation Protection Act of 1979, the governor is authorized to enter an agreement with the Department of Energy to clean up abandoned mill sites as provided in the federal Uranium Mill Tailings Radiation Control Act of 1978.

The state has established a nuclear waste (high-level) repository task force composed of state legislators, local elected officials, executive branch directors, and industry and academic experts. The task force goals and membership are listed in Tables 5-3 and 5-4, respectively.

5.3 Congressional Representatives

Utah's congressional delegation consists of two senators and, in the current Congress, two representatives. Reapportionment of the 98th Congress based on the 1980 census will give Utah a third representative. Names, party affiliations, and committee assignments for the incumbents are given in Table 5-5. Figure 5-1 shows Utah's congressional district boundaries.

TABLE 5-3. GOALS OF THE NUCLEAR WASTE REPOSITORY TASK FORCE

1. Evaluate the National High-Level Nuclear Waste Repository Program as to need and appropriateness of proposed solutions.
 2. Keep up to date on the current and future status of Federal program.
 3. Enable Utah to be a full participant in National repository siting decisions.
 4. Influence National policy relating to high-level nuclear waste disposal.
 5. Determine adequacy of proposed methods of transporting high-level nuclear wastes.
 6. Evaluate potential impacts of a repository in Utah were we selected as a site.
 - a. Health and safety considerations
 - b. Environmental considerations
 - c. Economic considerations
 1. Availability of up-front money to mitigate community impacts
 2. Employment factors during construction and operation phases
 3. Phase-out economics
 - d. Social considerations, including acceptance
 - e. Aesthetic considerations.
 7. Articulate to the Governor, other State officials, and the general public, benefits and risks of a Utah repository.
 8. Alert public in impact areas of benefits and possible risks of a repository in the local area.
 9. Prepare a written report to the Governor, including recommendations.
 - a. Detailed report
 - b. Executive summary
 - c. Public information document for lay persons
 10. Propose a post-report monitoring program so that Utah can provide leadership and protect its interests relating to nuclear waste disposal.
-

TABLE 5-4. NUCLEAR WASTE REPOSITORY TASK FORCE MEMBERS

Omar B. Bunnell
State Senator
640 North Third East
Price, UT 84501
(801) 637-0284

C. Hardy Redd
State Representative
LaSal, UT 84530
(801) 686-2221

Harold Jacobs
Mayor of Moab
121 East Center
Moab, UT 84532
(801) 259-5121

Gordon Harmston, Executive Director
Department of Natural Resources
231 East 400 South
Salt Lake City, UT 84111
(801) 533-5356

Edward S. Boyle, Commissioner
San Juan County
County Courthouse
Monticello, UT 84535
(801) 587-2233 (com. office)
(801) 587-2611 (office)

Robert L. Furlow, Director
Southeastern District Health Dept.
P.O. Box 800
Silvagni Building
Price, UT 84501
(801) 637-3671

James O. Mason, M.D., Dr. P.H.,
Chairman
Executive Director
Department of Health
150 West North Temple, Room 280
Salt Lake City, UT 84110
P.O. Box 2500
(801) 533-6111

James Byrne, Deputy Director
Utah Energy Office
231 East 4th South
Salt Lake City, UT 84111
(801) 533-5424

James-W. Bunger, Ph.D.
State Science Advisor
State Planning Coordinator's Office
State Capitol Room 124
Salt Lake City, UT 84114
(801) 533-4987

James A. Sorenson, Ph.D., Professor
Department of Radiology
University of Utah Medical Center
Salt Lake City, UT 84132
(801) 581-5221

Steven Neilson
Minerals West Corp.
46 South Main
Monticello, UT 84535
(801) 587-2932

Alvin E. Rickers, Director
Division of Environmental Health
150 West North Temple, Room 426
P.O. Box 2500
Salt Lake City, UT 84110
(801) 533-6121

Larry F. Anderson, Director
Bureau of Radiation and
Occupational Health
150 West North Temple, Room 435
Salt Lake City, UT 84110
(801) 533-6734

Val Finlayson, Ph.D.
Utah Power and Light Company
1407 West North Temple
Salt Lake City, UT 84110
(801) 535-2000

TABLE 5-5. UTAH'S SENATORS AND REPRESENTATIVES

Senator Jake Garn, Republican (Present term expires in 1987)

Chairman, Senate Banking, Housing, and Urban Affairs Committee; member, Housing and Urban Affairs, Insurance, and Financial Institutions subcommittees.

Member, Senate Appropriations Committee and Defense, Energy and Water Development Interior, Foreign Operations, and Transportation subcommittees.

Member, Senate Select Committee on Intelligence.

Senator Orrin G. Hatch, Republican (Present term expires in 1983)

Chairman, Labor and Human Resources Committee.

Member, Judiciary Committee; Chairman, Constitution Subcommittee; member, Separation of Powers and Security and Terrorism Subcommittees.

Member, Budget Committee.

Member, Senate Select Small Business Committee; Chairman, Government Regulation and Paperwork Subcommittee.

Member, Governing Board of the Office of Technology Assessment.

Representative K. Gunn McKay, Democrat, First Congressional District.

Representative Dan Marriott, Republican, Second Congressional District.

Figure 5-1. Utah's congressional district boundaries.

5.4 Interested Parties

According to a statewide poll in June 1979, conducted for the Salt Lake Tribune, a majority of Utah residents continue to favor further development of nuclear power in the United States. Sixty-two percent of those polled said they favored further development of nuclear plants; 30 percent were opposed; and eight percent were undecided. When asked if they favored or opposed construction of a nuclear power plant in a remote area of southeast Utah, 57 percent were in favor, 38 percent were opposed, and five percent were undecided.

However, Utah residents are apprehensive about everything related to nuclear power or radiation because of several occurrences unrelated to the nuclear waste issue. Considerable media coverage has been devoted to five major events, three of which began more than 25 years ago and have become current issues. These events are listed below.

Uranium Mining and Processing Since the late 1940s, southwestern Utah (as well as New Mexico, Arizona, and Colorado) residents have been employed in mining and processing uranium for the government's nuclear weapons programs. Since 1960, studies by the National Institute of Occupational Safety and Health have evaluated whether diseases suffered by miners and mill workers resulted from their exposure to radiation and whether they had been adequately warned about, and protected from, the dangers of radiation. These concerns moved into the national spotlight in the spring of 1979 at public hearings of the U.S. Senate's Human Resources Health and Scientific Research subcommittee, chaired by Senator Edward Kennedy (D-Mass.).

Weapons Fallout The southwestern corner of Utah was subjected to atomic fallout during weapons testing in the 1950s, especially the area around St. George and Cedar City. Senator Kennedy's subcommittee received testimony about the effects of radiation on residents as well as on the soldiers who were assigned to watch the explosions and/or march through the fallout zones at the Nevada Proving Grounds.

Uranium Tailings The by-products of uranium ore mining, called tailings, including accumulations from the industry in Utah, were not considered dangerous in the early years of the extraction process. They were often left in piles, used as land fill, even formed into building blocks. Recently, the tailings have been recognized as having a radiation level requiring them to be shielded from the environment and by shallow land burial in a controlled area. But the tailings of past mining continue to pose problems. A headline story in the May 22, 1979, edition of the Salt Lake Tribune reported that a new fire station was to be evacuated because potentially cancer-causing radon gases were escaping into the building from decaying uranium tailings used as land fill 22 years ago.

Nuclear Power Park Newspaper reports in the spring of 1979 indicated that Utah was being considered as one of two possible sites for proposed nuclear parks. The most frequently mentioned location would be Green River, Utah, just northwest of the Paradox Basin. According to reports in the press during May, DOE and Utah officials are proceeding with feasibility and impact studies on locating a proposed \$10-billion nuclear power park there. The Utah complex would include 10 nuclear power plants capable of generating up to 10,000 megawatts of power. Governor Matheson, concerned about the hazards of nuclear power, agreed to participate in the studies only if the Utah Energy Office could conduct them. Studies are expected to be completed in 1981.

Nuclear Waste Repository The Paradox salt basin in southeastern Utah has been evaluated since 1972 as a possible site for a high-level nuclear waste repository by the Office of Nuclear Waste Isolation. The site is one of four salt basins (Gulf Coast, Paradox, Permian, and Salina) that are being considered as high-level waste repository sites.

5.5 Media

The dominant Utah papers are Salt Lake City's morning Tribune (circulation 106,000 daily and 177,000 Sunday) and evening Deseret News (circulation 70,000). Logan, Ogden, and Provo also have daily papers. The Associated Press and United Press International have bureaus in Salt Lake City. All three commercial television networks and the Public Broadcasting Service have stations in Salt Lake City. Eleven Utah radio stations are on the Intermountain Radio Network, headquartered in Salt Lake City. A list of media data is presented in Appendix D.

The apprehensions of Utah residents about nuclear issues may be represented in an editorial about the proposed power park in the May 16, 1979 issue of the Price Sun-Advocate: "Utahns in particular should be suspicious of such a colossal nuclear giant located right in our midst. After all, didn't we serve as guinea pigs for the Atomic Energy Commission during Nevada nuclear testing in the late 1950s and early 1960s? Didn't the AEC regularly shower us with radioactive fallout and then spend years trying to assure us of how safe such low-level exposure was to our health?"

The "radioactive image" caused by the national attention given these problems led Utah officials to call a press conference in May 1979. The purpose was to "reassure the general public as well as those coming from other states that hazards do not exist here which would endanger their health and safety while in this state," according to Dr. James O. Mason, director of the Utah Health Agency.

6. SURVEY RESULTS

This section presents an analysis of low-level radioactive waste generation and disposal practices for Utah State licensees. Information collected by survey questionnaires sent to each licensee is summarized and is then followed by a detailed analysis for each of the five categories of generators (medical, academic, industrial, governmental, and commercial reactor). The survey methodology, survey forms, and letters used to obtain the information are presented in Appendix B.

6.1 Summary of Results

Utah licensees are divided into four types of low-level radioactive-waste generators shown in Table 6-1. Survey forms, cover letters, and general instructions were mailed to 104 potential generators and shippers of low-level radioactive waste. As indicated in Table 6-1, industrial licensees are the most numerous, followed by governmental, medical, and academic licensees. Since no commercial reactor facilities are located in Utah, this category is not discussed. The number of licensees responding to the survey along with the number of respondents generating waste is also shown in Table 6-1.

The overall survey return rate was 66 percent (69 respondents out of 104 licensees surveyed). The return rate in terms of decreasing response by generator type is: government (77 percent, 17 out of 22), industrial (66 percent, 38 out of 58), medical (65 percent, 11 out of 17), and academic (43 percent, 3 out of 7).

The summary of low-level radioactive waste volume shipped offsite for disposal by Utah licensees is shown in Table 6-2. Overall total waste volume shipped by all licensees fluctuated during the 1978-to-1980 period. The medical waste generators display a consistent waste-volume generation pattern. None of the industrial licensees indicated they shipped waste in the years 1978 through 1980. Table 6-3 presents the activity of the low-level radioactivity shipped for disposal.

TABLE 6-1. SUMMARY OF LICENSEES

<u>Type of Generator</u>	<u>Number of Licensees Surveyed</u>	<u>Number of Licensees Responding</u>	<u>Number of Respondents Generating Waste</u>
Medical	17	11	5
Academic	7	3	3
Industrial	58	38	2
Governmental	22	17	2
Total	104	69	12

TABLE 6-2. SUMMARY OF LOW-LEVEL RADIOACTIVE WASTE VOLUME SHIPPED FOR DISPOSAL

Type of Generator	Volume (cubic meters) ^b					
	1978 ^c		1979 ^c		1980 ^c	
	Volume	Responses	Volume	Responses	Volume	Responses
Medical	5	1	5	1	5	1
Academic	6	2	5	1	9	1
Governmental	(d)	1			3	1
Total	12	4	10	2	17	3

a. Blank spaces indicate no response for the applicable categories.

b. To convert cubic meters to cubic feet, multiply cubic meters by 35.314.

c. The total volume from all respondents.

d. The respondent did not report the volume of waste shipped for disposal.

TABLE 6-3. SUMMARY OF ACTIVITY LEVELS OF LOW-LEVEL RADIOACTIVE WASTE SHIPPED FOR DISPOSAL

Type of Generator	Activity					
	1978		1979		1980	
	<u>Curies^b</u>	<u>Responses</u>	<u>Curies^b</u>	<u>Responses</u>	<u>Curies^b</u>	<u>Responses</u>
Medical	(c)	1	(c)	1		
Academic	(c)	2	(c)	1	1	1
Industrial						
Governmental	3	1				
Total	5	4	0	2	1	1

- a. Blank spaces indicate no response for the applicable categories.
b. The total curies for the survey respondents.
c. The respondents did not report the curies of waste shipped offsite.

Table 6-4 presents the total disposal costs incurred by the respondents. Disposal costs per cubic meter vary widely by year and generator type. One medical licensee estimated its cost at \$2,500 per cubic meter in 1980 and two academic licensees estimate their 1980 costs at \$1,211 per cubic meter. These costs are significantly above normal disposal site charges which were \$247 per cubic meter in 1980 excluding transportation costs.

Table 6-5 gives a summary of low-level radioactive waste disposal methods. The 11 responding medical licensees use the largest combination of available disposal methods. Holding the waste for decay and release into sewage systems are the two most common disposal methods.

Processing methods used to prepare waste for shipment to disposal are shown in Table 6-6. For the four types of licensees surveyed, medical licensee respondents utilize the most processing methods.

The following subsections present a detailed description of the data obtained from the survey by type of licensee.

6.2 Medical Licensees

Medical licensees include hospitals, clinics, community health centers, diagnostic and radiation treatment clinics, private medical practices, and university medical schools. Of the 17 responding medical licensees, 5 have indicated that they generate low-level radioactive waste (Table 6-1).

6.2.1 Licensed Activities

The respondents' licensed activities include radiodiagnostic procedures, radiation therapy, clinical radioassay, and biological research, as listed in Table 6-7. The licensed activities of the medical licensees primarily involve radiodiagnostic procedures and clinical radioassay.

TABLE 6-4. SUMMARY OF DISPOSAL COSTS FOR LOW-LEVEL RADIOACTIVE WASTE SHIPPED OFFSITE^a

Type of Generator	1978		1979		1980	
	Cost ^b	Responses	Cost ^b	Responses	Cost ^b	Responses
Medical	\$1,500	1	\$2,000	1	\$2,500	1
Academic	1,200	2	855	1	2,423	2
Industrial						
Governmental	(c)	1			300	1
Total	\$2,700	4	\$2,855	2	\$5,223	4

- a. Blank spaces indicate no response for the applicable categories.
b. The total cost for the survey respondents.
c. The respondent did not report the disposal cost.

TABLE 6-5. SUMMARY OF DISPOSAL METHODS^a

<u>Type of Generator</u>	<u>Hold for Decay</u>	<u>Release to Sewer</u>	<u>Dispose in Common Refuse</u>	<u>Incinerate</u>	<u>Vent to Atmosphere</u>	<u>Bury Onsite</u>	<u>Return to Manufacturer</u>	<u>Ship for Disposal</u>	<u>Other</u>
Medical	4	4	1		2	1		1	
Academic	2	2	1	2		1		2	
Industrial						1			2
Governmental	1	1	1					2	
Total	7	7	3	2	2	3		5	2

a. Blank spaces indicate no response for applicable categories.

TABLE 6-6. SUMMARY OF WASTE PROCESSING BEFORE SHIPPING FOR DISPOSAL^a

<u>Type of Generator</u>	<u>Volume Reduction for Solids</u>	<u>Solidification of Liquids</u>	<u>Adsorption of Liquids</u>	<u>Onsite Storage for Decay</u>	<u>Total Responses</u>
Medical		1	1		1
Academic	1		1	1	1
Total	1	1	2	1	2

a. Blank spaces indicate no response for applicable categories.

TABLE 6-7. LICENSED ACTIVITIES

	<u>Number of Respondents^a</u>
Radiodiagnostic procedures	8
Radiation therapy	4
Clinical radioassay	7
Biological research	1

a. Based on all medical licensees that characterized their activities.

6.2.2 Generation and Characteristics of Waste

Table 6-8 shows that nearly one-half of the licensed respondents generate low-level radioactive waste and that the number of these generators remained constant, at five, for the three surveyed years (1978, 1979, and 1980). Table 6-9 indicates that the type of waste most frequently reported during this period was dry compressible waste material, including paper, cloth, plastic, and glass and liquid scintillation waste.

One respondent to the survey indicated that the chemical form of the waste was flammable. The other respondents did not characterize the chemical form of their waste.

6.2.3 Waste-Disposal Methods

As presented in Table 6-10, the most common methods for waste disposal are hold for radioactive decay and release of the waste to sewer. None of the respondents reported that they disposed of waste by incineration or returning the waste to the manufacturer.

6.2.4 Waste-Processing Methods

Waste-processing methods reported by two responding medical licensees were adsorption of liquids on vermiculite and solidification in plaster of Paris.

6.2.5 Radionuclides and Total Activity Levels of the Waste Shipped

The radionuclide reported as being shipped by medical licensees during 1978, 1979, and 1980 was I-125. The activity levels for waste shipped during 1978, 1979, and 1980 were approximately 0.450 millicurie per year.

TABLE 6-8. GENERATION OF LOW-LEVEL WASTE

Did Your Facility Generate Low-Level Radioactive Waste?	Number of Respondents ^a		
	1978	1979	1980
Yes	5	5	5
No	<u>6</u>	<u>6</u>	<u>6</u>
Total	11	11	11

a. Based on the total number of medical licensees responding to the survey.

TABLE 6-9. TYPE AND PERCENTAGE OF LOW-LEVEL RADIOACTIVE WASTE^{a,b}

Waste Type	Percentage of Low-Level Radioactive Waste											
	1978				1979				1980			
	<25	25-50	51-75	>75	<25	25-50	51-75	>75	<25	25-50	51-75	>75
Dry compressible	1	1		2	1	1		2	1	1		2
Liquid scintillation	2				2				2			
Aqueous liquids	1		1	1	1		1	1			1	2
Biological: Patient excreta				1				1				1
Gaseous					2				2			

a. Numbers indicate total number of respondents for category; blank spaces indicate no response.

b. Based on five responses to the survey for each of the years 1978, 1979, and 1980.

TABLE 6-10. LOW-LEVEL RADIOACTIVE WASTE-DISPOSAL METHODS

Waste Type	Disposal Method Used ^a																	
	Hold for Decay			Release to Sewer			Dispose in Common Refuse			Vent to Atmosphere			Bury Onsite			Ship for Disposal		
	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980
Dry compressible ^b	3	3	3										1	1	1	1	1	1
Liquid scintillation ^c				1	1	1			1							1	1	
Aqueous liquids ^d	2	2	2	2	2	2												
Biological: Patient excreta ^c				1	1	1												
Gaseous ^e		1	1								2	2						

a. Numbers indicate total number of respondents for category; blank spaces indicate no response.

b. Based on four responses.

c. Based on two responses.

d. Based on three responses.

e. Based on one response.

6.2.6 Shipping Containers

The shipping containers used exclusively by medical licensees were 55-gallon steel drums, Type A. (The Type A designation is included in U.S. Department of Transportation shipping specifications.)

6.2.7 Commercial Disposal Sites and Disposal Services Used

The commercial disposal site used by medical licensees from 1978 to 1980 was Richland, Washington. None of the medical licensees reported using a commercial disposal service.

6.2.8 Expected Trends in Future Waste Shipment

One medical licensee expects annual waste shipments to decrease.

6.3 Academic Licensees

Academic licensees include public universities and colleges as well as community colleges. Medical schools were included in the medical category.

6.3.1 Licensed Activities

Three academic licensees completed and returned the questionnaires. Table 6-11 lists the licensed activities of these three universities and colleges--biological, environmental and physics research, nonbiological and chemical research, educational use and product activation.

6.3.2 Generation and Characteristics of Waste

Table 6-12 shows that all of the responding licensees generated low-level waste during the 1978-to-1980 period. The reported waste forms generated by these licensees are listed in Table 6-13. These waste forms were: dry compressible wastes, consisting of paper, cloth, plastic, and

TABLE 6-11. LICENSED ACTIVITIES

Activities	Number of Respondents ^a
Biological research	3
Nonbiological research	2
Environmental research	3
Physics research	2
Chemical research	3
Educational or classroom use	2
Product activation	1

a. Based on the responses of the academic licensees characterizing their activities.

TABLE 6-12. GENERATION OF LOW-LEVEL RADIOACTIVE WASTE

Did Your Facility Generate Low-Level Radioactive Waste?	Number of Respondents		
	<u>1978</u>	<u>1979</u>	<u>1980</u>
Yes	<u>3</u>	<u>3</u>	<u>3</u>
Total ^a	3	3	3

a. Based on the total number of medical licensees responding to the survey.

TABLE 6-13. TYPE AND PERCENTAGE OF LOW-LEVEL RADIOACTIVE WASTE

Waste Type	Percentage of Low-Level Radioactive Waste ^{a,b}											
	1978				1979				1980			
	<25	25-50	51-75	>75	<25	25-50	51-75	>75	<25	25-50	51-75	>75
Dry compressible	2		1		2		1		2		1	
Liquid scintillation	1	1	1		1	1	1		1	1	1	
Aqueous liquids	2				2				2			
Biological:												
Animal carcasses		1				1			1	1		
Patient excreta	1				1				1			
Other ^c	1				1				1			
Other ^c	1				1				1			

a. Numbers indicate total number of respondents for each category; blank spaces indicate no response for applicable categories.

b. Based on three responses to the survey.

c. The respondents failed to characterize type of waste.

glass; liquid scintillation wastes consisting of empty vials and spent fluids; aqueous liquid wastes; and biological wastes consisting of animal carcasses. As shown in Table 6-14, the responding licensees characterized the chemical form of their waste types as flammable and toxic.

TABLE 6-14. CHEMICAL FORM OF LOW-LEVEL RADIOACTIVE WASTE

<u>Chemical Classification</u>	<u>Number of Responses</u>
Toxic	1
Flammable	2
None	1

a. Based on the total number of responses by academic licensees.

6.3.3 Waste-Disposal Methods

The responding academic licensees use several disposal methods for the low-level waste they generate. Table 6-15 shows the specific type of wastes disposed of along with all reported disposal methods. An individual respondent may use more than one disposal method. The two disposal methods not used by academic licensee respondents are vent to atmosphere, bury onsite, and return to manufacturer.

6.3.4 Waste-Processing Methods

Only three methods for processing wastes were reported by academic licensees: compaction to reduce the volume of solid wastes, adsorption of liquid wastes on diatomaceous earth for decay, and onsite storage for less than one year. Each of the three methods was reported to be used by one respondent.

6.3.5 Radionuclides and Total Activity Levels of the Waste Shipped

Table 6-16 presents the radionuclides shipped for disposal by academic licensees. In 1978, C-14, Co-60, H-3 and I-125 were shipped for disposal; in 1980, one shipment of waste contained C-14 and H-3. None of the respondents reported shipping waste in 1979.

6.3.6 Shipping Containers

One licensee who responded in this area reported using 55-gallon, Type A and Type LSA drums for shipping low-level radioactive wastes. (The Type A and LSA designations are included in U.S. Department of Transportation shipping specifications.)

6.3.7 Commercial Disposal Sites and Disposal Services Used

One academic licensee reported using the Richland, Washington, site during 1978, 1979, and 1980.

TABLE 6-15. LOW-LEVEL RADIOACTIVE-WASTE DISPOSAL METHODS

Waste Type	Disposal Method Used ^a														
	Hold for Decay			Release to Sewer			Dispose in Common Refuse			Incinerate			Ship for Disposal		
	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980
Dry compressible ^b	1	1	1							1	1	1	2	1	2
Liquid scintillation ^c	2	2	2	1	1	1							2	1	1
Aqueous liquids ^b	1	1	1	2	2	2									
Organic liquids ^d	1	1	1	1	1	1									
Biological:															
Animal carcasses ^d	1	1	1							1	1	1			1
Patient excreta ^c	1	1	1							1	1	1			
Other ^{d,e}	1	1	1				1	1	1	1	1	1			

a. Numbers indicate total number of respondents for category; blank spaces indicate no response for applicable category.

b. Based on two responses to the survey.

c. Based on three responses to the survey.

d. Based on one response to the survey.

e. The respondents failed to characterize the waste type.

TABLE 6-16. RADIONUCLIDES AND ACTIVITY OF WASTE SHIPPED FOR DISPOSAL

Radionuclide	Activity (millicuries)					
	1978		1979		1980	
	Total	Average	Total	Average	Total	Average
C-14	18.0	18.0	0	0	3.0	3.0
Co-60	4.6	4.6	0	0	0	0
H-3	6.1	6.1	0	0	1.7	1.7
I-125	5.0	5.0	0	0	0	0

a. Based on one response to the survey.

6.3.8 Expected Trends in Future Waste Shipment

One academic licensee responding to this question expects waste shipments to increase in the future.

6.4 Industrial Licensees

Industrial licensees surveyed included manufacturers of radiopharmaceuticals, testing and industrial research laboratories, and equipment manufacturers.

6.4.1 Licensed Activities

Table 6-17 lists the reported licensed activities of the 38 industrial licensees that responded to the questionnaires. A few of these industrial licensees are reportedly involved in four types of specific activities: quality-control testing procedures, product monitoring, nondestructive testing (i.e., radiography), and sealed source manufacturing. Most of the industrial licensees, however, failed to identify and characterize their licensed activities.

6.4.2 Generation and Characteristics of Waste

Of the surveyed industrial licensees, two out of 38 indicated that they generate low-level radioactive waste. Additionally, as shown in Table 6-18, this small percentage of industrial licensees remained constant from 1978 through 1980. The most-often-generated waste types, as reported by the two respondents, were slurries, resin sludges, and dry compressibles. The two respondents generating waste indicated that it was both toxic and corrosive.

6.4.3 Waste-Disposal Methods

Both respondents indicated that they disposed of their waste onsite. One of the respondents indicated that they disposed of their waste by a method that they failed to characterize.

TABLE 6-17. LICENSED ACTIVITIES

<u>Licensed Activities</u>	<u>Number of Respondents</u>
Nondestructive testing	10
Quality control testing	11
Monitoring services	1
Sealed source manufacture	1
Product monitoring	4
Other ^a	16

a. The respondents failed to characterize their licensed activities.

TABLE 6-18. GENERATION OF LOW-LEVEL RADIOACTIVE WASTE

DID YOUR FACILITY GENERATE LOW-LEVEL RADIOACTIVE WASTE?	NUMBER OF RESPONDING INDUSTRIAL LICENSEES		
	1978 ----	1979 ----	1980 ----
YES	2	2	2
NO	<u>36</u>	<u>36</u>	<u>36</u>
TOTAL	38	38	38

6.4.4 Waste-Processing Methods

No waste processing was reported by the two industrial licensees generating low-level radioactive wastes.

6.4.5 Radionuclides and Total Activity Levels of the Waste Shipped

No radionuclides were reported by the two industrial licensees generating low-level radioactive waste.

6.4.6 Shipping Containers

The two industrial licensees did not report the use of any type of shipping container.

6.4.7 Commercial Disposal Sites and Disposal Services Used

The two industrial licensees did not ship any waste to commercial burial sites, and therefore did not utilize the services of commercial waste brokers.

6.4.8 Expected Trends in Future Waste Shipment

The industrial licensees did not indicate whether their future waste generation would increase, decrease, or remain the same.

6.5 Governmental Licensees

This waste-generator category includes federal, state, and local government licensees; Department of Defense facilities, except for weapons programs, were also included. Of the 17 responding governmental licensees, only two in 1978 and one in 1979 and 1980 indicated that they generate low-level radioactive waste. Government-operated hospitals were included in the medical category.

6.5.1 Licensed Activities

The licensed activities reported by the 17 government licensees that responded to the questionnaires are nondestructive testing and defense programs. Many of the licensed activities, however, were not specifically characterized by respondents, possibly because the specific application was not listed in the questionnaire, although respondents were asked to specify "other" licensed uses. Such "other" uses may involve one or more of the following: environmental analysis, clinical testing, laboratory research, forensic testing, and food analysis.

6.5.2 Generation and Characteristics of Waste

Only two of the 17 governmental licensees responding reported generation of wastes in 1978; one reported waste generation for each of the years 1978 and 1980. The four general types of waste reported for all years were dry compressibles, including paper, glass, cloth, and plastic; aqueous wastes; slurries, sludges and resins; and organic liquids. The responding licensees failed to characterize the chemical forms of the wastes.

6.5.3 Waste-Disposal Methods

The low-level radioactive waste-disposal methods that were reported were: release to sewer, dispose in common refuse, ship for disposal, and return to manufacturer. An individual licensee may use more than one disposal method.

6.5.4 Waste-Processing Methods

No waste processing was reported by the two government licensees that generated low-level radioactive wastes.

6.5.5 Radionuclides and Total Activity Levels of the Waste Shipped

No radionuclides or total activity levels shipped were reported by the government licensees.

6.5.6 Shipping Containers

One government respondent reported use of 55-gallon, Type A drums for shipping low-level radioactive waste. (The Type A designation is included in U.S. Department of Transportation shipping specifications.)

6.5.7 Commercial Disposal Sites and Disposal Services Used

One government licensee reported using the Beatty, Nevada, disposal site in 1979. The government licensees did not report using the other two commercial burial sites.

6.5.8 Expected Trends in Future Waste Shipment

The two government licensees indicated an expected decrease in waste shipments in the future.

APPENDIX A

LICENSEES

APPENDIX A LICENSEES

The following appendix lists all low-level radioactive waste licensees in Utah by name, type of organization, and response to survey.

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
ACCU-Test Inc. P.O. Box 1227 Vernal, UT 84078	x			x	Industrial
Air Force, Department of the Propellant Lab Section (MAGCP) Directorate of Maintenance (COAMA) Hill AFB, UT 84406	x		x		Government
Air Force, Department of the Avionics PME Section (MACLC) Hill AFB, UT 84056	x		x		Government
Air Force, Department of the Directorate of Hardness OO-ALC/MMETH Hill AFB, UT 84406	x		x		Government
Air Force, Department of the Air Logistics Command Hill AFB, UT 84406	x		x		Government
Air Force, Department of the 508 Tactical Fighter Group Hill AFB, UT 84406	x		x		Government
American Red Cross Intermountain Red Cross Blood Center 555 Foothill Drive Salt Lake City, UT 84113	x			x	Medical
AMOCO Oil Company Salt Lake City Refinery 474 West 900 North Salt Lake City, UT 84103	x			x	Industrial
The Anaconda Company 1849 West North Temple Salt Lake City, UT 84116	x		x		Industrial
ARIX 1815 South State, Suite 100 Orem, UT 84057	x		x		Industrial

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>Licensee</u>
Department of the Army Dugway Proving Ground Dugway, UT 84022	x		x		Government
Department of the Army Ammunition Equipment Office Tooele Army Depot Tooele, UT 84074	x		x		Government
Department of the Army Tooele Army Depot Tooele, UT 84074	x		x		Government
Associated Piping & Engineering Corp. Freeport Center Industrial Park 851 Freeport Ind. Parkway Clearfield, UT 84016	x		x		Industrial
Atlas Corporation Atlas Minerals Division P.O. Box 1207 Moab, UT 84532	x		x		Industrial
Becton Dickinson Immunodiagnostics Automated Immunochemistry Systems 180 West 2950 South Salt Lake City, UT 84115	x		x		Medical
Brigham Young University Provo, UT 84601	x		x		Academic
Brush Wellman Inc. 67 West 2950 South Salt Lake City, UT 84115	x		x		Industrial
Brush Wellman, Inc. Delta Mill P.O. Box 815 Delta, UT 84624	x		x		Industrial
C. A. Cartwright Engineers 108 North Main St. Logan, UT 84321	x		x		Industrial

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Department of Ophthalmology 689 South 75 East Cedar City, UT 84720	x			x	Medical
Chicago Bridge and Iron Company 550 West 1700 South Salt Lake City, UT 84110	x		x		Industrial
Coon, King & Knowlton Soils and Inspection Departments 5330 South 900 East Salt Lake City, UT 84117	x		x		Industrial
Cottonwood Hospital 5770 South 300 East Murray, UT 84107	x			x	Medical
Leland Burt Cowan, M.D. 1255 E. 3900 S. Suite 375 Salt Lake City, UT 84117	x		x		Medical
Creamer and Noble Consulting Engineers Construction Department (Materials Testing Laboratory) P.O. Box 1094 475 E. Tabernacle St. George, UT 84770	x		x		Industrial
Dames & Moore Dames & Moore Laboratory 250 E. Broadway, Suite 200 Salt Lake City, UT 84111	x		x		Industrial
Defense Supply Agency Defense Depot Ogden 512 W. 12th Street Ogden, UT 84401	x		x		Government
Diagnostic Images, Inc. 3970 South, 700 East Suite 15 Salt Lake City, UT 84107	x		x		Medical

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Becton Dickinson & Company Auto-Assay Division 180-175 West 2950 South Salt Lake City, UT 84115	x			x	Industrial
Dixie Medical Center 544 South 400 East St. George, UT 84770	x			x	Medical
EIMCO Foundry Division of Environtech Corporation, 870 S. 500 West, Box 1740 Salt Lake City, UT 84110	x		x		Industrial
Energy Scanners Inc. 152 West Burton, Suite F Salt Lake City, UT 84115	x			x	Industrial
Ford Chemical Laboratory Inc. 40 West Louise Avenue Salt Lake City, UT 84115	x			x	Industrial
Garco Testing Laboratories #41 West Central Avenue P. O. Box 7006 Murray, UT 84107	x		x		Industrial
General Electric Company - Ices 3396 West 1987 South Salt Lake City, UT 84104	x		x		Industrial
Great Salt Lake Minerals and Chemicals Maintenance Department 765 North 10500 West, P. O. Box 1190 Ogden, UT 84402	x		x		Industrial
H-E Lowdermilk Company Engineering Department P.O. Box 509 Helper, UT 84526	x		x		Industrial
Hercules Incorporated Bacchus Works Magna, UT 84044	x		x		Industrial

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Holy Cross Hospital Department of Nuclear Medicine 1045 East 1st South Street Salt Lake City, UT 84102	x		x		Medical
Horrocks 1 West Main, P. O. box 377 American Fork, UT 84003	x		x		Industrial
Hydrotronics 3693 East Cove Point Dr. Salt Lake City, UT 84109	x		x		Industrial
Instrument Contractors 130 West 2950 South Salt Lake City, UT 84115	x		x		Industrial
Department of the Interior Salt Lake City Research Center U.S. Bureau of Mines 729 South Arapen Drive Salt Lake City, UT 84108	x		x		Government
Department of the Interior Water and Power Resources Service Upper Colorado Region P.O. Box 11568 Salt Lake City, UT 84147	x		x		Government
Intermountain Laboratories Inc. 870 East 7200 South Midvale, UT 84047	x			x	Industrial
Intermountain Pipe and Welding Co. Lower Geneva Road 45 South 1000 West P.O. Box 369 Pleasant Grove, UT 84062	x			x	Industrial
Internetics Inc. 2275 S. West Temple Salt Lake City, UT 84115	x			x	Industrial
Jack C. Webster Inc. 1973 W. North Temple Salt Lake City, UT 84116	x		x		Industrial

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Kaman Sciences Corporation Nuclear Controls and Electronics Division 195 West 2950 South Salt Lake City, UT 84115	x			x	Industrial
Kennecott Copper Corporation Utah Copper Division Magna, UT 84044	x		x		Industrial
Kennecott Copper Corporation Ledgemont and Geosciences Laboratories 1205A Wilmington Avenue Salt Lake City, UT 84106	x			x	Industrial
Kennecott Copper Corporation Kennecott Research Center P.O. Box 11299, 1515 Mineral Square Salt Lake City, UT 84147	x		x		Industrial
Department of Labor OSHA Analytical Laboratory 390 Wakara Way Salt Lake City, UT 84108	x		x		Government
Lakeview Hospital 630 Medical Drive Bountiful, UT 84010	x		x		Medical
Latter Day Saints Hospital Department of Radiology 325 Eighth Avenue Salt Lake City, UT 84143	x		x		Medical
Logan Hospital 1400 North 500 East Logan, UT 84321	x		x		Medical
McKay-Dee Hospital Center Department of Nuclear Medicine 3939 Harrison Boulevard Ogden, UT 84402	x		x		Medical
Met-Chem Engineering Laboratories 369 West Gregson Avenue Salt lake City, UT 84115	x		x		Industrial

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Metalsales, Inc. MSI Nuclear Division 80 East 2770 South Salt Lake City, UT 84115	x		x		Industrial
Metropolitan Water District of Salt Lake City 704 Tribune Building Salt Lake City, UT 84111	x		x		Government
Mountain West Design Inc. Soils and Testing Dept. 68 West 100 North Street Logan, UT 84321	x		x		Industrial
Amax Specialty Metals Magnesium Division Salt Lake City, UT 84116	x		x		Industrial
Nuclear Testing Services 1515 Major St. Salt Lake City, UT 84115	x		x		Industrial
Okland Construction Company Inc. P.O. Box 15448, 1978 South West Temple Salt Lake City, UT 84115	x		x		Industrial
Pacific States Cast Iron Pipe Company P.O. Box 1219 Provo, UT 84601	x			x	Industrial
Pioneer Engineering 1465 West 400 North P.O. Box 128 Orem, UT 84057	x			x	Industrial
Pipe-Alloy Inc. 9500 West 900 South Ogden, UT 84403		x		x	Industrial
Portland Cement Co. of Utah P.O. Box 1469 Salt Lake City, UT 84102	x		x		Industrial

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Price Municipal Corporation P.O. Drawer "P" Price, UT 84501	x			x	Government
Provo City Corporation 351 West Center Provo, UT 84601	x		x		Government
Rio Algom Corporation Lisbon Mine, LaSal Route P.O. Box 610 Moab, UT 84532	x		x		Industrial
Rollins, Brown and Gunnel 1435 West 820 North Provo, UT 84601	x			x	Industrial
Sandy City Corporation 800 East 100 North Sandy, UT 84070	x		x		Government
Signetics Corporation 1275 South 800 East Orem, UT 84057	x		x		Industrial
Southern Utah State College School of Science Cedar City, UT 84720	x			x	Academic
Spanish Fork City 50 South Main Street Spanish Fork, UT 84660	x			x	Government
St. Benedict's Hospital 5475 South Adams Ave. (500 East) Ogden, UT 84403	x		x		Medical
St. Mark's Hospital 1200 East 3900 South Salt Lake City, UT 84117	x		x		Medical
Stabro Laboratories Inc. 25 Kensington Avenue Salt Lake City, UT 84115	x		x		Industrial

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
TexasGulf Inc., Plant Dept. P.O. Box 1208 Moab, UT 84532	x		x		Industrial
Thiokol Chemical Corp. Wasatch Division Brigham City, UT 84302	x		x		Industrial
Tooele City Corporation 90 North Main Street Tooele, UT 84074	x		x		Government
U.S. Steel Corporation Geneva Works P.O. Box 510 Provo, UT 84601	x		x		Industrial
Uintah Engineering and Land Surveying Engineering Department P.O. Box Q-110 E. 1st South Vernal, UT 84078	x			x	Industrial
Utah Department of Public Safety Division of Comprehensive Emergency Management 4501 South 2700 West Salt Lake City, UT 84119	x		x		Government
Utah International Inc. P.O. Box 15479, 20 W. 1950 South Salt Lake City, UT 84115	x		x		Industrial
Utah Power & Light Company Department of Mining and Exploration Deseret Mine Orangeville, UT	x		x		Industrial
Utah Power & Light Company 1407 West North Temple Salt Lake City, UT 84110	x		x		Industrial
Utah State Department of Agriculture Office of the State Chemist 35 State Capital Building Salt Lake City, UT 84114	x		x		Government

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Utah State Department of Transportation Materials and Research 757 West Second South Salt Lake City, UT 84104	x		x		Government
Utah State Dept. of Health Division of Health 44 Medical Drive Salt Lake City, UT 84113	x			x	Government
Utah State University Radiological Services Office Logan, UT 84321	x		x		Academic
Utah Valley Hospital 1034 North 5th West Provo, UT 84601	x		x		Medical
University of Utah Spencer Drive, 1590 East Salt Lake City, UT 84112	x			x	Academic
University of Utah University Hospital Salt Lake City, UT 84112	x			x	Academic
University of Utah Radiological Health Department 100 Orson Spencer Hall Salt Lake City, UT 84112	x			x	Academic
Ute Research Laboratory P.O. Box 266 Ft. Duchesne, UT 84026	x		x		Industrial
Utility Testing Lab P.O. Box 25002 Salt Lake City, UT 84125		x		x	Industrial
Valley Engineering Inc. 168 North 100 East Logan, UT 84321	x		x		Industrial
Veterans Administration Medical Center Radioisotope Service Salt Lake City, UT 84148	x			x	Medical

UTAH

<u>Licensee Name and Address</u>	<u>Delivered</u>		<u>Response</u>		<u>Type of Licensee</u>
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	
Wasatch Pathologic Laboratories 211 Medical Arts Building Salt Lake City, UT 84111	x		x		Medical
Weber State College Zoology Department 36 South Fifth Street Ogden, UT 84403	x		x		Academic
Western Zirconium Inc. 3564 Lincoln Ave. P.O. Box 3208 Ogden, UT 84409	x			x	Industrial

APPENDIX B

SURVEY METHODOLOGY

INTRODUCTION

Appendix B presents the survey methodology used to gather and analyze low-level radioactive waste information for Utah. The survey questionnaire Figure B-1, was designed to obtain information on the flow of low-level radioactive waste from generation to disposal for each of the following waste generator categories: medical, academic, industrial, government, and commercial power reactor. The questionnaire was designed to gather as accurate as possible information in an aggregate form by type of waste generator.

The following presents a list of the types of information elicited to obtain a complete profile of low-level radioactive waste generation and disposal practices for each of the categories noted above:

- o Characterization of institutions and their licensed activities
- o Physical characteristics of the waste generated
- o Description of waste disposal methods
- o Description of waste processing methods
- o Radionuclides and activity levels of the shipped waste
- o Volume of waste shipped
- o Types of containers used
- o Identification of commercial disposal sites and disposal services used
- o Number of waste shipments made and direct total costs of waste disposal
- o Expected trend in future waste volume shipment

A list of potential low-level radioactive waste generators and shippers was supplied by the Nuclear Regulatory Commission.

The list of Utah licensees is contained in Appendix A. Each licensee was mailed a survey form (Figure B-1), general instructions, Figure B-2, and a cover letter (Figure B-3). After approximately 30 days, a second letter (Figure B-4) and questionnaire (Figure B-5) were mailed to those licensees that had not responded to the first mailing. The information obtained from the survey is presented in Section 6.

EG&G Idaho, Inc.
Low-Level Waste Management Program
P.O. Box 1625
Idaho Falls, ID 83415

K.F. Downs
(208) 526-0026
FTS 583-0026

Low-Level Radioactive Waste Survey

S.E. Everette
(208) 526-0625
FTS 583-0625

Please answer all questions as best you can. If you are uncertain about any of the quantitative data, give rough approximations. All responses will be kept confidential. The numbers next to the answers are for keypunching and should be ignored.

If you keep records for divisions of your organization located at other sites, make sure your answers reflect waste practices at these sites as well as at your own. If you receive more than one questionnaire, please fill out one, but return the others as well so that we can update our records.

Call S.E. Everette or K.F. Downs at the above number if you have any questions.

1. LICENSEE NAME _____
FACILITY NAME _____
STREET ADDRESS _____
PERSON COMPLETING QUESTIONNAIRE _____
TELEPHONE _____

2. TYPE INSTITUTION AND LICENSED ACTIVITIES
(CHECK AS MANY AS APPLY)

		Government: Federal _____
Medical (Hospitals, medical labs) _____		State _____ Local _____
Radiodiagnostic procedures _____ 5 Radiation therapy _____ 6 Clinical radioassay _____ 7 Biological research _____ 8 Other _____ 9-20 (SPECIFY) _____	Energy/physics/nuclear research _____ 6 Defense programs _____ 7 Medical research _____ 8 Educational/classroom use _____ 9 Non-destructive testing _____ 10 Other _____ 11-22 (SPECIFY) _____	
Industrial _____		Academic _____
Non-destructive testing (radiography) _____ 25 Quality control testing procedures _____ 26 Monitoring services _____ 27 Sealed source manufacture _____ 28 Product monitoring _____ 29 Material activation _____ 30 Radiopharmaceutical production _____ 31-42 Other _____ 43-54 (SPECIFY) _____	Biological research _____ 27 Non-biological research _____ 28 Environmental research _____ 29 Materials analysis _____ 30 Physics research _____ 31 Chemical research _____ 32 Instructional or classroom use _____ 33 Product activation (Charged particle accelerators, research reactors) _____ 34 Other _____ 35-46 (SPECIFY) _____	
Commercial Nuclear Power _____		

If your institution's activities fall into more than one of the types listed above (e.g. a hospital affiliated with a university), which category comprises the bulk of your use of radioactive materials? _____

Medical Industrial Academic Commercial

(Choose appropriate cat.)

Figure B-1. Low-Level Radioactive Waste Survey

3. Did your facility generate low-level radioactive waste in:

IF NO RADIOACTIVE WASTE WAS
GENERATED FOR ALL THREE YEARS,
YOU HAVE COMPLETED THE
QUESTIONNAIRE. PLEASE RETURN IT
IN THE ENVELOPE PROVIDED.

1978 Yes _____ No _____ 1
1979 Yes _____ No _____ 2
1980 Yes _____ No _____ 3

4. TYPE OF LOW-LEVEL RADIOACTIVE WASTE GENERATED. Please indicate how much of each waste type your facility generated each year. Indicate the waste type as an approximate **percentage** ($\pm 5\%$) of the total volume of radioactive waste you generated. If no waste of a type is generated, leave that row blank.

TYPE OF WASTE	Percentage of total 1978 radioactive waste	Percentage of total 1979 radioactive waste	Percentage of total 1980 radioactive waste	
Dry compressible (e.g., paper, cloth, plastic, vials, syringes)				8-18
Dry non-compressible (e.g., contaminated and/or irradiated equipment, etc.)				19-29
Liquid scintillation wastes				30-40
Slurry/Resins/Sludges				41-51
Filters/Filter cartridges				52-62
Evaporator concentrates				63-73
Aqueous liquids				74-84
Organic liquids				85-95
Biological wastes:				96-106
Animal carcasses				23-33
Patient excreta				34-44
Other:				45-55
Gaseous wastes				56-66
Sealed sources				67-77
Activation products (accelerators)				78-88
Other (please specify below)				89-99
	100%	100%	100%	23-29

5. Can any of the radioactive waste you generate be classified as: (Use Dept. of Transportation classification guides.)
(CHECK AS MANY AS APPLY)

Corrosive _____ 1
Chemically toxic _____ 2
Flammable _____ 3
Volatile _____ 4
Other _____ 5-15
None of the above _____ 16 (SPECIFY)

Figure B-1. Low-Level Radioactive Waste Survey

6. Please check the final disposal method or methods used for each type of waste generated by your institution in 1978, 79, and 80.
For types not generated, leave corresponding rows blank.

DISPOSAL METHOD

Type Waste	Dispose of as radioactive waste																											
	Hold for decay-dispose as non-radioactive waste			Release to Sewer			Dispose in Common Refuse			Incinerate			Vent to Atmosphere			Bury on Site			Other (Specify Below)			Ship for Disposal				Return to Manufacturer		
	78	79	80	78	79	80	78	79	80	78	79	80	78	79	80	78	79	80	78	79	80	78	79	80		78	79	80
Dry compressible (e.g., paper, cloth, glass, plastic)																												1-30
Dry non-compressible (e.g., contaminated and/or irradiated equipment, etc.)																												31-61
Liquid scintillation wastes																												1-30
Slurry/resins/sludges																												31-61
Filters/filter cartridges																												1-30
Evaporator concentrates																												31-61
Aqueous liquids																												1-30
Organic liquids																												31-61
Biological wastes:																												
animal carcasses																												1-30
patient excreta																												31-61
other: _____																												1-30
Gaseous wastes																												31-61
Sealed sources																												1-30
Activation products (accelerators)																												31-61
Other waste types (SPECIFY BELOW)																												1-30

If in Question 6 you indicated that wastes were not shipped for disposal during 1978, 79, and 80, you have completed the questionnaire. All subsequent questions relate only to wastes shipped for disposal.

Figure B-1. Low-Level Radioactive Waste Survey

7. What was the total volume in cubic meters or cubic feet of waste shipped off-site for disposal during each year? Please indicate quantity and circle units.

1978 ft^3 m^3 1979 ft^3 m^3 1980 ft^3 m^3

8a. What was the total activity from all sources of the waste shipped from your facility for each of the following years? (Give quantity and circle units; allow one digit for each block including the decimal.)

1978			1979			1980		
Quantity	Units		Quantity	Units		Quantity	Units	
<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	
22-27 30 31 32			35-42 45 46 47			50-55 58 60 61		

8b. Are these values decay corrected? Yes No 65

9. Identify the principal radionuclides making up the bulk activity of the waste shipped off-site for disposal for each of the following three years. Please give quantities to two significant digits (e.g., 2500 Ci or 1.5 mCi) and indicate units by circling Ci, mCi, or μ Ci.

Radionuclide	1978			1979			1980		
	Quantity	Units		Quantity	Units		Quantity	Units	
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	1-16
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	17-33
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	34-51
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	1-16
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	17-33
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	34-51
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	1-16
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	17-33
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	34-51
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	1-16
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	17-33
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	34-51
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	1-16
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	17-33
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	34-51
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	1-16
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	17-33
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	34-51
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	1-16
<u> </u>	<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci		<u> </u>	Ci mCi μ Ci	17-33

Figure B-1. Low-Level Radioactive Waste Survey

10. Is the waste you ship processed prior to shipment? Yes _____ No _____

If yes, what processing methods are used? (CHECK AS MANY AS APPLY)

- Volume reduction for solids
 - Compaction _____ 5
 - Incineration, ship residue _____ 6
- Volume reduction for liquids
 - Evaporation _____ 7
 - Filtration _____ 8
 - Ion exchange _____ 9
 - Other (centrifugation, reverse osmosis, fluid bed dryer/calclner) _____ 10
- Solidification
 - In plaster of paris _____ 11
 - In cement _____ 12
 - In polymer _____ 13
 - In bitumen _____ 14
 - Other _____ 15-25
(SPECIFY)
- Absorption of liquids through:
 - Vermiculite _____ 26
 - Microcel _____ 27
 - Diatomaceous earth _____ 28
 - Other _____ 29-39
(SPECIFY)
- On-site storage for decay
 - Less than one year _____ 40
 - One year or more _____ 41

11a. To which commercial disposal site did you ship your waste and what percentage of the shipped waste went to each?

	78	79	80
Barnwell, South Carolina	_____ 1-3	_____ 4-7	_____ 8-11
Richland (Hanford), Washington	_____ 12-15	_____ 16-19	_____ 20-23
Beatty, Nevada	_____ 24-27	_____ 28-31	_____ 32-35
Other _____ (SPECIFY)	_____ 36-46	_____ 47-50	_____ 51-54 _____ 55-58

11b. Does your facility use commercially available low-level radioactive waste disposal services (waste brokers)?

Yes _____ No _____ 59

(IF YES)

Disposal service utilized _____
(NAME AND ADDRESS) _____

60-70

12. How many shipments of radioactive wastes did you make in:

1978 _____ 1979 _____ 1980 _____ 1981 (to date) _____
1-3 4-7 8-11 12-15

13. What type of shipping containers are used most often?

55 gallon steel drums: Type A _____ LSA _____ 20

Fiberboard or wooden boxes: Type A _____ LSA _____ 21

Shipping casks (Type B): With disposable liner _____ Without disposable liner _____ 22

30 gallon steel drums: Type A _____ LSA _____ 23

Other _____ 24-34
(SPECIFY)

14. Excluding labor expenses, what were the total costs of radioactive waste disposal at your facility in:

1978 _____ 1979 _____ 1980 _____ 1981 (to date) _____
10-45 46-51 52-57 58-63

15. Is the waste volume shipped off-site by your facility expected in the next several years to:

Increase _____ Remain the same _____ Decrease _____ 55

Feel free to make additional comments. Thank you very much for your cooperation.

EG&G Idaho, Inc.
Low-Level Waste Generator Survey

General Instructions

1. The enclosed Radioactive Waste Survey is self-explanatory. The following instructions provide general guidelines. If you have any specific concerns, please call:

K.F. Downs S.E. Everette
(208) 526-0026 or (208) 526-0625
FTS 583-0026 FTS 583-0625

NOTE: Please complete all applicable questions whether or not your facility generates radioactive waste. If your facility does not generate waste, complete questions 1 through 3 and return the survey.

2. If possible, all quantitative data should be taken directly from shipment records. If this is not practical, please estimate answers as accurately as possible. We prefer to have actual data rather than estimates.
3. Please explain or specify answers (where requested) as completely as possible. If additional space is needed, please use the "Additional Comments" section on the last page of this questionnaire.
4. When you have completed this questionnaire, please return it in the enclosed stamped, self-addressed envelope.
5. If your facility does not dispose of radioactive materials by using the commercial radioactive material disposal sites, please fill out the survey form with the amount of material received in each year and where those radioactive materials received were disposed of (e.g., isotopes used in patient treatment, residues decayed to background, disposed in trash, or shipped out in finished products).

Figure B-2. Low-Level Waste Generator Survey

P.O. BOX 1625, IDAHO FALLS, IDAHO 83415

LOW-LEVEL RADIOACTIVE WASTE SURVEY - SEE-1-81

Dear :

EG&G Idaho, Inc., a contractor to the Department of Energy, is responsible for coordinating the development of a national program for the management of low-level radioactive wastes. The program has identified the need to clarify the scope and type of low-level waste generated and the practices used in managing these wastes. To provide such information, briefing books on low-level waste management are being developed for each state.

These state briefing books will include data on economic, demographic, governmental, and public interest factors that influence low-level waste management practices. Information on the volume, sources, physical forms, and projections of low-level waste will be a major feature of the briefing books.

EG&G Idaho, Inc., in cooperation with the Utah Bureau of Radiation and Occupational Health, is surveying all Nuclear Regulatory Commission licensees to collect data on waste generation in Utah.

Data obtained from this survey will be kept confidential and will only be reported in aggregated form by type of low-level waste generators (commercial power reactors, medical institutions, etc.). It will be used to obtain a profile of low-level waste generated in Utah and assist in the consideration of alternative approaches in developing a low-level waste management program. This information should enable the national program to respond better to public concerns, government interest, and the desire on the part of the private sector to properly manage low-level waste in the United States.

Please complete the survey and return it within five days in the enclosed self-addressed, stamped envelope. The more detailed the information you provide, the more meaningful the results of the survey.

Please feel free to obtain further information on the national program, the briefing books, or the survey by contacting either of the EG&G Idaho, Inc., program specialists listed below.

Very truly yours,

S. E. Everette
(208) 526-0625

K. F. Downs
(208) 526-0026

amw

Figure B-3. Cover Letter

P.O. BOX 1625, IDAHO FALLS, IDAHO 83415

July 22, 1981

Dear :

EG&G Idaho, Inc. is a contractor for the U.S. Department of Energy on the project to develop state briefing books on low-level radioactive waste concerns.

A major feature of these briefing books will be information on the volume, sources, physical forms and projections of low-level wastes. Since your organization holds a license, a survey form was forwarded to you during May, however to date we have received no response.

The information you provide will be used to obtain a profile of low-level waste generated in Utah and assist in the consideration of alternative approaches in developing a low-level waste management program; therefore, responding to this request is in your own interest.

As of mid-July, we have not received a completed survey from you. If you have not received a survey form, please check the appropriate category on the enclosed form and mail it to me. If you are still in the process of completing the survey form, please contact me to resolve any questions. If any one of the three latter categories is applicable, please check the appropriate category and return the enclosed form to me.

Let me close by stressing that the information we are requesting is vital to the validity of this study and that all responses will remain confidential.

Sincerely,

A handwritten signature in cursive script that reads "Karen F. Downs".

Karen F. Downs
Program Specialist
Low-Level Waste Management Program

amw

Enclosure:
As stated

Figure B-4. Followup Letter

FROM

Mr. S. E. EVERETTE
P. O. Box 1625
IDAHO FALLS, ID 83415

PLEASE CHECK THE APPROPRIATE BOX:

- ☐ I HAVE NOT RECEIVED THE LOW LEVEL WASTE GENERATOR SURVEY.
- ☐ I HAVE RECEIVED THE SURVEY AND INTEND TO SEND IT BACK.
- ☐ I HAVE ALREADY SENT IT BACK.
- ☐ USE ONLY SEALED SOURCES.
- ☐ USE NO NUCLEAR MATERIAL.
- ☐ USE NUCLEAR MATERIALS, BUT GENERATE NO RADIOACTIVE WASTE.

Figure B-5. Follow-up Form

APPENDIX C

STATE RULES AND REGULATIONS FOR

RADIOACTIVE WASTE MANAGEMENT

IN UTAH

PLACEMENT OF NUCLEAR WASTE

1981

GENERAL SESSION

Enrolled Copy

S. B. No. 18

By Frances Farley

K. S. Cornaby

Ivan M. Matheson

Karl G. Swan

Omar B. Bunnell

Haven J. Barlow

Arthur L. Kimball

Eldon A. Money

AN ACT RELATING TO THE PROHIBITION OF PLACEMENT OF NUCLEAR WASTE IN UTAH; PROHIBITING THE PLACEMENT OF HIGH LEVEL NUCLEAR WASTE IN UTAH, UNLESS THE GOVERNOR, AFTER CONSULTATION WITH THE COUNTY COMMISSIONER OF THE AFFECTED COUNTY AND WITH CONCURRENCE OF THE LEGISLATURE, AUTHORIZES SUCH PLACEMENT.

Be it enacted by the Legislature of the State of Utah:

Section 1. The State of Utah shall not approve the placement in Utah of high level nuclear waste unless the Governor, after consultation with the county commission of the affected county and with concurrence of the legislature, specifically approves such placement.

Section 2. As used in this act, "high level nuclear waste" means spent reactor fuel assemblies, dismantled nuclear reactor components, and solid and liquid wastes from fuel reprocessing and defense-related wastes, but does not include medical or institutional wastes, naturally-occurring radioactive materials, or uranium mill tailings.

HAZARDOUS WASTE FACILITIES MANAGEMENT ACT

1981

GENERAL SESSION

Enrolled Copy

S. B. No. 278

By Fred W. Finlinson

AN ACT RELATING TO HAZARDOUS WASTE MATERIAL; PROVIDING FOR THE CREATION OF A HAZARDOUS WASTE FACILITIES AUTHORITY UNDER SPECIFIED CIRCUMSTANCES; PROVIDING FOR THE COMPOSITION, DUTIES, AND RESPONSIBILITIES OF THE AUTHORITY; PROVIDING FOR THE ISSUANCE OF REVENUE BONDS BY THE AUTHORITY TO FINANCE THE CONSTRUCTION OF HAZARDOUS WASTE FACILITIES; PROVIDING FOR THE TERMS AND CONDITIONS GOVERNING THE ISSUANCE OF SUCH BONDS; AND PROVIDING THE PROCEDURE FOR THE ISSUANCE OF THESE BONDS BY THE AUTHORITY.

Be it enacted by the Legislature of the State of Utah:

Section 1. This act shall be known and may be cited as the "Hazardous Waste Facilities Management Act."

Section 2. As used in this act:

(a) "Authority" means the hazardous waste facilities authority created pursuant to section 4.

(b) "Committee" means the hazardous wastes committee created pursuant to section 26-37-2.

(c) "Disposal" means the final disposition of hazardous wastes into or onto the lands, waters, and air of this state.

(d) "Hazardous wastes" means wastes defined in section 26-37-2.

(e) "Hazardous waste treatment, disposal, and storage facility" means a facility or site used or intended to be used for the treatment, storage, or disposal of hazardous waste materials, including but not limited to, physical, chemical, or thermal processing systems, incinerators, and secure landfills.

(f) "Obligations" means any notes, debentures, interim certificates, mortgage certificates, revenue bonds or other evidence of financial indebtedness, but does not mean any general obligation bonds.

(g) "Site" means land used for the treatment, disposal, or storage of hazardous wastes.

(h) "Storage" means the containment of hazardous wastes for a period of more than 90 days.

(i) "Treatment" means any method, technique, or process designed to change the physical, chemical, or biological character or composition of any hazardous waste to neutralize or render it nonhazardous, safer for transport, amenable to recovery or storage, convertible to another usable material, or reduced in volume and suitable for ultimate disposal.

Section 3. (1) Any person who believes that the treatment, storage, and disposal of hazardous wastes within the state are not being adequately serviced by private industry may file a petition with the committee seeking the creation and establishment of a hazardous waste facilities authority.

(2) The petition shall be signed by the petitioner and set forth with particularity the reasons petitioner is relying upon in support of the petitioner's conclusion that the hazardous waste needs are not being satisfied.

(3) Upon the receipt of a petition, and after such public notice of the date and place of hearing as the committee deems appropriate is given, the committee shall conduct at least one public hearing on the issues raised by the petitioner.

(4) At the conclusion of the hearing or hearings, the committee shall approve or disapprove the petition. The action of the committee shall be supported by written findings of fact which shall be served upon the petitioner by certified mail.

(5) If the committee approves the petition, it shall make a written recommendation to the governor that action be taken

S. B. No. 278

to create and establish the authority. The governor, within 30 days after receipt of the recommendation, shall affirm it or remand the recommendation to the committee for its reconsideration.

(6) If the recommendation is remanded, the committee shall reconsider its action and either reapprove or disapprove the petition. If the petition is reapproved, it shall forward a notice of its reapproval to the governor who shall proceed to create and establish the authority; otherwise, the committee shall forward notice of its disapproval to the petitioner by certified mail.

Section 4. (1) If compliance is had with the requirements of section 3, the governor shall proceed to create and appoint the members of the authority which shall be composed of ten members appointed by the governor with the advice of the senate, as follows:

- (a) The director of the department of health;
- (b) The director of the department of community and economic development;
- (c) The director of the department of natural resources;
- (d) The director of the department of transportation; and
- (e) Six members from the public-at-large.

(2) Public-at-large members, no more than three of whom shall be from the same political party, shall be appointed to six-year terms of office, subject to removal by the governor with or without cause. Initial public-at-large members shall be appointed, respectively, in equal numbers, to two-year terms of office.

(3) The governor shall name one public-at-large member as chairman of the authority who is responsible for the call and conduct of authority meetings. The authority may elect such other officers as it deems necessary. Five members of the authority present at a duly noticed meeting shall constitute a

S. B. No. 278

quorum for the transaction of official authority business. Public-at-large members are entitled to per diem and expenses, for each day devoted to authority business, in accordance with the schedule promulgated under section 63-2-15.

Section 5. The authority is a body corporate and politic with power to:

- (1) Sue and be sued in its own name;
- (2) Have a seal and alter the same at will;
- (3) Borrow money and issue obligations, including refunding obligations, and provide for the rights of holders of such obligations;
- (4) Establish hazardous waste treatment, disposal, or storage surcharge schedules for facilities operated by, or under authority of, the authority, and require all private facility operators who contract with the authority to collect fees for all hazardous wastes received for treatment, disposal, or storage by such private facilities;
- (5) Promulgate rules pursuant to the Utah Administrative Rule-making Act governing the exercise of its powers and fulfillment of its purposes;
- (6) Enter into contracts and leases and execute all instruments necessary, convenient, or desirable;
- (7) Acquire, purchase, hold, lease, use, or dispose of any property or any interest in such property that is necessary, convenient, or desirable to carry out the purposes of this act and sell, lease, transfer, and dispose of any property or interest in such property at any time required in the exercise of its power including, but not limited to, the sale, transfer, or disposal of any materials, substances, or sources or forms of energy derived from any activity engaged in by the authority;
- (9) Contract with experts, advisers, consultants, and agents for needed services;

S. B. No. 278

(9) Appoint such officers and employees as it may require for the performance of its duties, and to fix and determine their qualifications and duties;

(10) Make, or contract for, plans, surveys, and studies necessary, convenient, or desirable to effectuate its purposes and powers and prepare any recommendations with respect to such plans, surveys or studies;

(11) Receive and accept aid or contributions from any source including the United States or this state, in the form of money, property, labor, or other things of value to be held, used, and applied to carry out the purposes of this act, subject to the conditions imposed upon such aid or contributions consistent with this act;

(12) Enter into agreements with any department, agency, or instrumentality of the United States or this state, or any financial institution, or contractor for the purpose of leasing and operating any facility;

(13) Consent to the modification of any obligation with the holder or such obligation to the extent permitted by the obligation relating to rates of interest or to the time and payment of any installment of principal or interest, or to the modification of any other contract, mortgage, mortgage loan, mortgage loan commitment, or agreement of any kind to which it is a party;

(14) Pledge revenues from any hazardous waste treatment, disposal, and storage facility to secure payment of any obligations relating to that facility, including interest on, and redemption of, those obligations;

(15) Execute or cause to be executed, mortgages, trust deeds, indentures, pledge agreements, assignments, security agreements, and financing statements that encumber property acquired, constructed, reconstructed, renovated or repaired with the proceeds from the sale of such obligations;

(16) Exercise the power of eminent domain;

(17) Do all other things necessary to comply with the requirements of the Resource Conservation and Recovery Act of 1976, and this act.

(18) Contract for the construction, operation and maintenance of hazardous waste treatment, storage, and disposal facilities, including plants, works, instrumentalities, or parts thereof, for the collection, conveyance, treatment, exchange, storage, and disposal of hazardous wastes, subject to approval by the committee pursuant to section 26-37-7; and

(19) Exercise any other powers or duties necessary or appropriate to carry out and effectuate this act.

Section 6. (1) The authority is authorized, pursuant to chapter 34, title 78, to acquire sites sufficient in number to meet the hazardous waste treatment, storage, and disposal needs of the state if, in the judgment of the authority, private operators are not adequately meeting such needs. Exercise of the power of eminent domain to acquire such sites is declared to be for a public purpose and use.

(2) Before the purchase or condemnation of any site by the authority, the committee shall certify that the site meets the standards for eventual incorporation into an approved hazardous wastes operations plan.

(3) If the authority is disincorporated for any reason, all its property shall vest in, and become the property of, the state, which shall succeed to all the rights and liabilities of the authority which exist at the time of vestiture in the state.

Section 7. Fees for the treatment, disposal, and storage of hazardous wastes at facilities operated by, or under subcontract with the authority shall be set by the authority based upon the following considerations:

(a) The quantity of hazardous wastes processed;

S. B. No. 278

(b) The difficulty encountered in the treatment, disposal or storage of such wastes;

(c) The maintenance expense and the expense of other legal obligations incurred pursuant to post-closure monitoring and liability requirements related to the long-term disposal or storage;

(d) The operation and maintenance expense incident to the facility and to the debt retirement obligations of the authority; and

(e) Any other considerations deemed relevant by the authority.

Section 8. (1) All obligations of the authority shall plainly state that they are limited and that neither the credit of the state nor its taxing authority is pledged in whole or in part in payment of such obligations.

(2) All obligations, before issuance, shall be authorized by resolution of the authority and may:

(a) Be executed and delivered from time to time, as the authority determines;

(b) Be sold at public or private sale in such manner as the authority determines;

(c) Be in such form and denominations as the authority determines;

(d) Be of such tenor as the authority determines;

(e) Be in registered or bearer form either as to principal, interest, or both;

(f) Be payable in such installments and at such times as the authority determines;

(g) Be payable at such places, either within or without this state, as the authority determines;

(h) Bear interest at such rate or rates, payable at such place or places, and evidenced in such manner, as the authority determines;

S. B. No. 278

(i) Be redeemable prior to maturity, with or without premium;

(j) Contain any other provisions the authority deems in its best interest that are not inconsistent with this act; and

(k) Bear facsimile signatures and seals.

(3) Any or all expenses, premiums, or commissions incurred in the issuance and sale of its obligations may be paid either from the proceeds of the sale of such obligations or from revenues generated by the projects involved.

Section 9. (1) The principal and interest on any obligation issued pursuant to this act shall be secured by:

(a) A pledge and assignment of the proceeds earned by the facility built and acquired with the proceeds of the obligations;

(b) A mortgage or trust deed on the facility built and acquired with the proceeds from the obligations; and

(c) Such other security on the facility as is deemed most advantageous by the authority.

(2) Obligations authorized for issuance under this act and any mortgage or other security given to secure such obligations may contain any provisions customarily contained in security instruments, including, but not limited to:

(a) The fixing and collection of fees from the facility;

(b) The maintenance of insurance on the facility;

(c) The creation and maintenance of special funds to receive revenues earned by the facility; and

(d) The rights and remedies available to obligation holders in the event of default.

(3) All mortgages, trust deeds, security agreements or trust indentures on a facility shall provide in the event of foreclosure, that no deficiency judgment may be entered against the authority, the state, or any of the state's political subdivisions.

S. B. No. 278

(4) Any mortgage or other security instrument securing such obligations may provide that in the event of a default in the payment of principal or interest or in the performance of any agreement, that payment or performance may be enforced by the appointment of a receiver with power to charge and collect fees and to apply the revenues from the facility in accordance with the provisions of the security instrument.

(5) Any mortgage or other security instrument made pursuant to this act may also provide that in the event of default in payment or breach of a condition, that the mortgage may be foreclosed or otherwise satisfied in any manner permitted by law, and that the trustee under the mortgage or the holder of any obligation secured by such mortgage may, if the highest bidder, purchase the security at foreclosure sale.

Section 10. Proceeds from the sale of obligations shall be applied solely to the purposes for which they were issued. Accrued interest and premiums received upon such sale and any proceeds not needed for the purposes for which the obligations were issued, however, shall be applied to payment of principal or interest on such obligations.

Section 11. The cost of acquisition or improvement of any facility is deemed to include:

(1) The actual cost of land acquisition and improvements to the land; and

(2) The actual cost of construction, alteration, or remodeling of a facility, including maintenance and the cost of equipping it; the cost of architectural and engineering fees; the cost of legal and accounting fees incurred incident to issuance of such obligations; the cost of fees for financial advisors and printing; and the interest on such obligations for a reasonable period of time.

Section 12. If, at the time of delivery of an obligation, the member or officer who signed the obligation no longer

occupies such position, the signature or facsimile is nevertheless valid and sufficient for all purposes.

Section 13. All obligations of the authority are negotiable instruments within the purpose and meaning of the Utah Uniform Commercial Code, subject to any provision of such obligations that relate to registration.

Section 14. No person who executes an obligation issued pursuant to this act is personally liable on account of such action.

Section 15. All property acquired or held by the authority is declared to be public property used for essential public and governmental purposes. All property owned by the authority and all income derived from it is exempt from taxation by the state or its political subdivisions. All principal and income derived by holders of obligations issued by the authority is also exempt from taxation by the state or its political subdivisions.

Section 16. Obligations issued pursuant to this act are securities in which all persons and organizations authorized to invest in obligations of this state may properly and legally invest. These obligations are also declared to be securities which may properly and legally be deposited with, and received by, any state, county, or municipal officer.

Section 17. (1) Each resolution adopted by the authority authorizing the issuance of obligations shall be published in a newspaper with general circulation in the state. For a period of 30 days after the date of publication, any interested person may contest the legality of the resolution, the obligations authorized by it, or any provision made for the security and payment of the proposed obligations. At the expiration of the 30-day period, no person, except as otherwise provided in subsection (2) of this section, has standing to contest the validity of such action.

S. B. No. 278

(2) If any official required to sign obligations refuses to sign them, alleging that the obligations are illegal, the authority may bring an original action in the state supreme court for a writ of mandamus to compel the official to sign the obligations.

Section 18. (1) The attorney general shall provide all legal services, and the state auditor, all accounting and auditing services, for the authority without reimbursement.

(2) Subsection (1) of this section is inapplicable to the opinions of attorneys or accountants necessitated before issuance of any obligations.

HAZARDOUS WASTE FACILITY SITING ACT

1981

GENERAL SESSION

Enrolled Copy

S. B. No. 258

By Fred W. Finlinson

AN ACT RELATING TO HAZARDOUS WASTE MATERIAL; PROVIDING FOR THE ADOPTION OF GUIDELINES FOR THE SELECTION OF HAZARDOUS WASTE TREATMENT, DISPOSAL, AND STORAGE FACILITY SITES; PROVIDING PROCEDURES FOR THE ADOPTION OF A STATE-WIDE HAZARDOUS WASTE SITING PLAN BY THE HAZARDOUS WASTE COMMITTEE; PROVIDING JUDICIAL REMEDIES FOR PERSONS WHOSE PROPERTY VALUES ARE ADVERSELY AFFECTED BY THE LOCATION OF A HAZARDOUS WASTE TREATMENT FACILITY; AND PROVIDING SPECIFIED PROTECTIONS FOR HAZARDOUS WASTE TREATMENT FACILITIES LOCATED AT SITES APPROVED BY THE STATE-WIDE SITING PLAN.

Be it enacted by the Legislature of the State of Utah:

Section 1. This act shall be known and may be cited as the "Hazardous Waste Facility Siting Act."

Section 2. Economic and population growth of the state have resulted in the generation of hazardous wastes. Increased industrial expansion, however, is essential to the citizens of this state because of the need to provide jobs for future residents and because of the improvement in the standard of living that continued economic development brings.

There exists within our state a critical shortage of approved hazardous waste treatment, disposal, and storage facility sites. This shortage is expected to increase in the future because of federal and state regulations enacted pursuant to the Resource Conservation and Recovery Act of 1976. Technology and management practices currently exist to treat, dispose, and store hazardous wastes without unacceptable

environmental and health effects. The legislature finds it is necessary for the public good to take an active role in the approval of hazardous waste treatment, disposal, and storage facility sites.

Therefore, it is the legislature's purpose in this act to require the state hazardous waste committee, consistent with acceptable impacts upon the environment and upon public health, to develop a state-wide plan for siting hazardous waste treatment, disposal, and storage facilities and to authorize the committee to certify sites suitable for the construction and operation of such facilities.

Section 3. (1) "Committee" means the hazardous waste committee created pursuant to section 26-37-2.

(2) "Disposal" means the final disposition of hazardous wastes into or onto the lands, waters, and air of this state.

(3) "Hazardous wastes" means wastes as defined in section 26-37-2.

(4) "Hazardous waste treatment, disposal, and storage facility" means a facility or site used or intended to be used for the treatment, storage, or disposal of hazardous waste materials, including but not limited to, physical, chemical, or thermal processing systems, incinerators, and secure landfills.

(5) "Site" means land used for the treatment, disposal, or storage of hazardous wastes.

(6) "Siting plan" means the state hazardous waste facilities siting plan adopted by the committee pursuant to sections 5 and 6.

(7) "Storage" means the containment of hazardous wastes for a period of more than 90 days.

(8) "Treatment" means any method, technique, or process designed to change the physical, chemical, or biological character or composition of any hazardous waste to neutralize

S. B. No. 258

or render it non-hazardous, safer for transport, amenable to recovery or storage, convertible to another usable material, or reduced in volume and suitable for ultimate disposal.

Section 4. This chapter shall not be construed to supercede any other state or local law relating to hazardous waste; except, as otherwise provided in section 8.

Section 5. (1) The committee, after the conduct of public hearings and written comment and within one year after the effective date of this act, shall adopt and publish guidelines for the location of hazardous waste treatment, storage and disposal facilities. The guidelines shall ensure that facilities are sited so that the wastes located there will not constitute an unacceptable health hazard or impact the environment in an unacceptable manner.

(2) Proposed guidelines for siting shall take into account the following considerations:

(a) The zoning classification of the site proposed and its proximity to present or projected land use dedicated to industrial development;

(b) The existing land uses and the density of population in areas neighboring the proposed site;

(c) The density of population in areas adjacent to probable hazardous waste delivery routes;

(d) The risk and impact of accidents which might occur during the transportation of hazardous wastes to the site;

(e) The determination of areas that are dedicated to an incompatible public use or are unsuitable for other reasons for the location of hazardous wastes;

(f) The geology of the proposed site with special attention to the presence of fault zones and the risk of contamination to ground and surface waters through leaching and runoff;

(g) The risk to life and property from fires or explosions that might occur if improper storage and disposal methods are used;

(h) The economic and environmental impact of the proposed facility site location upon local governmental units adjacent to, or within which, the facility is proposed for location;

(i) Closure and post-closure monitoring and maintenance requirements; and

(j) Such other criteria as are required for the siting of hazardous wastes under state or federal law.

Section 6. (1) After completion of the guidelines, the committee shall prepare and publish a preliminary siting plan for the state. The preliminary siting plan, which shall not become final until adopted by the committee in accordance with the procedures specified in subsection (2) of this section and shall be based upon the guidelines adopted under section 5 and be published within one year after adoption of the guidelines.

(2) (a) After completion of its guidelines, the committee shall publish notice of intent to prepare a siting plan. The notice shall invite all interested persons to nominate sites for inclusion in the siting plan. It shall be published at least twice in not less than two newspapers with state-wide circulation and shall also be sent to any person, business, or other organization that has notified the committee of an interest or involvement in hazardous waste management activities.

(b) Nominations for the location of hazardous waste sites shall be accepted by the committee for a period of 120 days after the date of first publication of notice. Nominations may include a description of the site or sites suggested or, may simply suggest, a general area. In addition, any nomination may provide data and reasons in support of inclusion of the site nominated.

(c) The committee, in cooperation with other state agencies and private sources, shall then prepare an inventory of the hazardous wastes generated in the state, those likely to be generated in the future, and those being generated in other states that are likely to be treated, disposed of, or stored in the state; the sites within the state currently being used for hazardous wastes and those suggested through the nomination process; the treatment, storage, and disposal processes and management practices that are required to comply with section 26-37-7; and an estimate of the public and private costs for meeting the long-term demand for hazardous waste treatment, disposal, and storage facilities.

(d) After the hazardous waste inventory and cost estimate are complete, the committee with the use of the guidelines developed in section 5, shall provide for the geographical distribution of enough sites to fulfill the state's needs for hazardous waste disposal, treatment, and storage for the next 25 years. The committee shall not exclude any area of the state from consideration in the selection of potential sites but, to the maximum extent possible, shall give preference to sites located in areas already dedicated through zoning or other land use regulations to industrial use or to areas located near such uses. However, the committee shall give consideration to excluding an area designated for disposal of uranium mill tailings or for disposal of nuclear wastes unless the proposed disposal site is approved by the affected county through its board of county commissioners.

(e) The committee shall also analyze and identify areas of the state where, due to the concentration of industrial waste generation processes or to favorable geology or hydrology, the construction and operation of hazardous waste treatment, disposal, and storage facilities appears to be technically, environmentally, and economically feasible.

(3) The preliminary siting plan prepared pursuant to subsection (2) of this section shall before adoption, be distributed to all units of local government located near existing or proposed sites. Notice of the availability of the preliminary siting plan for examination shall be published at least twice in two newspapers, if available, with general circulation in the areas of the state that potentially will be affected by the plan. The committee shall also issue a state-wide news release that informs persons where copies of the preliminary siting plan may be inspected or purchased at cost. After release of the preliminary siting plan, the committee shall hold not less than two public hearings in different areas of the state affected by the proposed siting plan to allow local officials and other interested persons to express their views and submit information relevant to the plan. The hearings shall be conducted not less than 60 nor more than 90 days after release of the plan. Within 30 days after completion of such hearings, the committee shall prepare and make available for public inspection a summary of public comments. The committee, between 30 and 60 days after publication of the public comments, shall prepare a final siting plan. The final siting plan shall be widely distributed to members of the public, and the committee, at any time between 30 and 60 days after release of the final plan, on its own initiative or that of interested parties, shall hold not less than two public hearings in each area of the state affected by the final plan to allow local officials and other interested persons to express their views. The committee within 30 days after the last hearing, shall vote to adopt, adopt with modification, or reject the final siting plan. Any person adversely affected by the committee's decision may seek judicial review of the decision by filing a petition for review

S. B. No. 258

with the ~~district~~ court for Salt Lake County within 90 days after the committee's decision.

(4) Judicial review may be had, however, only on the grounds that the committee violated the procedures set forth in this section, that it acted without or in excess of its powers, or that its actions were arbitrary or capricious and not based on substantial evidence.

(5) If the final siting plan is adopted, the committee shall cause it to be published. After publication of the final siting plan, the committee shall engage in a continuous monitoring and review process to ensure that the long-range needs of hazardous waste producers likely to dispose of hazardous wastes in this state are met at a reasonable cost. An annual review of the adequacy of the plan shall be conducted and published by the committee. If necessary, the committee may amend the siting plan to provide additional sites or delete sites which are no longer suitable. Before any plan amendment adding or deleting a site is adopted, the committee, upon not less than 20 days' public notice, shall hold at least one public hearing in the area where the affected site is located.

(6) After adoption of the final plan, an applicant for approval of a plan to construct and operate a hazardous waste treatment, storage, and disposal facility who seeks protection under this act shall select a site contained on the final site plan. Nothing in this act, however, shall be construed to prohibit the construction and operation of an approved hazardous waste treatment, storage, and disposal facility at a site which is not included within the final site plan, but such a facility is not entitled to the protections afforded under this act.

Section 7. (1) Before construction of a hazardous waste management facility, but in no case later than nine months after approval of a plan for a hazardous waste treatment,

storage, or disposal facility, any owner or user of property adversely affected by approval may bring an action in a district court of competent jurisdiction against the owner of the proposed facility. If the court determines that the planned construction and operation of the hazardous waste management facility will result in the devaluation of the plaintiff's property or will otherwise interfere with the plaintiff's rights in the property, it shall order the owner to compensate the plaintiff in an amount equal to the value of the plaintiff's loss.

(2) The remedy provided in subsection (1) of this section is the exclusive remedy for owners or users aggrieved by the proposed construction and operation of a hazardous waste treatment, disposal or storage facility, and no court has jurisdiction to enjoin the construction or operation of any facility located at a site included in the siting plan adopted by the committee.

(3) Nothing in this act shall prevent an owner or user of property aggrieved by the construction and operation of a facility from seeking damages that result from a subsequent modification of the design or operation of a facility but such damages are limited to the incremental damage that results from the modification. Any action for such damages shall be brought within nine months after the plans for modification of the design or operation of the facility are approved.

(4) For the purpose of assessing damages, the value of the rights affected is fixed at the date the facility plan is approved and the actual value of the right at that date is the basis for the determination of the amount of damage suffered, and no improvements to the property subsequent to the date of approval of the plans shall be included in the assessment of damages. Similarly, for any subsequent modification of a

S. B. No. 258

facility, value is fixed at the date of approval of the amended facility plan.

(5) The owner or operator of a proposed facility may, at any time before an award of damages, abandon the construction or operation of the facility or any modification and cause the action to be dismissed. As a condition of dismissal, however, the owner or operator shall compensate the plaintiff for any actual damage sustained as a result of construction or operation of the facility before abandonment together with court costs and a reasonable attorney's fee.

(6) Nothing in this chapter shall prevent a court from enjoining any activity at a hazardous waste facility that is outside of, or not in compliance with, the terms and conditions of an approved hazardous waste operations plan.

Section 8. The construction or operation of a hazardous waste treatment, storage, or disposal facility at a site included within the siting plan is not required to conform to any local zoning or other land use regulation, law, or ordinance. The owner of any hazardous waste treatment, storage, or disposal facility proposed to be located at a site included in the siting plan is not required to obtain approval of the site from any county or municipal planning commission or similar authority and no local unit of government may prohibit or unduly restrict the transportation of hazardous waste through the governmental unit to an approved hazardous waste treatment, storage, or disposal facility.

Section 9. The financing, acquiring, constructing, reconstructing, improving, maintaining, equipping or finishing of a hazardous waste treatment, disposal, or storage facility is deemed, where applicable, to be a "project", subject to the Utah Industrial Facilities Development Act.

Section 10. If any provision of this act, or the application of any provision to any person or circumstance, is

S. B. No. 258

held invalid, the remainder of this act shall not be affected
thereby.

APPENDIX D

MEDIA

APPENDIX D

MEDIA

This Appendix contains selected newspaper articles, and a listing of T.V. stations, radio stations, and newspapers in Utah.

MEDIA

Editor
Ogden Standard-Examiner
455 23rd St.
Ogden, UT 84402
(801) 394-7711

Managing Editor
Logan Herald Journal
75 W. Third No. St.
P.O. Box 487
Logan, UT 84321
(801) 752-2121

N. L. Christensen
Daily Herald
1555 N. 200 W.
P.O. Box 717
Provo, UT 84601
(801) 373-5050

Robert Collins
KSTR
P.O. Box 1120
Grand Junction, CO 81510
(303) 243-1722

Alan Cutler, News Director
KQH
P.O. Box 140
Grand Junction, CO 81510
(303) 242-7800

Bureau Manager
United Press International
802 Tribune Bldg.
143 S. Main St.
Salt Lake City, UT 84111
(801) 328-8866

J. Dee Tranter, News Director
KURA
82 N. Main St.
Moab, UT 84532
(801) 259-6161

Bill Jones, News Director
KEXO
P.O. Box 1448
Grand Junction, CO 81510
(303) 243-1230

Hal Knight
Deseret News
30 E. First S.
P.O. Box 1257
Salt Lake City, UT 84110
(801) 237-2720

Tom Lundstrum, News Director
KREX-TV
P.O. Box 789
Grand Junction, CO 81510
(303) 242-5000

Will Fehr, Mg. Ed.
Salt Lake Tribune
143 S. Main St.
P.O. Box 867
Salt Lake City, UT 84110
(801) 237-2011

Fred Schmauck
Intermountain Radio Network
312 E. South Temple
Salt Lake City, UT 84111
(801) 355-4641

James Stevens, County Agent
U.S.U. Extension Service
Grand County Courthouse
Moab, UT 84532
(801) 259-7213

Samuel J. Taylor, Publisher and Editor
Times-Independent
35 E. Center St.
Moab, UT 84532
(801) 259-7525

Bureau Chief
Associated Press
Room 323 Annex
143 S. Main St.
Salt Lake City, UT 84111
(801) 322-3405

Spence Kinard, News Director
KSL-TV
145 Social Hall Ave.
Salt Lake City, UT 84111
(801) 237-2690

Mickey Gallivan, News Director
KUV-TV
2185 S. 3600 W.
Salt Lake City, UT 84111
(801) 973-3030

Energy Writer
Grand Junction Sentinel
P.O. Box 668
Grand Junction, CO 81501
(303) 242-5050

News Director
KTVX-TV
1760 Fremont Dr.
Salt Lake City, UT 84104

Editor
Monticello San Juan Record
P.O. Box 428
Monticello, UT 84535
(801) 587-2277

IN OUR OPINION . . .

Dispose of nuclear waste any place except here?

More than three decades after atomic power plants first began operating, there still is no satisfactory system for disposing of radioactive wastes.

That issue is heating up once again after voters in the state of Washington decided in the last election to close the state's dump next summer.

Washington has one of only three commercial dumping sites in the nation for low-level radioactive refuse. The others are in Nevada and South Carolina. Nevada's Governor Robert List already has pledged to close that dump. And South Carolina has cut by half what it will accept.

Not only is public resentment growing over nuclear waste dumping, it's also aimed at trucking such wastes on public roads. The problem is accentuated by the fact that liquid nuclear wastes can't be accepted at the South Carolina dump, so wastes from the many nuclear plants along the East Coast must be trucked to Hanford, Washington.

Even low-level wastes, it has long been recognized, can be very dangerous. They include such garbage as contaminated paper, plastics, construction materials, industrial wastes, and trash from nuclear medicine.

For at least 25 years, such material was put in sealed metal barrels and dumped at some 50 sites in the ocean.

Now, one-fourth of the barrels are leaking. The practice of ocean dumping ceased in 1970.

The alternative — burying low-level wastes in dirt-covered trenches — may be as damaging as putting wastes on the ocean floor. Two dumps were closed in 1975 and 1977, for example, because they were contaminating water supplies.

Even more dangerous, however, is the problem of high-level waste disposal. Those wastes come from nuclear reactors and the production of nuclear weapons. President Carter has proposed disposing of these wastes in underground geologic formations. Repository sites in 23 states, including Utah's Paradox Basin, are being considered by the Energy Department. Governor Matheson says he opposes using Utah as a dumping site. And the Legislature is considering a bill that would prohibit depositories for high-level nuclear waste in Utah without the approval of the governor and the Legislature.

The new Reagan administration, then, is to be left with the task of deciding what state rights should prevail, and what the federal government's role should be in disposing of spent fuel from private nuclear utilities.

As it seeks to do so, the public must realize it can't keep acting as if nuclear wastes should be disposed of in any state but theirs.

Fire station tailings job advertised

The federal government has issued an advance notice on a project to remove radioactive tailings from the Salt Lake County Fire Station No. 1, 3690 S. Main, the government's first concrete steps to clean up the Vitro tailings.

The U.S. Department of Energy issued a notice Monday is expected to take 120 days once a contract is signed.

Great piles of tailings were left behind when the Vitro Chemical Co. uranium mill, about 33rd South and West, went out of business in the 1950s. Unsuspecting builders used tailings as fill for home and business building construction.

On May 21, 1978, a Deseret News environmental column exposed the hazards from tailings at the fire station. Shortly afterward, state tests confirmed that dangerous levels of radioactive radon gas were in the station.

The notice of bids was issued by the Department of Energy's Albuquerque, N.M., operations office, which is in charge of the tailings removal. The fire station cleanup is part of the Uranium Mill Tailings Remedial Actions Project, authorized by a congressional bill.

The work will include removal of about 6,300 cubic yards of tailings from under and around the station.

"To accomplish this, the floors of the station will have to be removed and then replaced after the tailings have been removed, along with any equipment or materials affected during the work," the notice said. Cost is between \$650,000 and \$860,000.

Requests for drawings and specifications on the project should be submitted by March 25 to Ford, Bacon and Davis, P.O. Box 8009, Salt Lake City. Bids will be opened about April 18.

Salt Lake City, Utah Deseret News, February 19, 1981

Comments sought on N-waste site

Written comments should be submitted by Feb. 24 on an environmental impact statement to be prepared for long-term management of transuranic waste buried and stored at the Radioactive Waste Management Complex of the Idaho National Engineering Laboratory near Idaho Falls.

Transuranic waste is material contaminated with small amounts of long-lived radioactive elements. About 3.9 mill-

ion cubic feet is at the facility. Comments should be sent to J.B. Whitsett, chief, Radioactive Waste Programs Branch, U.S. Department of Energy, Idaho Operations Office, 550 Second St., Idaho Falls, Idaho 83401, phone (208) 528-1709.