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

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WYOMING STATE BRIEFING BOOK FOR
LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

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October 1981

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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 Wyoming State Briefing Book has been prepared to assist the Department of Energy 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 Wyoming, 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 varies in form and characteristics but is similar to the waste 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 are 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 were disposed of 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 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

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2. GEOGRAPHY

Wyoming is located in the mountain census region of the western United States. It is bordered on the north by Montana, the northeast by South Dakota, the southeast by Nebraska, the south by Colorado, the southwest by Utah and the west by Idaho. The state, with an area of almost 98,000 square miles, is the ninth largest in the nation. Figure 2-1 shows state and county boundaries.

2.1 Physiography

The average elevation in Wyoming is about 6,700 feet above sea level, and ranges from a low of 3,125 feet in the northeast corner to 13,785 feet at Gannet Peak in the Wind River Range. The elevation is generally higher in the southeastern part near Laramie and in the northwestern part near Cody.

Wyoming is divided into five physiographic regions (Figure 2-2): the northern, middle, and southern Rocky Mountains, Great Plains, and the Wyoming Basin.^{1,2} The northern Rocky Mountains only extend into the extreme northwest corner of the state from Montana. The middle Rocky Mountains, which include the Yellowstone Plateau, the Wind River and Teton Ranges, and the Absaroka Plateau extend over the northwestern portion of the state. Three mountain ranges (the Laramie, Medicine Bow, and Sierra Madre mountains) constitute the southern Rocky Mountains in the state's southeast quadrant. Between the middle and southern Rocky Mountains lies the Wyoming Basin, which consists of intermontane depressions. The Great Plains extend over most of eastern Wyoming to the Nebraska border. This area consists of rolling plains and eroded valleys. Elevation decreases from about 5,000 feet in the west to about 3,500 feet in the east.

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Figure 2-1. State and county map of Wyoming.

Figure 2-2. Wyoming's major physiographic regions.

2.2 Drainage Patterns

The Continental Divide splits Wyoming from the northwest corner to the center of the southern border. A major river that has its headwaters in the state is the Snake River, a tributary of the Columbia River. Runoff from Wyoming also feeds the Colorado River and the Missouri River, which flow into the Gulf of California and the Gulf of Mexico, respectively. In fact, along the divide at Two Ocean Pass south of Yellowstone National Park, water from a small pond ultimately flows into both the Pacific and the Atlantic oceans.² Farther south, near South Pass, the Continental Divide splits in two and rejoins again at Bridger Pass, southwest of Rawlins. The twin divides enclose the Great Divide Basin, with an area of 3,000 square miles. There is no drainage from this basin and precipitation, which averages 7 to 10 inches annually, is removed by evaporation and infiltration.³ Major drainages in the state are shown in Figure 2-3.

Groundwater recharge potential in the state is estimated at four million acre-feet annually. However, less than 250,000 acre-feet of groundwater are currently tapped in the state, of which 133,500 acre-feet are used for irrigation, 32,100 for municipal, domestic, and livestock use, and 50,400 for industrial processes.¹

2.3 Climate

Wyoming is relatively cool, with temperatures rarely exceeding 100°F. The highest temperature on record is 114°F. Summer temperatures throughout most of Wyoming are between 85 and 95°F, with cool nights. Nighttime summer temperatures are 30 to 40°F in the mountains and high valleys, and 50 to 60°F elsewhere.³

Winters in Wyoming are usually long and cold, and are characterized by rapid and frequent changes between cold and mild spells. Many of the valleys that are surrounded by mountain ranges collect cold air drainage at

Figure 2-3. Major rivers in Wyoming.

night. The protecting mountains prevent the air from being stirred, and the colder, heavier air remains in the valleys. These inversions often result in temperatures well below zero in the valleys. The Continental Divide also affects winter temperatures; cold waves usually move southward on the east side of the divide, but seldom cross the divide to the west side.

January is generally the coldest month; mean minimum temperatures in the western valleys can be as low as 5°F below zero, although elsewhere in the state they usually range from 5 to 10°F. The lowest recorded temperature is 66°F below zero at Yellowstone National Park.³

2.4 Precipitation

Precipitation varies throughout the state and is affected by the numerous mountains. Wyoming's mountain ranges are generally oriented north-south and are perpendicular to the prevailing westerlies. Air currents from the Pacific Ocean rise over the mountains and drop much of their moisture along the western slopes. East of the mountains, the state is semiarid. Annual precipitation varies from 5 to 40 inches and averages 12 inches for the state. Showers are frequent during the summer, but often only produce a few hundredths of an inch of rainfall. Local rainstorms occasionally produce 1 to 2 inches in a 24-hour period; but rarely are 3 to 5 inches recorded in a 24-hour period. In the eastern two-thirds of the state, more than 60 percent of the annual precipitation falls between April and October; in the western third of the state, less than 60 percent falls during the warmest months (Figure 2-4).

Snowfall is frequent from November through May, but above 6,000 feet, snow can occur during any month. Annual snowfall ranges from 15 inches to over 200 inches.³

2.5 Environmental Hazards

The most widespread hazard is flooding, which occurs along streams of almost every size. Flooding usually occurs in the spring and early

Figure 2-4. Seasonal precipitation in Wyoming.

summer. In the extreme northeast corner of the state, flooding is sometimes caused by a sudden winter thaw. All of the larger streams have flood-prone plains somewhere along their routes.

Hailstorms, common during summer, are the most destructive type of local storm.³ East of the Laramie Mountains, eight or more hailstorms occur each year.

Thunderstorms occur over the entire state, but are most frequent in the southeast quadrant, which receives 30 to 70 each year. The most damaging results of severe thunderstorms are flash floods and high winds. In the last 50 years, winds of at least 80 miles per hour have occurred in all parts of the state except the extreme northeast corner. In the winter, winds frequently reach 30 to 40 miles per hour with gusts to 50 or 60. Tornadoes can occur in Wyoming, but the amount of destruction is relatively small.³

Sporadic moderate-to-severe earthquakes are confined to the western counties in the overthrust belt region. Earthquakes have also caused some severe landslides in northwestern Wyoming.

2.6 Land Ownership

Most of the land in eastern Wyoming is privately owned, while the majority of the land in the western half is owned by the federal government (Figure 2-5).¹ Forty-three percent of the land in the state is privately owned, while the federal government controls 48 percent, Indian tribal lands cover 3 percent, and the state government owns 6 percent.⁴

The Bureau of Land Management controls 60 percent of the federal land in Wyoming, the Forest Service manages 31 percent, and 8 percent is administered by the National Park Service.⁴ Areas administered by the National Park Service include Grand Teton and Yellowstone national parks, Devil's Tower and Fossil Butte national monuments, Bighorn Canyon National

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Figure 2-5. Wyoming lands controlled by the U.S. government.

Recreation Area, Fort Laramie National Historical Site, and John D. Rockefeller, Jr., Memorial Parkway.⁵ The State of Wyoming owns 48 parks and recreation areas. These state and federal parks cover about 4 percent of Wyoming. The Wind River Indian Reservation in west-central Wyoming covers approximately 1.9 million acres.⁶

2.7 Land Use

Mining is the most important land-use activity in Wyoming. Mineral and energy resources are abundant and distributed widely throughout the state. Estimates of Wyoming's reserves include four billion barrels of oil and 51 trillion cubic feet of natural gas,⁷ with reserves extending into every county (Figure 2-6). Wyoming also has immense coal deposits (Figure 2-7).⁸

Wyoming provides much of the nation's uranium. The state ranks second in the nation in uranium production and reserves. Over 5.5 million tons of uranium ore were extracted in 1979 from five counties: Carbon, Converse, Fremont, Johnson, and Natrona.⁹

Wyoming provides about 65 percent of the nation's bentonite, a colloidal clay used in oil drilling, foundry casting, and iron processing industries. Nearly 4.5 million tons were mined in the state in 1979, mostly from Cook and Bighorn counties (73%), but with significant production also from Johnson, Washakie, and Weston counties.¹⁰ About 4.8 million tons of iron ore were mined in 1979,⁹ with 90 percent from Fremont County and the remaining 10 percent from Platte County. About 50 percent of the nation's trona is mined in Sweetwater County.⁹ Trona is a mineral refined to soda ash and used in the production of glass, wood pulp, detergent, and baking soda.

Agriculture is the state's second most important land-use activity. Most of the privately owned land in the state is used for grazing and much more than half of all agricultural income comes from livestock,

MBBL - Million barrels of oil

MCF - Million Cubic Feet of Natural gas

Figure 2-6. Drilling basins and estimated undiscovered oil and natural gas reserves in Wyoming.

Figure 2-7. Major coal-bearing regions of Wyoming.

particularly cattle.¹ Thirteen percent of the land in Wyoming is forested and only about 4 percent is cultivated cropland. Most of the irrigated land is in the drainages of the Platte, Wind, Bighorn, Tongue, and Green rivers. Principal crops in these areas are hay, sugar beets, beans, and potatoes. Hay, wheat, barley, and oats are the principal crops on the non-irrigated cropland.³

2.8 References

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8. Wyoming Energy Consumption, Prepared for the State of Wyoming, Department of Economic Planning and Development, by Bickert, Browne, Coddington, and Associates, Denver, Colorado, June 1975.
9. State of Wyoming, Department of Economic Planning and Development, 1980 Wyoming Mineral Yearbook, Cheyenne, Wyoming, January 1981.
10. State of Wyoming, Department of Labor and Statistics, Wyoming Bentonite and Trona Industries, Cheyenne, Wyoming, 1980.

3. DEMOGRAPHY

This section identifies those demographic factors and trends that affect or relate to the quantity and nature of low-level radioactive wastes within the State of Wyoming, to assist with an assessment of the state as a potential producer of radioactive wastes. It also identifies those institutions, including colleges, universities, and hospitals, that are potential major users of radionuclides that may ultimately become radioactive wastes. Health-care facilities and educational institutions tend to increase or decrease in line with population trends for the state or interstate regions that they serve.

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 waste generation. In addition, population distribution may be useful in considerations involving population concentrations and the corresponding areas of low-level radioactive waste production.

Wyoming has experienced rapid population growth during the past decade. The final population count as of April 1, 1980, was 470,816.¹ This represents an increase of 138,400 (42 percent) over the 332,416 inhabitants recorded in the 1970 census. Compared to the national growth rate of about 11 percent for this period, Wyoming's increase is indeed dramatic. Data for the decade preceding mid-1979 show Wyoming's percentage growth to be the fourth highest nationally.²

Wyoming includes 23 counties. Until the 1980 census, no Standard Metropolitan Statistical Areas (SMSAs) were designated within any of these counties. As a result of the census count, the City of Casper in Natrona County has acquired SMSA status.

Population data for the 23 counties are given in Table 3-1. Data for 1970 and 1980 are obtained from census counts.¹ Projected data for the year 1990 are also given.³ As indicated by the tabular data, the rapid recent growth is expected to continue.

Laramie and Natrona counties each contain about 70,000 residents for a combined total of 30 percent of Wyoming's current population. Fremont and Sweetwater counties follow with about 40,000 inhabitants each; the total for the two represents 17 percent of the state's residents. These four counties thus contain nearly half of the state's population.

Projections by the State of Wyoming for the 1990 forecasts used in Table 3-1 are qualified³ as being based on standardized statistical methodology, wherein population changes are estimated on the basis of empirical and historical data gathered within the state. The source document also emphasizes the fact that certain proposed projects in Wyoming, while too tentative in nature to be used in the statistically derived forecasts, could radically alter the growth of certain counties. For example, the construction of two proposed coal gasification plants in Johnson County could not only significantly increase the population of that county, but could also impact the population of adjacent counties. Population in and around Sheridan County could be increased dramatically by three proposed projects--a coal gasification plant and two coal mines, one of which would necessitate a new dam to relocate a reservoir that currently overlies large estimated coal deposits. Finally, continued exploration and development of estimated oil and gas reserves in the overthrust belt could increase the population growth of Lincoln, Sublette, Teton, and Uinta counties beyond the statistically based forecasts given in Table 3-1.

Data for 1970 through mid-1975 indicate that about 60 percent of Wyoming's population increase resulted from immigration.⁴ During that time span, the state's population increased 12.6 percent. Natural increase (births less deaths) accounted for 5.1 percent, while net migration (immigration less outmigration) accounted for the remaining 7.5 percent.

TABLE 3-1. RECORDED AND PROJECTED POPULATION EXPANSION WITHIN WYOMING

<u>Region</u>	<u>Population</u>			<u>Percent Growth</u>	
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>1970-1980</u>	<u>1980-1990</u>
<u>State</u>	<u>332,416</u>	<u>470,816</u>	<u>689,885</u>	<u>41.6</u>	<u>46.5</u>
<u>Counties</u>					
Albany	26,431	29,062	42,325	10.0	45.6
Big Horn	10,202	11,896	15,491	16.6	30.2
Campbell	12,957	24,367	46,989	88.1	92.8
Carbon	13,354	21,896	39,297	64.0	79.4
Converse	5,938	14,069	21,753	136.9	54.6
Crook	4,535	5,308	6,656	17.0	25.4
Fremont	28,352	40,251	52,350	42.0	30.1
Goshen	10,885	12,040	15,136	10.6	25.7
Hot Springs	4,952	5,710	7,188	15.3	25.9
Johnson	5,587	6,700	8,632	19.9	28.8
Laramie	56,360	68,649	111,879	21.8	63.0
Lincoln	8,640	12,177	18,510	40.9	52.0
Natrona	51,264	71,856	100,431	40.2	39.8
Niobrara	2,924	2,924	3,328	0.0	13.8
Park	17,752	21,639	24,942	21.9	15.3
Platte	6,486	11,975	10,704	84.6	10.6
Sheridan	17,852	25,048	37,602	40.3	50.1
Sublette	3,755	4,548	5,292	21.1	16.4
Sweetwater	18,391	41,723	54,632	126.9	30.9
Teton	4,823	9,355	19,393	94.0	107.3
Uinta	7,100	13,021	25,695	83.4	97.3
Washakie	7,569	9,496	11,474	25.5	20.8
Weston	6,307	7,106	10,206	12.7	43.6

Although Wyoming's population is increasing, particularly in the four previously cited counties, the state's population ranks low (49th) nationally.⁵ Because of Wyoming's small population and large land area (97,206 square miles), the overall population density averages only five persons per square mile. Figure 3-1 shows the relative density of population by county in 1978. Varied terrain, development of natural resources, and the small land percentage allocated to irrigation (see Section 2) dictate the state's population distribution. Resource development results in high population influx; sometimes, however, such influx is of short duration. Mountain ranges and the high, arid plateau regions, on the other hand, offer barriers to dense population development.

Table 3-2 compares the age distribution of Wyoming's population for 1970 and 1979.⁶ The greatest increase was in the 16-through-44 age group, nationally the bracket of highest mobility. This mobility results primarily from efforts to find better employment opportunities. Such opportunities are provided in Wyoming's resource development industries.

3.2 Universities and Hospitals

Several Wyoming institutions are potential sources of radioactive wastes resulting from the use of radionuclides. Colleges and universities are such potential sources; Wyoming has eight universities and colleges with a total enrollment of approximately 23,884 students in 1977.⁷ Table 3-3 provides a listing of these institutions, the county in which each is located and the comparative enrollments during a three-year period.

Hospitals are also potential producers of radioactive wastes. Hospital data for the years 1970 through 1978 are provided in Table 3-4.⁸ These data apply to the total number of hospitals in Wyoming for each year. As indicated, the state's hospitals have not been operating at high levels of occupancy. According to the Wyoming Health Systems Agency, several factors influence this occupancy rate. These factors

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Figure 3-1. Wyoming state map showing relative population densities, by county.

TABLE 3-2. COMPARISON OF WYOMING'S POPULATION BY AGE GROUP, 1970-1979

	<u>Total</u>	<u>Under 16</u>	<u>16-21</u>	<u>22-44</u>	<u>45-64</u>	<u>65+</u>
1970	332,416	105,810	36,086	93,228	66,990	30,302
Percent	100.0	31.8	10.9	28.0	20.2	9.1
1979	445,000	124,600	55,625	140,175	84,995	39,605
Percent	100.0	28.0	12.5	31.5	19.1	8.9
Increase	112,584	18,790	19,539	46,947	18,005	9,303
Percent	33.9	17.8	54.1	50.4	26.9	30.7

TABLE 3-3. WYOMING UNIVERSITY AND COLLEGE FALL ENROLLMENTS, 1974-1977

Institution	Location (county)	Fall Enrollments ^a		
		1974-1975	1975-1976	1976-1977
University of Wyoming	Albany	7,949	8,332	8,726
Casper College	Natrona	3,452	4,001	4,035
Central Wyoming College	Fremont	941	1,689	1,774
Eastern Wyoming College	Goshen	1,412	1,750	1,651
Laramie County Community College	Laramie	2,926	3,273	3,080
Northwest Community College	Park	1,224	1,266	1,493
Sheridan College	Sheridan	647	827	1,153
Western Wyoming College	Sweetwater	1,572	2,078	1,972

a. University of Wyoming figures represent persons enrolled for credit. The other college figures represent both credit and non-credit students and include all enrolled during the fall term.

TABLE 3-4. WYOMING HOSPITAL STATISTICS, 1970-1978

<u>Year</u>	<u>Population</u>	<u>Beds</u>	<u>Admissions</u>	<u>Average Length of Stay (Days)</u>	<u>Patient Days</u>	<u>Percent Occupancy</u>
1970	332,416	1,634	59,498	5.99	356,203	59.72
1971	347,899	1,684	57,961	6.47	374,776	60.97
1972	357,667	1,678	59,913	6.04	362,134	58.96
1973	378,136	1,676	60,764	5.89	358,124	58.54
1974	397,685	1,692	61,302	5.67	347,888	56.33
1975	409,202	1,654	62,999	5.24	329,894	54.64
1976	420,452	1,659	62,700	5.10	319,595	52.63
1977	437,238	1,641	62,467	5.03	314,521	52.51
1978	454,238	1,672	63,362	5.16	327,181	53.61

include (a) fewer physicians in rural communities, (b) efforts of government and insurance companies to reduce the number of admissions, (c) shorter lengths of stay when admitted, and (d) more patients traveling to larger facilities in Wyoming or surrounding states.⁸ Shorter stays and travel to out-of-state hospitals explain the rather surprising tabular indication that available hospital beds and percent occupancy have remained quite constant over the surveyed years, even though large population growth has occurred within the state.

Table 3-5 gives the distribution, by county, of Wyoming's medical facilities.⁹ Most of the state's hospitals are quite small and widely scattered. Only four of the counties have 100 or more hospital beds. Thirteen counties have 50 or fewer.

The low hospital occupancy rate, in spite of little increase in the number of licensed bed facilities, coupled with Wyoming's large increase in population during the past decade, are factors that make relevant future projections speculative, at best. Possibly, population influx concentrated in specific counties that currently have small hospital facilities will require the expansion of those facilities in the next two decades. Very probably, Wyoming's continuing population growth will also have impact on the larger medical facilities in adjacent states; for example, those in Denver, Colorado; Billings, Montana; and Ogden and Salt Lake City, Utah.

TABLE 3-5. WYOMING MEDICAL FACILITIES, BY COUNTY, 1979

County	Population	Licensed Medical Facilities	Number	Licensed Beds	Occupancy Rate (Percent)	Number	Licensed Beds	Occupancy Rate (Percent)	Mental Health Centers
Albany	30,852	2	1	90	62	1	120	94	1
Big Horn	12,770	5	2	58	68	3	108	95	1
Campbell	24,063	2	1	31	52	1	109	90	1
Carbon	21,437	3	1	85	36	2	138	98	1
Converse	14,206	2	1	32	63	1	60	90	1
Crook	5,737	1	1	16	27	-	-	-	1
Fremont	39,009	4	2	121	70	2	250	97	3
Goshen	13,595	2	1	56	49	1	72	81	1
Hot Springs	6,143	3	1	50	37	2	80	97	1
Johnson	7,087	3	1	26	63	2	103	97	1
Laramie	67,161	4	2	300	65	2	274	89	1
Lincoln	11,653	2	2	35	30	0	0	0	2
Natrona	69,447	3	1	282	59	2	218	88	1
Niobrara	3,139	2	1	24	28	1	24	96	-
Park	21,456	4	2	89	40	2	123	98	1
Platte	9,230	2	1	43	39	1	40	95	1
Sheridan	27,469	2	1	97	65	1	120	95	1

TABLE 3-5. (continued)

<u>County</u>	<u>Population</u>	<u>Licensed Medical Facilities</u>	<u>Number</u>	<u>Licensed Beds</u>	<u>Occupancy Rate (Percent)</u>	<u>Number</u>	<u>Licensed Beds</u>	<u>Occupancy Rate (Percent)</u>	<u>Mental Health Centers</u>
Sublette	4,733	-	-	-	-	-	-	-	1
Sweetwater	40,081	2	1	100	48	1	101	93	1
Teton	8,586	2	1	43	40	1	12	83	1
Uinta	10,904	3 ^a	1	22	48	1	26	93	1
Washakie	9,715	2	1	36	41	1	76	97	1
Weston	<u>7,586</u>	<u>2</u>	<u>1</u>	<u>36</u>	<u>31</u>	<u>1</u>	<u>41</u>	<u>96</u>	<u>1</u>
State Total	466,057	57	27	2,037		29	2,095		25

a. State Psychiatric Hospital in Evanston, Uinta County, is included in total.

3.3 References

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4. ECONOMY

The economic factors and trends identified in this section can affect or be related to the generation of low-level radioactive wastes within the State of Wyoming. Growth in industry, labor-force distribution, agricultural acreage distribution, income levels, and energy consumed to sustain a growing economy are factors that are potentially useful in assessing the state as a producer of such wastes, as well as in appraisals of where within the state such wastes are produced.

4.1 Economic Indicators

Data for the decade preceding mid-1979 rank Wyoming among the 10 leading states in three important indices of economic growth.¹ These indices are: (a) growth of population, (b) growth of nonfarm employment, and (c) growth of personal income (see Tables 4-1, 4-2, and 4-3). The data show that Wyoming leads in growth of personal income during the decade and ranks third and fourth, respectively, in employment and population growth. While data for personal income are not adjusted to compensate for inflationary trends, they do show relative rankings of the leading states.

4.2 Nonagricultural Industries

In terms of earnings consisting of labor and proprietor income, mining is the current leader of the private nonfarm industries in Wyoming, as shown in Table 4-4.² The construction industry ranks second; services and retail trade rank third and fourth, respectively. Earnings in the latter two industrial sectors reflect, in part, lively tourism within the state and the popularity of Yellowstone and Grand Teton national parks as well as recreational attractions in the Big Horn and Wind River Mountains.

TABLE 4-1. GROWTH OF POPULATION INDEX

<u>Rank</u>	<u>State</u>	<u>July 1, 1969</u>	<u>July 1, 1979</u>	<u>Percent Change</u>
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

<u>Rank</u>	<u>State</u>	<u>1969</u>	<u>1979</u>	<u>Percent Change</u>
1.	Nevada	193,500	383,100	+98.0%
2.	Alaska	86,800	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

<u>Rank</u>	<u>State</u>	<u>1969</u>	<u>1979</u>	<u>Percent Change</u>
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 INCOME IN WYOMING

	Earnings ^a				Average Annual Growth Rate	
	Millions of 1972 Dollars				Percent	
	1969	1978	1990	2000	1969-1978	1978-2000
Total	993	1,972	3,815	5,268	7.9	4.6
Farm	73	72	85	99	0.2	1.5
Nonfarm	920	1,900	3,730	5,169	8.4	4.7
Private	695	1,564	3,183	4,435	9.4	4.9
Agricultural services, forestry, fisheries, and other	4	7	11	14	6.4	3.2
Mining	127	458	1,103	1,589	15.3	5.8
Construction	79	232	353	396	12.7	2.5
Manufacturing	64	105	203	301	5.7	4.9
Transportation, communication, and public utilities	109	189	327	447	6.3	4.0
Wholesale trade	33	83	170	233	10.8	4.8
Retail trade	117	198	377	508	6.0	4.4
Finance, insurance, and real estate	36	68	150	217	7.3	5.4
Services	126	224	490	730	6.6	5.5
Government and government enterprises	225	336	547	734	4.6	3.6
Federal, civilian	55	80	113	147	4.3	2.8
Federal, military	29	37	48	58	2.7	2.1
State and local	140	219	385	528	5.1	4.1

a. Earnings consist of income by laborers and proprietors.

Table 4-4 also shows that, in terms of 1972 dollars, all sectors of both private industry and government enterprises have experienced positive growth in earnings during the past decade. The tabular forecasts for the state indicate that this positive growth will continue, although at a lesser rate, during the next two decades.

Distribution of private business establishments, nonfarm employees, and annual payroll by counties within Wyoming is provided, for 1978, in Table 4-5.³ The table indicates Natrona County to be the largest employment center within the state, with a 1978 payroll of nearly \$350 million. Laramie County follows, with a payroll of about \$180 million, and Sweetwater County ranks third with a \$165-million payroll. These three counties account for 47 percent of the total payroll within the state.

Table 4-6 compares the labor-force distribution by county for Wyoming's four leading private industries in 1979 with the distribution forecast for 1982.⁴ Sizable increases in all four labor-force segments are projected, as an example, for Campbell County. A 61-percent projected increase in mining personnel for that county is accompanied by projected personnel increases of 38 percent for services, 37 percent for trade, and 9 percent for construction. Large increases in the mining labor force are also projected for the following counties: Carbon (65 percent), Converse (27 percent), Sheridan (42 percent), Sweetwater (21 percent), and Uinta (49 percent). Further, these increases are forecast to occur over a relatively short time span.

Mining is particularly significant in the economy of Wyoming, because growth in this major industry generally attracts growth in the other three leaders--trade, services, and construction. The U.S. Department of Commerce designates mining, applied to Wyoming, as a major industry that includes mining of metals, bituminous coal, and lignite, as well as extraction of oil, gas, and nonmetallic minerals.³ Recorded and projected earnings to the year 2000 are included for mining in Table 4-4.

TABLE 4-5. WYOMING NONFARM ESTABLISHMENTS, EMPLOYEES, AND PAYROLL BY COUNTY, 1978

County	Number of Establishments ^a	1978	
		Number of Employees for Week Including March 12 ^b	Annual Payroll (\$1,000)
Albany	668	6,247	46,354
Big Horn	259	1,921	19,043
Campbell	589	7,394	104,155
Carbon	471	6,137	90,229
Converse	332	3,350	37,769
Crook	106	734	7,210
Fremont	900	10,248	126,131
Goshen	280	2,292	18,332
Hot Springs	169	1,326	10,922
Johnson	195	1,296	11,794
Laramie	1,516	18,319	179,753
Lincoln	276	2,513	30,850
Natrona	2,286	26,976	342,273
Niobrara	74	465	3,503
Park	692	5,482	60,314
Platte	224	1,880	18,146
Sheridan	658	7,110	76,741
Sublette	136	783	6,464
Sweetwater	780	11,035	165,423
Teton	493	3,871	33,619
Uinta	213	1,938	14,956
Washakie	288	2,371	23,670
Weston	203	1,815	19,933

a. An establishment is defined as a single physical location where business is conducted or where services or industrial operations are performed.

b. Excluded are government employees, railroad employees, and self-employed persons.

TABLE 4-6. RECORDED AND PROJECTED LABOR-FORCE DISTRIBUTION BY COUNTY FOR WYOMING'S FOUR LEADING INDUSTRIES

County	Trade		Mining		Services		Construction	
	1979	1982	1979	1982	1979	1982	1979	1982
Albany	2,236	2,395	32	32	1,703	1,703	541	551
Big Horn	571	604	815	898	364	384	236	252
Campbell	1,895	2,595	2,809	4,522	1,085	1,495	1,500	1,639
Carbon	1,636	2,004	2,154	3,559	1,106	1,264	1,105	1,431
Converse	1,153	1,458	1,445	1,837	349	349	633	599
Crook	213	213	321	374	78	78	162	157
Fremont	3,284	3,648	4,392	4,765	2,264	2,424	730	713
Goshen	1,032	1,032	92	92	519	519	313	266
Hot Springs	373	394	351	412	714	742	207	228
Johnson	387	387	428	478	318	338	284	311
Laramie	5,579	6,069	111	111	4,607	4,712	2,099	2,206
Lincoln	988	1,232	1,548	1,856	289	289	513	731
Natrona	8,060	8,620	6,316	6,853	4,837	5,172	3,008	3,172
Niobrara	266	266	30	30	124	124	56	59
Park	1,914	1,968	855	859	1,665	1,665	639	646
Platte	629	591	345	346	489	446	506	221
Sheridan	2,952	3,358	801	1,134	1,390	1,466	1,338	1,268
Sublette	305	311	165	166	133	138	398	417
Sweetwater	3,060	3,427	6,105	7,364	1,857	1,978	3,304	2,951
Teton	1,372	1,743	21	21	1,830	2,105	564	605
Uinta	959	1,079	773	1,149	358	432	169	249
Washakie	762	785	203	205	443	449	255	261
Weston	533	605	658	773	248	280	71	86
State Total	40,159	44,784	30,773	37,836	26,774	28,554	18,632	19,017

A short-term projection of the mining labor force distribution by counties is included in Table 4-6. To supplement this information, Table 4-7 shows the quantities of the various minerals produced, by county, in 1979, and Table 4-8 provide the state-assessed valuation of this production.⁵

Examination of the data in Tables 4-7 and 4-8 shows that several Wyoming counties each produce as many as four minerals. The data also show that the assessed valuation of oil produced in 1979 is one-half the total valuation of minerals extracted in the state, even though oil production for that year was down by 6 percent. Although concentrated in Campbell and Park counties, oil production occurs in 21 of the state's 23 counties; natural gas is produced in 17 counties. The geological overthrust belt, which runs along the western border of the state, is presently considered the most significant oil and natural gas development in North America.⁶ While estimates of reserves and resources vary widely, this region potentially has deposits of a magnitude equal to that of Alaska's Prudhoe Bay. The production revealed in Table 4-7 for Uinta County may only be the beginning of rapid oil and gas development along the western border. Figure 2-3 maps the estimated undiscovered oil and gas reserves, corresponding to drilling basins, in Wyoming. The seven giant drilling basins shown extend into every county in the state and contain estimated reserves of four billion barrels of oil and 51 trillion cubic feet of natural gas, according to data published by the Wyoming Department of Labor and Statistics.⁷

From 1970 through 1979, Wyoming's coal production increased at an average annual rate of 28.7 percent, with related employment keeping pace at 26.8 percent.⁶ The major coal-bearing regions in Wyoming are shown in Figure 2-4 and encompass large regions of the state. Coal mining is currently concentrated in Campbell County (see Table 4-7) but pursued in six other counties as well. The state's coal reserves are huge. Present technology makes mining to a depth of 3000 feet economically feasible. Known reserves to this depth originally totaled 56 billion tons, but estimated unproven reserves would add as much as 81 billion tons to the

TABLE 4-7. MINERAL PRODUCTION IN WYOMING, BY COUNTY, 1979

County	Oil (bbls)	Gas (MCF)	Coal (tons)	Uranium (tons)	Iron Ore (tons)	Bentonite (tons)	Trona (tons)	Gypsum (tons)
Albany	146,429							17,770
Big Horn	6,143,501	2,482,520				1,449,483		160,268
Campbell	24,689,520	19,731,572	39,322,640					
Carbon	2,163,503	19,152,942	10,644,086	1,153,902				
Converse	7,002,401	13,791,617	3,004,854	1,898,391				
Crook	2,573,420	103,235				1,822,662		
Fremont	6,229,773	53,983,673		1,886,906	4,347,250			
Goshen	5,589							
Hot Springs	9,031,264	16,078	9,207			81,348		
Johnson	3,219,622	1,038,896		98,891		341,796		
Laramie	265,012							
Lincoln	132,234	11,167,328	5,083,240					
Natrona	7,538,813	8,199,305		474,255		50,898		
Niobrara	1,250,981	190,557						
Park	25,975,683	11,989,008				29,904		147,952
Platte					432,684			
Sheridan	187,804		3,536,608					

TABLE 4-7. (continued)

County	Oil (bbls)	Gas (MCF)	Coal (tons)	Uranium (tons)	Iron Ore (tons)	Bentonite (tons)	Trona (tons)	Gypsum (tons)
Sublette	1,951,420	46,291,372						
Sweetwater	9,959,104	115,087,044	7,191,938				11,771,985	
Teton								
Uinta	3,633,587	22,949,460						
Washakie	1,647,022	6,152,091				369,399		
Weston	1,931,340	995,482				333,752		
Total	115,678,022	333,322,180	68,792,573	5,512,345	4,779,934	4,479,242	11,771,985	325,990
Increase or decrease compared to	-7,111,104	+59,597,205	+12,336,440	-4,725	-534,917	+852,590	+1,797,748	-189,130

TABLE 4-8. STATE-ASSESSED VALUATION, 1979 MINERAL PRODUCTION

County	Oil	Gas	Coal	Uranium	Iron Ore	Bentonite	Trona	Misc.	Total
Albany	\$ 1,892,499	\$	\$	\$	\$	\$	\$	\$1,203,457	\$ 3,095,956
Big Horn	56,923,753	4,703,756				4,880,699		452,938	66,961,146
Campbell	294,760,148	30,107,745	215,056,128					28,490	539,952,511
Carbon	23,343,752	28,031,579	157,312,492	29,309,717				144,383	238,141,923
Converse	113,336,096	27,549,885	13,071,115	14,771,671				133,117	168,861,884
Crook	30,543,237	26,061				6,471,542		287,613	37,328,453
Fremont	63,044,286	78,737,117		21,250,042	14,345,925			194,271	177,571,641
Goshen	132,575							12,738	145,313
Hot Springs	88,744,551	5,282	127,977			321,325			89,199,135
Johnson	39,628,708	771,293		1,243,718		994,869		162,251	42,800,839
Laramie	3,910,717							2,194,596	6,105,313
Lincoln	2,482,497	16,590,692	58,467,419					20,822	77,561,430
Natrona	69,694,225	10,694,869		2,715,283		154,729		555,744	83,814,850
Niobrara	24,949,601	43,190							24,992,791
Park	212,607,228	9,089,390				97,188		347,519	222,341,325
Platte					2,531,201			3,054,838	5,586,039
Sheridan	1,874,569		55,171,085					219,557	57,265,211

TABLE 4-8. (continued)

County	Oil	Gas	Coal	Uranium	Iron Ore	Bentonite	Trona	Misc.	Total
Sublette	24,657,776	49,054,915						2,527	73,715,218
Sweetwater	117,848,499	156,845,560	72,863,769				108,890,862	369,399	456,818,089
Teton								83,586	83,586
Uinta	51,297,201	40,346,055						120,960	91,764,220
Washakie	18,871,870	1,472,565				969,495		57,282	21,371,212
Weston	44,640,388	2,061,337				1,778,902		1,047	47,981,674
Total	\$1,285,184,176	\$456,131,295	\$572,648,542 ^a	\$69,290,431	\$16,877,126	\$15,168,749	\$108,890,862	\$9,847,135	\$2,534,038,316
Percent of total	50	18	34	3	1	1	4	0.6	

a. Includes \$578,557 valuation adjustment of 1978 production.

known figure. Only 1.2 billion tons have been extracted; 98 percent of the initially known reserves thus remain untapped. Further, should technological advances and economic factors extend mining operations down to 6000 feet, an estimated additional 800 billion tons of coal would be available.⁶ Currently, 26 coal mines are operating in the state (four deep mines and 22 strip mines). Several additional mines have been proposed, with intended startups in the present decade.⁵

Trona, mined in Sweetwater County, continued to be the fourth most valuable mineral extracted in the state during 1978-1979. Production rose from 9.8 million tons in 1978 to 11.8 million tons in 1979 and valuation increased from \$79.8 million to \$108.9 million.⁵

Uranium is mined in five counties (Table 4-7). Production declined slightly in 1979; production decreased from 1978 by 4,700 tons and valuation fell \$2.9 million to \$69.3 million. The future of uranium production in Wyoming is dependent on the role nuclear power will play in the nation's planned energy mix. National policy will dictate what this role will be.⁵

Bentonite production increased by over 800,000 tons from 1978 to 1979, and the state-assessed valuation for 1979 production was about \$15.2 million. Bentonite production should remain stable during the foreseeable future.⁵ This mineral is extracted in eight of the state's counties (Table 4-7).

The remaining mineral products of Wyoming--iron ore, gypsum and construction materials--all showed either increases in production and valuation or held steady in 1979, and markets for all of these commodities are favorable.⁵

4.3 Agriculture

Economic data for agriculture are treated separately from data for nonagricultural industries because of differences in the respective

distribution of the two types of enterprises throughout Wyoming. These differences result in specialized influences for each type on land-use considerations.

The distribution of major field crop acreage by counties is shown in Table 4-9.⁸ As the table indicates, hay is the leading field crop produced in the state. (The column for hay, a perennial crop, includes acres harvested. Values for other crops are in acres planted.) The total hay acreage exceeds, by 64 percent, the acreage used for all other crops in the state. Hay and oats are grown in every county. Goshen County contributes the largest total field crop acreage in the state, followed by Laramie, Albany, Sublette, Carbon, Fremont, Crook, Platte, Lincoln, and Park, in that order. These 10 of the state's 23 counties provide 68 percent of the major crop acreage.

Cash receipts from field crops and livestock commodity groups are listed in Table 4-10 for the years 1974 through 1979.⁸ Data totals for field crops show a downward trend until 1977, after which some rebound occurred, but not to the general level of 1974. Feed crops are the notable exception to the general trend; cash receipts for these commodities increased 35 percent during the time span.

Data totals for cash receipts from livestock products show substantial increases (Table 4-10) since 1974. Meat animals dominate this commodity category, providing 91 percent of the total receipts to growers in 1974 and 95 percent in 1979. During the recorded years, receipts from meat animals increased 150 percent. Cash receipts from poultry and eggs decreased, revealing an exception to the general trend; but as the table indicates, these commodities provide only a small part of overall livestock products receipts.⁸

The relative importance of Wyoming in the nation's agriculture is given in Table 4-11.⁸ Wyoming ranks among the top 10 states in production of sheep, sugar beets, dry beans, and barley. Of interest, too, is the large size of the average farm or ranch in the state, compared to the national average.

TABLE 4-9. DISTRIBUTION OF MAJOR WYOMING CROP ACREAGE BY COUNTY, 1979

<u>County</u>	<u>Hay</u>	<u>Wheat</u>	<u>Barley</u>	<u>Corn</u>	<u>Oats</u>	<u>Sugar Beets</u>	<u>Dry Beans</u>	<u>Total</u>
Albany	127,800		1,100		300			129,200
Big Horn	30,000	900	26,700	7,500	5,200	10,200	4,300	84,800
Campbell	51,000	33,900	5,300		5,500			95,700
Carbon	107,000	4,700	800		1,200			113,700
Converse	40,000	2,900	3,700	900	2,300		1,900	51,700
Crook	71,000	22,500	4,000	500	13,500			111,500
Fremont	82,000	200	18,500	6,100	3,800		1,700	112,300
Goshen	50,000	78,500	3,700	36,100	5,000	14,500	11,100	198,900
Hot Springs	20,000	100	1,400	900	1,000	150		23,550
Johnson	38,000	1,500	1,500		4,500			45,500
Laramie	51,000	115,900	6,600	4,500	4,700	500	900	184,100
Lincoln	91,000	3,400	14,300		700			109,400
Natrona	24,000	4,100	800	1,000	2,200			32,100
Niobrara	26,000	13,100	4,700	1,500	4,900			50,200
Park	49,500	1,000	32,300	6,100	2,600	10,850	6,900	109,250
Platte	37,000	47,100	3,700	14,400	2,100	2,700	3,000	110,000

TABLE 4-9. (continued)

<u>County</u>	<u>Hay</u>	<u>Wheat</u>	<u>Barley</u>	<u>Corn</u>	<u>Oats</u>	<u>Sugar Beets</u>	<u>Dry Beans</u>	<u>Total</u>
Sheridan	62,000	6,000	5,200	1,500	3,400			78,100
Sublette	128,500				500			129,000
Sweetwater	17,200		400		500			18,100
Teton	20,000	100	1,500		200			21,800
Uinta	47,500	100	2,200		200			50,000
Washakie	13,500	200	14,200	5,000	1,400	10,000	200	44,500
Weston	<u>16,000</u>	<u>4,800</u>	<u>1,400</u>	<u>1,000</u>	<u>5,300</u>			<u>28,500</u>
State totals	1,200,000	341,000	154,000	87,000	71,000	48,900	30,000	1,931,900

TABLE 4-10. CASH RECEIPTS BY AGRICULTURAL COMMODITIES, WYOMING, 1974-1979
(Thousands of dollars)

Commodity	1974	1975	1976	1977	1978	1979
Crops	121,411	100,363	88,637	73,540	79,714	96,434
Food grains	28,748	28,161	19,074	15,440	13,357	19,353
Feed crops	24,299	26,108	30,914	25,117	26,641	32,875
Vegetables	15,528	13,765	11,194	10,648	11,841	14,389
All other crops	52,836	32,329	27,432	22,313	27,849	29,791
Livestock and products	246,959	273,715	308,254	381,892	456,860	585,973
Meat animals	223,680	255,014	285,739	358,743	433,730	559,452
Dairy products	9,553	8,855	10,450	11,481	11,726	13,791
Poultry and eggs	1,207	1,152	1,208	1,011	718	628
Misc. livestock	12,519	8,694	10,857	10,657	10,686	12,102
State totals	368,370	374,078	396,891	455,432	536,574	682,407

TABLE 4-11. WYOMING'S RANK IN THE NATION'S AGRICULTURE, 1979

Crop or Livestock Item	Unit	Production or Number (in Thousands)		Rank
		U.S.	Wyoming	
All sheep and lambs	Head	12,513	1,050	3
Stock sheep	Head	10,891	960	3
Average size of farms and ranches	Acres	453 ^a	4,875 ^a	3
Sheep on feed	Head	1,622	90	5
Sugar beets	Tons	21,996	906	8
Dry beans	Cwt.	20,665	532	9
Barley	Bu.	378,067	8,460	10
Land in farms and ranches	Acres	1,046,713	35,100	10
Potatoes (fall)	Cwt.	301,628	1,144	19
Alfalfa hay	Tons	87,581	1,308	23
All hay	Tons	145,878	2,127	24
Beef cows	Head	36,983	621	25
Winter wheat	Bu.	1,608,897	5,874	25
Cattle and calves on feed	Head	12,249	52	26
Rye	Bu.	24,549	51	27
Oats	Bu.	534,386	2,024	27
Corn silage	Tons	113,705	891	30
Cattle and calves	Head	110,961	1,340	31
Corn for grain	Bu.	7,763,771	2,523	36

a. The values given for average sizes of farms and ranches are in actual numbers of acres.

Farm earnings for the state are included in the data provided in Table 4-4. In terms of 1972 dollars, these earnings decreased slightly during the past decade but are expected to increase modestly during the next 20 years.

4.4 Per Capita Income

For 1979, per capita income in Wyoming was \$9,657; this amount is 11 percent higher than the national level of \$8,706.⁹ Approximately 33,000 persons were living below the poverty level in 1975. This represents about 8.7 percent of the state's population for that year, compared to about 11.4 percent nationally.⁹

The civilian labor force in Wyoming numbered 224,000 in 1979. During that year, the Wyoming female labor participation rate of 55 percent was above the national rate of 51.5 percent, and the male participation rate of 84.4 percent was above the national rate of 77.9 percent.⁹

4.5 Energy Consumption

Economic growth within a state is typically accompanied by increased energy demands. The trend is very evident in Wyoming. Annual energy consumption apportioned by user classification in the state, for the period spanning 1960 through 1978, is shown in Table 4-12.¹⁰ As indicated by the tabular data, overall consumption increased steadily (with few minor annual fluctuations) until about 1973, when the oil embargo and resultant increases in energy prices influenced usage trends. But even that influence was relatively small. In the industrial sector, for example, consumption increased by a factor of 2.3 during the 1960-72 period. Minor cutbacks occurred in 1973 and 1974, after which annual usage by industry increased sharply (up by 6 percent for 1975, 13 percent for 1976,

TABLE 4-12. CONSUMPTION OF ENERGY BY END-USE SECTORS WITHIN THE
STATE OF WYOMING
(Trillion Btu)

Year	Residential ^a	Commercial ^a	Industrial ^a	Transportation ^a	Total Energy Consumed ^b
1960	17.195	19.038	62.843	41.261	140.337
1961	18.859	23.555	69.708	39.842	151.964
1962	19.889	26.782	81.029	43.678	171.378
1963	18.297	26.896	80.387	40.266	165.847
1964	21.203	25.072	83.804	38.766	168.845
1965	21.815	28.347	83.273	44.089	177.524
1966	24.314	24.995	88.866	44.730	182.904
1967	27.119	28.536	99.930	54.399	209.984
1968	29.170	33.102	114.111	53.966	230.350
1969	33.191	36.855	129.545	57.515	257.105
1970	35.162	36.586	127.998	57.185	256.931
1971	38.356	38.029	133.325	61.680	271.391
1972	43.500	40.880	146.640	61.266	292.286
1973	34.331	38.178	143.767	67.270	283.546
1974	31.067	39.338	141.374	68.789	280.568
1975	31.967	36.801	149.368	65.899	284.035
1976	31.861	37.499	169.201	71.074	309.635
1977	32.645	42.715	190.278	74.771	340.409
1978	38.947	51.638	198.089	84.723	373.397

a. Energy sources include natural gas, petroleum, and electricity (with electrical energy losses incurred in the generation and transmission of electricity).

b. Totals may not equal sum of components due to independent rounding.

12 percent for 1977, and 4 percent for 1978). The tabular data show generally similar trends for the other end-use sectors. Resource development and the accompanying population growth in Wyoming result in the increasing demands for energy within the state.

Table 4-13 shows the types and amounts of energy sources used during the 1960-78 time span.¹⁰ As indicated by the included data, use of coal increased sharply in 1973 and expanded rapidly through 1977. The same five-year period shows declining use of natural gas.

Figure 4-1 charts the comparative proportion of energy consumed during 1978 by each end-use sector. Industry is the largest consuming sector, with 53 percent of the total energy used. Next is transportation, with 23 percent. Commercial and residential sectors follow, with 14 and 10 percent, respectively.

Finally, a general correlation is evident between the historical increase in energy consumption (recorded in Tables 4-11 and 4-12) and the recorded growth of both industry and population. Previously cited forecasts based on statistical methodology project continuing, though relatively gradual, industrial and demographic growth (Sections 4.2 and 3.1). But, as has been discussed, a number of proposed projects throughout the state, as well as potential developments in the overthrust belt, could result in radical expansion of Wyoming's industry and population. While uncertainties are sufficient to exclude these possibilities from the statistically based projections, the potential impact on the state's economy is enormous. Energy consumption may be expected to increase, as it has in the past, with the expansion of industry and population. This expansion may be gradual, in line with statistical forecasts, or may flare rapidly if resource development possibilities become realities.

4.6 Electrical Generation by Nuclear Power

No nuclear plants for electrical power generation are planned in Wyoming during a projected period that extends to the year 2000.

TABLE 4-13. CONSUMPTION OF ENERGY BY TYPE, WYOMING 1960-1978
(Trillion Btu)

Year	Coal	Petroleum	Natural Gas (Dry)	Hydroelectric Power ^a	Total Energy Consumed ^b
1960	16.717	75.157	52.828	6.552	140.337
1961	21.154	79.104	59.326	6.737	151.964
1962	25.806	88.022	61.189	10.298	171.378
1963	31.537	83.017	61.283	9.211	165.817
1964	33.371	84.454	62.253	9.147	168.845
1965	35.396	85.558	61.079	9.243	177.524
1966	42.471	80.109	67.814	9.608	182.904
1967	41.068	94.072	75.629	8.229	209.984
1968	45.309	104.814	81.244	9.976	230.350
1969	57.249	108.299	103.173	11.460	257.105
1970	65.058	103.135	113.406	10.562	256.931
1971	60.326	110.216	118.860	13.748	271.391
1972	81.933	116.221	129.232	12.167	292.286
1973	104.530	120.298	110.772	12.562	283.546
1974	113.026	121.100	98.043	14.734	280.568
1975	131.407	126.075	88.935	11.657	284.035
1976	185.285	137.235	88.471	10.822	309.635
1977	242.915	149.952	85.219	7.951	340.409
1978	242.198	169.895	88.701	10.250	373.397

Figure 4-1. Consumption of energy by end-use sector in Wyoming during 1978.

4.7 References

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5. GOVERNMENT AND PUBLIC ATTITUDES

This section describes the structure and jurisdiction of Wyoming government. Key state government officials, the Wyoming delegation to Congress, and state statutes and regulations relevant to radioactive waste management are identified and briefly summarized.

5.1 State Government

Wyoming entered the Union in 1890 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.

Historically, the Republican party has been dominant throughout most of Wyoming's history. The party has controlled both houses of the legislature in all but five sessions and held three or more of the five elective executive offices, except for one four-year period in the 1930s. Third parties have played an insignificant role in Wyoming politics.

In general, southern Wyoming counties, traversed by the Union Pacific railroad and developed early by industry and coal mining interests, have tended to vote Democratic. Northern counties, which have been more rural and farmer-rancher dominated until recently, are mostly Republican. However, elections are more often decided on the basis of the personalities of the candidates than in more populous states.

The present legislature has a Republican majority in both bodies; 19 of the 30 senators and 39 of the 62 representatives are Republican. Of the five elected to officials in the executive branch, three are Republican. The notable exception to the Republican dominance is the governor, Ed Herschler, who is a Democrat. All three congressional delegates are Republican.

Executive Branch Five elected officials lead the executive branch of government: The governor, secretary of state, auditor, treasurer, and state superintendent of public instruction. They form a de facto cabinet by serving on key boards and commissions with considerable authority and responsibility.

All executive officials serve four-year terms. All are eligible for reelection except the Treasurer who must allow a four-year lapse between terms.

The executive branch includes a number of boards, commissions, councils, and departments. Some of these bodies are attached to the governor's office; others are independent, advisory, or regulatory within the executive branch.

Table 5-1 lists Wyoming's officials, agencies, boards, and commissions.

The governor of Wyoming is the highest elected official of the state and is head of the executive branch. The present governor, Ed Herschler, began his second term January 1979, after serving in the Wyoming House for 10 years. Currently, Governor Herschler is Chairman of the Western Governor's Policy Office (WESTPO) and president-elect of the Western Governors' Conference.

The governor has the power to appoint and remove all nonelected administrative officials with consent of the Senate. An important appointment by the governor is the state's attorney general, an elective office in many states. Because the attorney general's regulatory duties have increased recently, this appointment may be controversial.

The governor recommends budgets, may call special sessions, and has the authority to veto legislation and specific items in appropriation bills. If the legislature is in session, a two-thirds vote of each house is required to override the veto. Vetos occurring after the session may not be overridden.

TABLE 5-1. DIRECTORY OF STATE OFFICIALS, AGENCIES, BOARDS, AND COMMISSIONS

Elected State Officials

Ed Herschler	Governor	State Capitol	777-7434
Thyra Thomson	Secretary of State	State Capitol	777-7378
James B. Griffith	Auditor	State Capitol	777-7831
Shirley Wittler	Treasurer	State Capitol	777-7408
			777-7913
Lynn Simons	Supt. of Public Instruction	Hathaway Building	777-7673

Executive Agencies

Adjutant General	5500 Bishop, National Guard Armory	772-6233
Administration and Fiscal Control	Emerson Building	777-7201
Aeronautics Commission	200 East 8th Avenue	777-7481
Agriculture	2219 Carey Avenue	777-7321
Archives and Historical	Barrett Building	777-7013
Attorney General	State Capitol	777-7810
Auditor	State Capitol	777-7831
Charities and Reform	Barrett Building	777-7405
Community College Commission	Boyd Building	777-7763
Conservation Commission	2219 Carey Ave	777-7321
Criminal Administration	720 West 18th Street	777-7716
Disaster and Civil Defense	5500 Bishop Blvd	777-7566
Economic Planning and Development	Barrett Building	777-7284
Education	Hathaway Building	777-7673
Engineer	Barrett Building	777-7354
Environmental Quality	401 W. 19th St., Equality State Bank	777-7937
Examiner	819 West Pershing Blvd	777-7796
Fire Prevention and Electrical Safety	Hathaway Building	777-7288
Game and Fish	Hathaway Building	
Governor	5400 Bishop Blvd	777-7631
Health and Social Services	State Capitol	777-7434
Health and Medical Services	Hathaway Building	777-7656
Pub. Assist. and Social Services	Hathaway Building	777-7121
Vocational Rehabilitation	Hathaway Building	777-7561
Highway Department	Hathaway Building	777-7385
Highway Patrol	5300 Bishop Blvd	777-7475
Industrial Siting	5300 Bishop Blvd	777-7301
Information Desk	Boyd Building	777-7368
Insurance	State Capitol	777-7220
Labor and Statistics	2424 Pioneer Ave	777-7401
	Hathaway Building	777-7261

Executive Agencies (continued)

Land Office	2424 Pioneer Ave	777-7331
Law Library	Supreme Court Building	777-7509
Library, State	Supreme Court Building	777-7281
Liquor Commission	1520 East 5th	777-7120
Livestock Board	Barrett Building	777-7515
Manpower Planning	821 West Pershing	777-7671
Military Department	5500 Bishop,	772-6201
	National Guard Armory	
Occupational Health and Safety	200 East 8th Avenue	777-7786
Probation and Parole	1712 Pacific Avenue	777-7208
Public Service Commission	320 W. 25th St	777-7427
Real Estate Commission	Supreme Court Building	777-7141
Recreation Commission	604 East 25th Street	777-7695
Retirement	Barrett Building	777-7691
Revenue and Taxation	Revenue Building	777-7961
Secretary of State	State Capitol	777-7378
State Planning Coordinator	2320 Capitol Avenue	777-7574
Traffic Safety	720 West 18th Street	777-7497
Travel Commission	I-25/Etchepare Circle	777-7777
Treasurer	State Capitol	777-7408 and 777-7913
Worker's Compensation Division	2305 Carey Avenue	777-7441

Wyoming has no lieutenant governor; the secretary of state serves as acting governor during absences of the chief executive. Thyra Thompson, first elected as secretary of state in 1962, is the custodian of the Great Seal of the State and is chief elections officer. She also convenes the House of Representatives at legislative sessions and administers the Uniform Commercial Code, as well as laws pertaining to corporations, securities, trade names and trademarks, notary publics and collection agencies. The secretary of state is also the state's record keeper, maintaining records of administrative rules and regulations, oaths of office, facsimiles of signatures, proclamations, and executive orders.

Wyoming's auditor, Jim Griffith, was elected to a second term in 1978. He also served one term as state treasurer. The auditor is the general accountant of the state, maintaining complete and accurate accounting of all income and disbursements in the state treasury. The auditor and treasurer maintain identical accounts, which are reconciled daily. The office audits selected state agencies to determine that funds are spend properly and controls General Fund expenditures to ensure they remain within legislative appropriations.

The present treasurer, Shirley Wittle, is midway through her first term. The treasurer administers the General Fund, which is the state's operating fund and is used to account for all taxation and revenue not specifically allocated to other funds by law. The treasurer receives and administers all money not expressly allocated by law to other officials. The treasurer is responsible for the state's checking account, pays all warrants issued by the auditor and accounts for receipts and disbursements.

Other duties include investing the permanent state funds, issuing refund checks for several programs, and administering the state workmen's compensation act.

Lynn O. Simons, the superintendent of public instruction, was elected in 1978. She, along with the State Board of Education, is responsible for the organization of the Wyoming Department of Education, as well as the general supervision of public elementary and secondary education. The superintendent represents Wyoming in educational matters that involve other states and the federal government. The superintendent, by virtue of the office, represents education interests on many boards and commissions, including ex officio membership on the Community College Commission, the University of Wyoming, and the State Board of Education.

Legislative Branch. The Wyoming Legislature consists of a Senate and a House of Representatives and meets for annual sessions in Cheyenne. The general session convenes on the second Tuesday of January in odd-numbered years and continues for not more than 40 working days. The budget session convenes on the fourth Tuesday of January of even-numbered years and continues for not more than 20 working days.

The Senate consists of 30 members elected for four-year terms. Terms are staggered so 16 senators are chosen in presidential election years and the remainder two years later. Senatorial districts are shown in Figure 5-1.

The House of Representatives has 62 members. The state constitution prescribes that the number of representatives cannot be less than twice or greater than three times the number of senators. Figure 5-2 shows the congressional districts.

Except for revenue bills, which must originate in the House of Representatives, bills may be introduced in either house. The cut-off date for introducing bills is noon of the eighteenth working day of the session, unless two-thirds of the House and all members of the Senate consent. Constitutional amendments require a two-thirds vote to pass; all other bills and resolutions need a simple majority by the members in each house to pass. A law takes effect 90 days after adjournment of the session, unless a different effective date is specified in the bill.

Figure 5-1. Wyoming's state congressional districts.

Figure 5-2. Wyoming's state senatorial districts.

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State Agencies. In general, the executive branch agencies (departments) are organized according to function of area of statutory responsibility. The directors of the nine departments administer government programs and statutory responsibilities and serve as advisors to the governor in matters within their jurisdiction.

Wyoming has not designated a state radiation control agency. Presently, two agencies have roles in radiation control -- the Department of Health and Social Services and the Department of Environmental Quality.

The Radiological Protection Office in the Department of Health and Social Services Division of Health and Medical Services is charged with registering all users and possessors of radioactive isotopes or materials in accordance with state statute. The department exercises no other regulatory control over radioactive material users but provides technical guidance and expertise.

The Department of Environmental Quality is charged with protecting and preserving Wyoming's environment. The department has three divisions--Air, Land, and Water Quality--as well as a solid-waste management program. The department is the lead state agency for Wyoming's participation in the Uranium Mill Tailings Remedial Action Program. The director of the Land Quality Division, Walt Ackerman, represents Wyoming in regional compact efforts.

In addition to these two departments, other state agencies, such as the State Engineer's Office and the Geological Survey, may become involved in nuclear energy or radioactive waste disposal issues.

The following summarizes legislative action relating to low-level radioactive waste during the 44th (1977), 45th (1979), and 46th (1981) Wyoming legislative assemblies.

Senate File 103, which was introduced to the Education, Health, and Welfare Committee during the 44th legislature by senators Rodger McDaniel (D-Cheyenne) and John F. Turner (R-Moose), died after being amended on the second reading. It would have designated the Division of Health and Medical Services, Department of Health and Social Services, as the radiation control agency for Wyoming and would have granted rulemaking authority to the division. H.B. 393, which was introduced by representatives Ellen Crowley (R-Cheyenne) and J. Leonard Graham (R-Dayton), was engrossed by a vote of 57 to 4, read before the Senate and recommended to pass by the Education Committee. It was placed on general file where it died. The bill would have authorized the Governor to enter into agreements with the Nuclear Regulatory Commission for the state to assume duties relating to radiation control. The Department of Health, Radiological Health Services Program, would have been designated the radiation control agency and granted regulatory authority.

H.B. 95, introduced during the 45th legislature by representatives Ellen Crowley (R-Cheyenne) and Walter C. Urbigkit Jr. (D-Cheyenne), was sent to the Committee on Labor, Health, and Social Services, and referred to the Appropriation Committee where it died on general file. The bill was identical to H.B. 393, introduced to the 44th Legislature in 1977 by representatives Crowley and Graham.

H.B. 88, which was introduced by Representative Ellen Crowley (R-Cheyenne) to the Committee on Labor, Health and Social Services, was referred to the Appropriations Committee where it was amended and recommended to pass. It was then placed on general file where it died. The bill, titled "The Wyoming Medical Radiation Control Act of 1981," would have designated the Division of Health and Medical Services, Department of Health and Social Services, as the radiation control agency of Wyoming and would have granted the division regulatory authority. A copy of this bill is included in Appendix C.

H.B. 152, which was introduced by Representative Don Thorson (R-Newcastle) to the Committee on Mines, Minerals and Industrial Development, was amended and engrossed by the House. It died in the Senate Committee on Corporations, Elections and Political Subdivisions. The bill would have established a system for control of solid and hazardous wastes to be administered by the Department of Environmental Quality and, by its terms, low-level radioactive waste was not excluded from the definition of hazardous waste. See Appendix C for a copy of this bill.

5.2 Statutes and Regulations

Because Wyoming has not assumed regulatory authority over radiation sources and radioactive materials pursuant to Section 274 of the Atomic Energy Act of 1954, exclusive jurisdiction over nuclear materials in Wyoming is vested in the federal government through the Nuclear Regulatory Commission. Wyoming has designated no agency as the state's radiation control agency and, as a result, there currently exist no state statutes or regulations explicitly and specifically dealing with low-level radioactive waste disposal. Nonetheless, several legislative enactments that could be germane to low-level waste disposal are described below.

Radioactive Isotopes or Material. This law (Section 35-4-301--35-4-303, Wyoming Statutes) requires that each user, processor, manufacturer, packager, refiner, producer, or disposer of radioactive isotopes or materials be registered with the Department of Health and Social Services. Upon application by the user or processor, the department provides a registration form calling for information regarding the proposed activity. Proper completion of the registration form results in the issuance by the department of a certificate of registration to the applicant. Failure to obtain registration is a misdemeanor, punishable by a fine of up to \$100 for each offense.

Wyoming Environmental Quality Act. In 1973, Wyoming adopted the "Wyoming Environmental Quality Act" (Section 35-11-101 et seq., Wyoming Statutes), which created the Department of Environmental Quality. This Act transferred to the new agency all the powers, duties, functions, and regulatory authority that had formerly been vested in several other agencies. In addition to the transferred duties and powers, the law requires that the department shall perform any and all acts necessary to carry out the purposes of the act, and that it shall consult and cooperate with other state agencies, other states, and the federal government in carrying out the purposes of the act. The department has overall responsibility for environmental quality in Wyoming. Each of its three

divisions is charged with the protection, preservation, and regulation of a particular part of the environment. The statutes prohibit persons from detrimentally affecting the quality of the air or water in the state. They require that any use of the land for mining or other mineral removal shall include reclamation of the land in order to allow it to be used for its highest previous use.

The Environmental Quality Act, for the purposes of water quality, includes radioactive substances in the definition of "wastes," and wastes are then included in the definition of "pollution." For air quality, the definitions of "air contaminant" and "air pollution" include radioactive materials, though radiation sources are not specifically listed. The definitions are written in terms of materials which might injure the public health. The Land Quality Division has a similar definition, which is written in terms of "hazardous" materials and "toxic wastes."

Solid Waste Disposal Act. Section 18-11-101 of the Wyoming Revised Statutes empowers each board of county commissioners to establish, by resolution, solid-waste disposal districts within any portion of the county and to appoint a solid-waste disposal district governing board of three to nine members. The governing board may enforce rules and regulations by appropriate legal proceedings relative to the solid-waste district. Any operational requirements of solid-waste disposal systems are applicable to both cities and counties.

Western Interstate Nuclear Compact. Wyoming is a member of the Western Interstate Nuclear Compact (Section 9-15-101--9-15-105, Wyoming Statutes). The implementing agency of the Compact, the Western Interstate Energy Board, is composed of one member from each party state and has wide-ranging statutory authority, including the following powers:

- o Encourage and promote cooperation in the development and utilization of nuclear and related technologies.

- o Conduct training programs for personnel in nuclear and related fields.
- o Consider and make recommendations concerning transportation of nuclear and related wastes.
- o Prepare, maintain, and implement a regional plan for carrying out the duties and responsibilities of the board.

Initiative and Referendum. Article 3, Section 52, of the Wyoming Constitution gives the people the power to propose and enact law by initiative and to approve or reject acts of the legislature by referendum. In order to effect changes, fifteen percent of the electorate who voted in the preceeding general election and residents of two-thirds of the counties of the state must sign a petition containing a summary of the proposal. The secretary of state then is empowered to place the proposed law on the first state-wide election held more than 120 days after adjournment of the legislature.

The procedures for referendum are identical to those of initiative; however, referendum is used to approve or reject an act passed by the legislature and must be filed with the secretary of state within ninety days after the legislative session during which the act was passed.

Department of Environmental Quality. The three divisions within the Department of Environmental Quality Department, and the Solid Waste Management Program, have issued regulations as authorized by the Environmental Quality Act of 1973. The regulations adopted by the Air Quality Council and enforced by the Air Quality Division do not specifically refer to radiation sources, but such materials could be included in the definition of "air pollution," which is written in terms of any air contaminant in "such quantity or duration as is materially injurious to human health or welfare..., or unreasonably interferes with the enjoyment of life or property."

The regulations promulgated by the Water Quality Division adopt by reference the definitions in the statute, which specifically refer to radioactive materials as a type of waste, and "waste" as one type of pollution. The division also has adopted a definition of "toxic materials" that could include radiation sources. "Toxic materials" are those which, after discharge into the environment and ingestion into any environmentally significant organism, will cause death, disease, cancer, or genetic or physiological malfunctions. In addition, the Water Quality Division has specifically limited the levels of radium (5 pCi/l, radium 226 plus radium 228) and strontium (8 pCi/l, strontium 90) that are permissible in Wyoming surface waters. The regulations require that any "activities of man" shall employ "all controls which are technologically feasible" to prevent levels of radioactive materials from exceeding permissible levels. Finally, the Water Quality Division has adopted regulations covering permits and standards for discharges of wastes into watercourses.

The Division of Land Quality has issued regulations which cover mining operations, land reclamation, and water diversion (use and impoundments). Land Quality has adopted a definition of "toxic materials" (and a similar term, "hazardous materials"), which is essentially the same as the definition used by Water Quality. Waste, including mill tailings, is regulated, and a section of the regulations deals specifically with tailings impoundments.

The Solid Waste Management Program has promulgated regulations that adopt by reference the statutory and regulatory definition already discussed. The jurisdiction of the program is over all entities, public or private, that are involved in any aspect of the management, control or disposal of solid waste. "Solid waste" includes the division's definition of "hazardous wastes," which is similar to the previous definitions. The Solid Waste Management Program is charged with protecting the environment from damage caused by the improper or harmful disposal of solid waste materials.

There is overlap in the area assigned to each of the four programs in the Environmental Quality Department, but the Environmental Quality Council and the director of the department coordinate the activities and the interactions of the programs.

5.3 Congressional Representatives

Wyoming is represented in the U.S. Congress by two Republican senators, Malcolm Wallop and Alan K. Simpson, and one representative, Richard B. Cheney, also a Republican.

Senator Wallop was elected to his first term in the U.S. Senate in 1976 after serving two terms in the Wyoming House and one term in the Wyoming Senate. Currently, he is a member of the following committees and subcommittees:

Energy and Natural Resources Committee

-Subcommittees:

- o Public Lands and Water Resources, Chairman
- o Water and Power
- o Energy and Mineral Resources

Finance Committee

-Subcommittees:

- o Energy and Agricultural Taxation, Chairman
- o International Trade
- o Taxation and Debt Management

Select Committee on Intelligence

- o Budget Authorization Subcommittee, Chairman

Select Committee on Ethics, Chairman

Senator Simpson was elected to his first term in the Senate in 1978, after serving in the Wyoming House for fourteen years. As a member of the Environment and Public Works Committee, Senator Simpson is involved in nuclear issues. He is Chairman of the Subcommittee on Nuclear Regulation and also serves on the Subcommittee on Environmental Pollution and the Subcommittee on Toxic Substances and Environmental Oversight. Other committees and subcommittees on which Senator Simpson serves are: Committee on Veterans Affairs (Chairman), Committee on the Judiciary, Subcommittee on Immigration and Refugee Policy (Chairman), Subcommittee on Immigration and Refugee Policy (Chairman), and Subcommittee on Regulatory Reform and Courts.

Wyoming's only seat in the U.S. House of Representatives is held by Richard B. Cheney, who was elected to his second term in 1980. Cheney was a Deputy Assistant to the President early in Gerald Ford's presidency. Later he was named Assistant to the President and White House Chief of Staff. Congressman Cheney currently serves on the committees on Interior and Insular Affairs and Standards of Official Conduct and is a member of the Subcommittees on Public Laurels and Parks, and Energy and the Environment. He was also Chairman of the House Republican Policy Committee, becoming one of the few members to be elected to a leadership position after one term in office.

6. SURVEY RESULTS

This section presents an analysis of low-level radioactive-waste generation and disposal practices for Wyoming licensees. Information collected by survey questionnaires sent to each licensee is first summarized for Wyoming and is then followed by a detailed analysis for each of the four categories of generators (medical, academic, industrial, and government). Presented in Appendix B are the survey methodology, survey forms, and letters used to obtain the data compiled in this section.

None of the licensees responding to the survey reported shipping low-level radioactive waste to commercial disposal facilities in the years 1978 through 1980. Data from NUS-3440¹ show that less than one cubic meter of waste with less than one curie of activity was shipped for disposal in 1979 by Wyoming licensees. This small amount of waste was shipped to Barnwell, South Carolina, for disposal. Similar information for 1980 shows that Wyoming did not ship any waste out of state for disposal.

The following subsections present data obtained from the survey on the licensed activities, types of waste generated and alternative disposal methods used by the responding Wyoming licensees.

6.1 Summary of Results

Wyoming licensees are divided into four types of low-level radioactive waste generators, as shown in Table 6-1. From a list of Wyoming licensees, 83 potential generators and shippers of low-level radioactive waste were identified. Survey forms, cover letters, and general instructions were mailed to each. As indicated in Table 6-1, industrial licensees are the most numerous, followed by medical, governmental, and academic. The number of licensees responding to the survey, along with the number of respondents generating waste for disposal, is also shown in Table 6-1.

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	18	7	7
Academic	1	0	0
Industrial	55	40	6
Governmental	9	9	0
Total	83	56	13

The overall survey return rate was 67 percent, (56 respondents out of 83 licensees surveyed). The return rate in terms of decreasing response by generator type was: governmental (100 percent, 9 out of 9), industrial (73 percent, 40 out of 55), medical (39 percent, 7 out of 18), and academic (0 percent, none out of 1). Since no response was received from Wyoming's one academic licensee, this category is not discussed in this section.

Table 6-2 gives a summary of low-level radioactive waste disposal methods. Industrial licensees use the largest combination of available disposal methods (four); hold for decay and bury on site are the two most common disposal methods. None of the respondents incinerate waste, dispose in common refuse, or ship waste to disposal facilities.

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 seven responding medical licensees, 7 indicated that they generate low-level radioactive waste (Table 6-1).

TABLE 6-2. SUMMARY OF DISPOSAL METHODS^a

<u>Generator</u>	<u>Hold for Decay</u>	<u>Release to Sewer</u>	<u>Vent to Atmosphere</u>	<u>Bury Onsite</u>	<u>Return to Manufacturer</u>	<u>Other^b</u>
Medical	7	4			2	
Industrial	<u>1</u>	—	<u>1</u>	<u>4</u>	<u>1</u>	<u>3</u>
Total	8	4	1	4	3	3

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

b. The respondents failed to report their disposal methods.

6.2.1 Licensed Activities

The respondents' licensed activities include radiodiagnostic procedures, radiation therapy and clinical radioassay, as listed in Table 6-3.

TABLE 6-3. LICENSED ACTIVITIES

<u>Medical Activity</u>	<u>Number of Respondents^a</u>
Radiodiagnostic procedures	6
Radiation therapy	2
Clinical radioassay	4

a. Based on all medical licensees that responded to the questionnaire.

6.2.2 Generation and Characteristics of Wastes

Table 6-4 shows that five of the licensed respondents generated low level radioactive wastes in 1978 and seven generated waste in 1979 and 1980. The type of waste most frequently generated during these periods was dry, compressible waste material including paper, cloth, plastic, glass, and aqueous liquid (see Table 6-5).

One of the licensees classified the chemical form of their generated waste as volatile.

6.2.3 Waste-Disposal Methods

Included in Table 6-2 is a listing of low-level radioactive waste disposal methods that were reported to be used by the 7 responding medical licensees as indicated in Table 6-6. The methods most commonly used were: hold for decay, and release of waste to sewage systems. One

TABLE 6-4. GENERATION OF LOW-LEVEL RADIOACTIVE WASTE

Did Your Facility Generate Low-Level Radioactive Waste?	Number of Responding Medical Institutions		
	1978	1979	1980
Yes	5	7	7
No	<u>2</u>	<u>0</u>	<u>0</u>
Total	7	7	7

TABLE 6-5. TYPE AND PERCENTAGE OF LOW-LEVEL RADIOACTIVE WASTE

Type of Waste	Percentage of Low-Level 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	1		3	1	1	1	3	2	1	1	3	2
Dry noncompressible	1				1				1			
Liquid scintillation wastes	1	1			1	1			1	1		
Aqueous liquids	2	2			3	2			3	2		
Organic liquids	2				2				2			
Biological wastes:												
Patient excreta	1	1			1	1			1	1		1
Sealed sources	1				1				1			
Other ^c						1				1		

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

b. Data based on the five responses received for 1978 and seven responses received for 1979 and 1980.

c. The respondents failed to characterize the type of waste.

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

Waste Type	Disposal Method Used ^a								
	Hold for Decay			Release to Sewer			Return Manufacturer		
	1978	1979	1980	1978	1979	1980	1978	1979	1980
Dry compressible ^b	5	7	7				1	1	
Dry noncompressible ^c	2	2	2						
Liquid scintillation wastes ^c	1	1	1	1	1	1			
Aqueous liquids ^d	2	3	3	3	3	3			
Organic liquids ^e	1	1	1	1	1	1			
Biological wastes; Patient excreta ^f	1	1	1	7	7	7			
Sealed sources ^g	1	1	2						
Other ^{h,i}		1	1						

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

b. Based on five responses for 1978 and seven responses for 1979 and 1980.

c. Based on two responses for each of the years 1978, 1979, and 1980.

d. Based on four responses for 1978 and five year response for 1979 and 1980.

e. Based on one response for each of the years 1978, 1979, and 1980.

f. Based on three response for each of the years 1978, 1979, and 1980.

g. Based on one response for each of the years 1978 and 1979 and two responses for the year 1980.

h. Based on one response for each of the years 1979 and 1980.

i. The respondent failed to characterize their type of waste.

other method was return to manufacturer. None of the licensees reported that they disposed of their waste in common refuse, incinerated their waste, vented to the atmosphere, buried on site, or shipped to disposal facilities.

6.3 Academic Licensees

The academic licensee failed to respond to the survey, therefore this category is not discussed.

6.4 Industrial Licensees

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

6.4.1 Licensed Activities

Table 6-7 lists the reported licensed activities of the 40 industrial licensees that responded to the questionnaires. Industrial licensees are involved in five types of specific activities: quality-control testing procedures, product monitoring, nondestructive testing (i.e., radiography), sealed source manufacturing, and monitoring services. By far the largest percentage of industrial licensees, however, failed to identify and characterize their licensed activities.

TABLE 6-7. LICENSED ACTIVITIES

<u>Industrial Activity</u>	<u>Number of Respondents^a</u>
Nondestructive testing	5
Quality control testing	7
Sealed source manufacturer	4
Monitoring services	1
Product monitoring	7
Other ^b	16

a. Based on the total number of industrial licensees that responded the survey.

b. Represents licensees who failed to characterize their licensed activities.

6.4.2 Generation and Characteristics of Wastes

Of the responding industrial licensees, 6 out of 40 or (15 percent) indicated that they generate low-level radioactive waste. Additionally, as shown in Table 6-8, this percentage of industrial licensees remained constant from 1978 through 1980. Table 6-9 presents the generated waste types and their percentages. Six general types of waste forms were reported by industrial licensees: dry compressible wastes consisting of paper, cloth, glass, and plastic, among other disposables; dry noncompressible wastes; aqueous and organic liquid filters and filter cartridges; gaseous wastes; and sealed sources. Industrial licensees characterized the chemical forms of the generated waste as corrosive, toxic, and flammable, as indicated in Table 6-10.

6.4.3 Waste-Disposal Methods

The industrial licensees reportedly used three disposal methods for low-level radioactive waste--hold for decay, vent to the atmosphere, and bury on site. Table 6-11 shows the specific types of waste disposed along with the methods used for disposal. An individual licensee may use more than one disposal method. Several alternative disposal methods reportedly not used by industrial licensees were: release to the sewer, disposal in common refuse, incineration, ship to disposal facilities, and return to manufacturer.

6.5 Governmental Licensees

This waste-generator category was intended to include federal, state, and local governmental agencies and institutions. Department of Defense facilities, except for weapons programs, were also included. Government-operated hospitals were included in the medical licensee category. Of the 19 responding government institutions, none indicated that it generates or ships low-level radioactive waste (Table 6-1); therefore this category is not discussed.

TABLE 6-8. GENERATION OF LOW-LEVEL RADIOACTIVE WASTE

<u>Did Your Facility Generate Low-Level Radioactive Waste?</u>	<u>Number of Responding Industrial Institutions</u>		
	<u>1978</u>	<u>1979</u>	<u>1980</u>
Yes	6	6	6
No	<u>34</u>	<u>34</u>	<u>34</u>
Total	40	40	40

TABLE 6-9. TYPE AND PERCENTAGE OF LOW-LEVEL RADIOACTIVE WASTE

Type of Waste	Percentage of Low-Level 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	3	1			3	1			3	1		
Dry noncompressible	2		1		2		1		2		1	
Slurry, resins, sludges		1		2		1		2		1		2
Filters, filter cartridges	2				2				3			
Aqueous liquids		2				2				2		
Organic liquids	1				1				1			
Gaseous wastes	1				1				1			
Sealed-sources	1				1				2			

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

b. based on the six responses for each of the years 1978, 1979, and 1980.

TABLE 6-10. CHEMICAL FORM OF LOW-LEVEL RADIOACTIVE WASTE GENERATED

	<u>Number of Responses</u>
Corrosive	4
Toxic	4
Flammable	1
Other	1
None	1

TABLE 6-11. LOW-LEVEL RADIOACTIVE WASTE-DISPOSAL METHODS

Type of Waste	Disposal Method Used ^{a,b}														
	Hold for Decay			Release to Sewer			Vent to Atmosphere			Bury on Site			Other		
	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980
Dry compressible ^b										2	2	2	2	2	2
Dry non-compressible ^c										1	1	1	1	1	1
Slurry, resins, sludges ^d										2	2	2	1	1	1
Filters, Filter cartridges ^c										2	2	2			
Aqueous liquids ^c										1	1	1	1	1	1
Organic liquids ^e													1	1	
Gaseous wastes ^e													2	2	3
Sealed sources ^f	1	1	1												
Other ^{e,g}										1	1	1			

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

b. Based on four responses for each of the years 1978, 1979, and 1979.

c. Based on two responses for each of the years 1973, 1979, and 1980.

d. Based on three responses for each of the years 1978, 1979, and 1980.

e. Based on one response for each of the years 1978, 1979, and 1980.

f. Based on one response for each of the years 1978 and 1979 and two responses for the year 1980.

g. The respondent failed to characterize the type of waste.

APPENDIX A

LICENSEES

APPENDIX A

LICENSEES

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

WYOMING

<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 the Air Force 90 Strategic Missile Wing (SAC) F.E. Warren AFB, WY 82001	x		x		Government
Allen Drill Collar Service, Inc. P.O. Box 9425 Odessa, TX 79762	x		x		Industrial
AMOCO Pipeline Company Crude Oil Pipeline Rural Pump Station Ft. Laramie, WY 82212	x		x		Industrial
Associated Engineers 910 Garfield Street Laramie, WY 82070	x		x		Industrial
Rocky Mountain Energy Co. Bear Creek Uranium P.O. Box 2654 Casper, WY 82602	x			x	Industrial
Bennett-Carder & Associates Inc. 507 5th St. P.O. Box 1324 Rock Springs, WY 82901	x			x	Industrial
Big Horn Perforators Inc. 1159 Road 9 Powell, WY 82435	x		x		Industrial
Bishop Randall Hospital Capitol Hill Lander, WY 82520	x			x	Medical
BRW/Noblitt Inc. 1912 Capitol Avenue, Suite 300 Cheyenne, WY 82001	x		x		Industrial
Burton/Hawks Inc. P.O. Box 359 Casper, WY 82602	x		x		Industrial
Campbell County Memorial Hospital 720 West 8th Street Gillette, WY 82716	x			x	Medical

WYOMING

<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>	
Carbon County Memorial Hospital Rawlins, WY 82301	x			x	Medical
Chen and Associates Inc. 900 East F Street Casper, WY 82601	x		x		Industrial
City of Cheyenne 2101 O'Neil Cheyenne, WY 82001	x		x		Government
Cooper and Clark 3606 South Highway 59 Gillette, WY 82716	x		x		Industrial
Cordero Mining Company P.O. Box 1449 Gillette, WY 82716	x		x		Industrial
CTL/Thompson Inc. Construction Department (Materials Testing Laboratory) 30 Foster Road, Suite M Casper, WY 82602	x		x		Industrial
Depaul Hospital Department of Radiology 2600 East 18th Street Cheyenne, WY 82001	x			x	Medical
Dyna Jet Inc. P.O. Box 2444 Gillette, WY 82716	x		x		Industrial
Empire Laboratories Inc. 3151 Nationway, Suite K-11 Cheyenne, WY 82001	x			x	Industrial
Engineering Services Inc. Soils Testing 501 N. Sun Drive Casper, WY 82601	x			x	Industrial

WYOMING

<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>	
EXXON Company U.S.A. Division of EXXON Corporation, Highland Uranium Operations P.O. Box 3020 Casper, WY 82602	x		x		Industrial
Federal-American Partners Gas Hills Star Route Riverton, WY 82501	x		x		Industrial
FMC Corporation Industrial Chemical Group Box 431 Kemmerer, WY 83101	x		x		Industrial
FMC Corporation P.O. Box 872 Westraco, WY	x		x		Industrial
Fremont County Memorial Hospital P.O. Box 1280 Riverton, WY 82501	x		x		Medical
Goodwell Inc. Box 195 Upton, WY 82730	x			x	Industrial
Howard Donley Associates Inc. Central Western Building 235 N. Wolcott, Suite #4 Casper, WY 82601	x		x		Industrial
Husky Oil Company Process Operations Department 2700 E. 5th St. P.O. Box 1588 Cheyenne, WY 82001	x		x		Industrial
Department of the Interior USGA Water Resources WY District Div. P.O. Box 1125, 2120 Capital Avenue Cheyenne, WY 82001	x		x		Government

WYOMING

<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 the Interior U.S. Geological Survey P.O. Box 2373 Casper, WY 82602	x		x		Government
J & P Corporation P.O. Box 114 Casper, WY 82602	x			x	Industrial
John W. Donnell & Associates, Inc. P.O. Box 638 1701 Big Horn Ave. Worland, WY 82401	x		x		Industrial
The Kemmerer Coal Company Frontier, WY 83121	x		x		Industrial
Kerr-McGee Coal Corporation Clovis Point Mine Caller Box 3014 Gillette, WY 82716	x		x		Industrial
Pathfinder Mines Corporation Big Eagle Mine Jeffrey City, WY 82310	x		x		Industrial
Marathon Pipe Line Company c/o Platte Pipeline Company Pumping Station, Box 400 Guernsey, WY 82214	x		x		Industrial
Memorial Hospital of Laramie County Department of Radiology 300 East 23rd Street Cheyenne, WY 82001	x			x	Medical
Memorial Hospital of Natrona County Radiology Department 1233 East Second Street Casper, WY 82601	x		x		Medical
Memorial Hospital of Sheridan County 1401 West Fifth Street Sheridan, WY 82801	x		x		Medical

WYOMING

<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>	
Memorial Hospital of Sweetwater County 1200 College Hill, P. O. Box 1359 Rock Springs, WY 82901	x		x		Medical
Mid-Con Inspection Service Inc. Box 274 658 Antler Drive Casper, WY 82602	x		x		Industrial
Inberg-Miller Engineers Materials Testing Laboratory 124 East Main Street Riverton, WY 82501	x		x		Industrial
Minerals Exploration Company P.O. Box 2674 Pronghorn Drive Casper, WY 82601	x			x	Industrial
Minerals Exploration Company P.O. Box 1500 Rawlins, WY 82301	x			x	Industrial
Morrison-Knudsen Co. Inc. Box 1028 Cheyenne, WY 82001	x			x	Industrial
Nelson Engineering Materials and Testing Laboratory P.O. Box 100 195 Riverview Dr. Green River, WY 82935	x		x		Industrial
Northwest Analytical Laboratory 424 East North Powell, WY 82435	x			x	Industrial
Ivinson Memorial Hospital Nuclear Medicine Department 255 North 30th Street Laramie, WY 82070	x		x		Medical

WYOMING

<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>
Oil Well Perforators Inc. Box 399 Mills, WY 82644	x		x		Industrial
Pathfinder Mines Corporation Lucky Mc Mine P.O. Box 831 Riverton, WY 82501	x			x	Industrial
Pathfinder Mines Corporation Shirley Basin Mine Shirley Basin, WY 82615	x		x		Industrial
Petro-Log Incorporated 119 Crescent Drive Casper, WY 82601	x		x		Industrial
Petrotomics Company P.O. Box 2509, #1 Getty Road Shirley Basin, WY 82615	x		x		Industrial
Pioneer Nuclear Inc. The Wyoming Bldg. Suite 605, 202 E Casper, WY 82601	x			x	Industrial
City of Rawlins P.O. Box 953 Rawlins, WY 82301	x		x		Government
Robert Jack Smith & Associates Inc. 1015 Harshman Street Rawlins, WY 82301	x		x		Industrial
Rocky Mountain Materials Testing, Inc. 520 "G" Street Rock Springs, WY 82901	x		x		Industrial
Scinti-Log Inc. 2393 North Salt Creek Highway Casper, WY 82601	x		x		Industrial
Scott Engineering Company Box 2097 Gillette, WY 82716	x		x		Industrial

WYOMING

<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>	
St. John's Hospital Teton County Hospital District Jackson, WY 83001	x		x		Medical
Stauffer Chemical Co. of Wyoming P.O. Box 513 Green River, WY 82935	x		x		Industrial
Teton Exploration Drilling Company P.O. Drawer A-1 Casper, WY 82602	x		x		Industrial
Texaco Inc. East of Casper Casper, WY 82601	x		x		Industrial
TexasGulf Inc. P.O. Box 100 Granger, WY 82934	x		x		Industrial
Thunder Basin Coal Company P.O. Box 1839 Gillette, WY 82716	x			x	Industrial
Clinical Laboratories Cheyenne 5501 Murray Hill Drive Cheyenne, WY 82001	x		x		Medical
United Nuclear Corporation Mining and Milling Division P.O. Box 2996 Casper, WY 82601	x		x		Industrial
United States Steel Corporation Western Ore Operations P.O. Box 569 Lander, WY 82520	x		x		Industrial
Uranium Supply Services Corporation P.O. Box 1133 Mills, WY 82644	x			x	Industrial
Veterans Administration Hospital 2360 E. Pershing Boulevard Cheyenne, WY 82001	x			x	Medical

WYOMING

<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>	
Washakie Memorial Hospital 15th Street Worland, WY 82401	x			x	Medical
West Park County Hospital 707 Sheridan Ave. Cody, WY 82414	x			x	Medical
Western Nuclear Corp. Field Office, P. O. Box 630 Jeffrey City, WY 82310	x		x		Industrial
Wilson Animal Hospital 336 North Jefferson Sheridan, WY 82801				x	Medical
Wyoming Game and Fish Commission Water Quality Laboratory 360 Buena Vista Dr. Lander, WY 82520	x		x		Government
Wyoming State Highway Department State Highway Bldg. P.O. Box 1708 Cheyenne, WY 82001	x		x		Government
State of Wyoming Disaster and Civil Defense Agency 624 E. Pershing Blvd. Cheyenne, WY 82002	x		x		Government
State of Wyoming Division of Health & Medical Services Hathaway Building Cheyenne, WY 82002	x		x		Government
University of Wyoming Laramie, WY 82071	x			x	Academic

APPENDIX B

SURVEY METHODOLOGY

INTRODUCTION

Appendix B presents the survey methodology used to gather and analyze low-level radioactive waste information for Wyoming. 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 Wyoming 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 _____
		State _____ Local _____
<u>Medical (Hospitals, medical labs)</u>		
Radiodiagnostic procedures	_____ 5	Energy/physics/nuclear research _____ 6
Radiation therapy	_____ 6	Defense programs _____ 7
Clinical radioassay	_____ 7	Medical research _____ 8
Biological research	_____ 8	Educational/classroom use _____ 9
Other _____	_____ 9-20	Non-destructive testing _____ 10
(SPECIFY)		Other _____ 11-22
(SPECIFY)		(SPECIFY)
<u>Industrial</u>		<u>Academic</u>
Non-destructive testing (radiography)	_____ 25	Biological research _____ 27
Quality control testing procedures	_____ 26	Non-biological research _____ 28
Monitoring services	_____ 27	Environmental research _____ 29
Sealed source manufacture	_____ 28	Materials analysis _____ 30
Product monitoring	_____ 29	Physics research _____ 31
Material activation	_____ 30	Chemical research _____ 32
Radiopharmaceutical production	_____ 31-42	Instructional or classroom use _____ 33
Other _____	_____ 43-54	Product activation (Charged particle accelerators, research reactors) _____ 34
(SPECIFY)		Other _____ 35-46
(SPECIFY)		(SPECIFY)
<u>Commercial Nuclear Power</u>		
_____ 1		

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	55-60
(Check 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			1-11
Organic liquids			12-22
Biological wastes:			
Animal carcasses			23-33
Patient excreta			34-44
Other:			45-55
Gaseous wastes			66-76
Sealed sources			1-11
Activation products (accelerators)			12-22
Other (please specify below)			
	100%	100%	100%
			23-28

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 $\frac{\text{ft}^3}{1-4} \frac{\text{m}^3}{6 \quad 7}$ 1979 $\frac{\text{ft}^3}{8 \quad 12} \frac{\text{m}^3}{13 \quad 14}$ 1980 $\frac{\text{ft}^3}{15-19} \frac{\text{m}^3}{20 \quad 21}$

- 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> <u> </u> <u> </u> <u> </u> <u> </u> <u> </u>	Ci mCi μ Ci		<u> </u> <u> </u> <u> </u> <u> </u> <u> </u> <u> </u>	Ci mCi μ Ci		<u> </u> <u> </u> <u> </u> <u> </u> <u> </u> <u> </u>	Ci mCi μ Ci	
22-27 30 31 32			35-42 45 46 47			50-55 59 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	
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	1-16
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	17-33
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	34-51
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	1-16
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	17-33
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	34-51
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	1-16
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	17-33
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	34-51
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	1-16
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	17-33
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	34-51
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	1-16
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	17-33
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	34-51
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	1-16
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	17-33
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	34-51
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	1-16
_____	_____	Ci mCi μ Ci	_____	Ci mCi μ Ci	_____	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 _____	_____ 36-46	_____ 47-50	_____ 51-54
(SPECIFY)			_____ 55-58

Figure B-1. Low-Level Radioactive Waste Survey

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) _____
40-45 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 _____ 65

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

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 Radiological Health Services, Division of Health and Medical Services, State of Wyoming--is surveying all Nuclear Regulatory Commission licensees to collect data on waste generation in Wyoming.

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 Wyoming 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 survey by contacting either the Radiological Health Services, State of Wyoming (777-7956), or one of the EG&G Idaho, Inc., program specialists listed below. Further information on the national program or the briefing books is available from the EG&G Idaho Program specialists.

Very truly yours,

S. E. Everette
(208) 526-0625

K. F. Downs
(208) 526-0026

Figure B-3. Cover Letter

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 Wyoming 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,

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

amw

Enclosure:
As stated

Figure B-4. Followup Letter

APPENDIX C

STATE RULES AND REGULATIONS FOR

RADIOACTIVE WASTE MANAGEMENT

IN WYOMING

STATUTES AND REGULATIONS

In states which have not signed agreements with the United States Nuclear Regulatory Commission (NRC) allowing them to assume legislative and regulatory authority over radioactive materials, UMTRAP operations will be governed by NRC rules as well as by the environmental standards of the state. Currently the NRC retains regulatory authority in Wyoming; however, negotiations are expected to culminate in an NRC agreement sometime in 1981.

TRANSPORTATION

Wyoming has passed no legislation concerning the transportation of hazardous materials, hazardous wastes, or radioactive substances. Officials from the Highway Department and Department of Environmental Quality confirmed the non-existence of any regulations on these subjects.

In the absence of such state law, federal law applies. Transportation of hazardous materials in Wyoming will therefore be governed by U.S. Department of Transportation (DOT) regulations. In the future, state legislation and regulations may be passed which will then be applicable. (Memorandum of understanding between U.S. Department of Transportation and U.S. Nuclear Regulatory Commission.) (Transportation Safety Act of 1974, 45 U.S.C.A. 39,437,438,440,441; 46 USCA 170; 49 U.S.C.A. 1471,1472,1653,1655,1801-1812,1901-1907)

The DOT regulations on transportation of hazardous materials:

- ° Contain tables of hazardous materials, including radioactive materials, which cross-index such materials by proper shipping name and by the nomenclature describing the requirements of the regulations.
- ° Prescribe requirements for shipping papers including -
 - (a) a description of hazardous materials with additional descriptive requirements for radioactive materials;
 - (b) a certification of compliance that the shipment contains radioactive material, and (c) a hazardous waste manifest.
- ° Delineate requirements for marking each package freight container and transport vehicle with additional requirements for radioactive materials and with prohibition of display of identification numbers for placards on radioactive substances.
- ° Require specified labeling for each package, overpack, or freight container with additional requirements

for radioactive materials requirements as to the physical character and condition of the labels themselves and graphic representations of required labels.

- Require placards on each end and each side of the type required in the provided tables and according to (a) general specifications as set out in the regulation; (b) the graphic representations of required placard; (c) the provided color tolerance chart; and (d) the dimensional specifications set out.

In addition to the regulations on transportation, the regulations also set out rules for shipments of hazardous materials. These regulations:

- Classify hazardous materials.
- Provide rules for packaging.
- Forbid certain materials and packages.
- Delineate shipper's responsibility.
- Provide for reuse of packaging and empty packages.
- Prescribe loading and unloading requirements.
- Set out rules for qualification, maintenance and use of tank cars including examination before shipping and retesting.
- Set out rules for qualification, maintenance, and use of cargo tanks and cylinders including marking, safety relief devices, periodic retesting and repair.

The regulations also contain a special subpart on biological and radioactive materials. These regulations:

- Define and classify the radioactive materials.
- List the transport groups of radionuclides.
- Provide special rules for limited quantities and low specific activity radioactive materials.
- Prescribe special packaging and shipment requirements including Nuclear Regulatory Commission packaging rules.
- Set out rules for radioactive material in special form, radioactive material in normal form, and fissile radioactive material.
- Prescribe rules for contamination controls and special tests.

A special part is provided for carriage of hazardous materials by public highway. These regulations:

- Require retention of manufacturer's certificate and retest reports for cargo tanks.
- Delineate special requirements for shipping papers.
- Provide special rules for retesting and inspections of cargo tanks.
- Set out special rules for loading and unloading.
- Provide a loading and storage chart for hazardous materials.
- Prescribe rules for vehicles in transit and accidents.

The regulations also contain a part which sets out in exhaustive engineering detail the shipping container specifications. These regulations:

- Specify construction, capacity, reuse, devices, marking, tests, size, shape, inspection, efficiency, materials and the engineering data and criteria for these specifications.
- Provide specifications for all common modes of shipping including cylinders, inside containers and lining, metal barrels, trunks, boxes, drums, portable tanks, and general packaging.

Finally, there are regulations dealing with:

- Attendance and surveillance of motor vehicles
- Parking
- Routes
- Fires and Tires
- Smoking
- Fueling

(Code of Federal Regulations Title 49, Parts 171-173, 177-179, and 397)

Penalties for violation of these regulations include:

- Civil penalties of \$10,000
- Criminal penalties of \$25,000 fine or five years imprisonment or both

- ° Orders requiring suspension of activities.

(Transportation Safety Act of 1974)

OPERATIONS

Under the U.S. Atomic Energy Act, no one may transfer, acquire, or possess nuclear by-product material, including uranium mill tailings except under an NRC license. To obtain a license for operations and storage of uranium mill tailings, an UMTRAP operator must comply with applicable NRC regulations. (42 United States Code Annotated, § 2111)

The NRC has passed general radiation standards. These regulations:

- ° Set out permissible doses, levels, and concentrations according to:

 measurements of rems per calendar quarter
 specific body parts
 restricted versus unrestricted areas.
- ° Prescribe precautionary procedures including:

 Personnel monitoring
 Caution signs, labels, signals, and controls.
- ° Require reports on radiation monitoring and on theft or loss of licensed material.
- ° Require notifications of incidents causing certain types of radiation exposure or release
- ° Set out the information to be contained in personnel monitoring reports.
- ° Provide for injunctive proceedings and license revocation.
- ° Set out, in the Appendix, the concentrations in air and water above natural background radiation applicable to permissible exposure.

(Nuclear Regulatory Commission Standards for Protection Against Radiation, U.S. Nuclear Regulatory Commission)

The Environmental Protection Agency has promulgated regulations specifically addressed to uranium mill tailings. These rules are applicable to any site at which uranium was produced for sale to any federal agency. The regulations:

- ° Provide permissible radiation levels in buildings, radiation concentrations in soils, and radiation doses to persons to be achieved by any UMTRAP action.

- ° Provide exceptions in cases of danger to health or safety, unreasonable costs or where environmental protection would be better served by variations.
- ° Allow for special standards to be set up by the Department of Energy where exceptional circumstances exist.

In addition to federal rules, storage of uranium mill tailings must conform to the state regulations. The Wyoming Department of Environmental Quality under the authority of the Wyoming Environmental Quality Act has passed regulations in several areas affecting operations and storage. (Wyo. Stat., § 5-11-101 et seq.)

The Land Quality regulations deal with mining and reclamation of mine sites including uranium mining. The regulations:

- ° Provide for reclamation based on scales of land uses.
- ° Require certain types of reclamation based on the methods of mining used.
- ° Prescribe standards as to topsoil, subsoil, overburden, refuse, and revegetation.
- ° Set out rules for water use with special rules for mill tailings impoundments.
- ° Elaborate time schedules for reclamation.
- ° Prescribe standards for roads and other forms of access.
- ° Provide a self-bonding program to secure operator responsibility.

(Land Quality Rules and Regulations, Wyoming Department of Environmental Quality)

The Department of Environmental Quality has passed Water Quality regulations. These regulations:

- ° Classify surface waters and uses.
- ° Contain enforcement provisions.
- ° Designate state waters by class.
- ° Set out policies on sampling of state waters to determine compliance with water standards.
- ° Set out testing procedures for determining compliance.

- Provide special requirements for radioactive materials.
- Determine acceptable criteria for turbidity and temperature.

(Water Quality Rules and Regulations, Department of Environmental Quality, Wyoming Environmental Quality Act , Wyo. Stat. 35-11-101, Protection of Public Water Supply Act Wyo. Stat. 35-187)

Any storage facility which will discharge wastes into the waters of the state must conform to the applicable state regulations. These regulations:

- Define radioactive materials as "pollutants" and require permits for their discharge.
- Set up procedures for permit applications and processing those applications.
- Prescribe the conditions under which permits may be granted.
- Set up compliance schedules.
- Provide standards and provision for their application.
- Require monitoring, recording, and reporting of equipment, flow, and certain pollutants.

(Wyoming NPDES Permit Program Regulations, Department of Environmental Quality)

Disposal

The regulations set up in the above section on storage of mill tailings will also apply to disposal, particularly the reclamation regulations under Land Quality. There are also regulations specific to disposal.

The NRC regulations contain a special part pertaining to Waste Disposal. These regulations provide a method for obtaining approval of proposed disposal procedures.

(Nuclear Regulatory Commission Standards for Protection Against Radiation)

The Department of Environmental Quality has passed Solid Waste rules particularly applicable to disposal. These regulations:

- Prescribe minimum requirements for the operation of hazardous waste facilities.

- ° Provide rules for construction and operation of facilities.
- ° Provide special rules for construction and operation of hazardous waste facilities including:
 - (a) submission of plans for construction; (b) fencing; and (c) construction requirements pertaining to location near water, run-offs, fire protection, and total containment of the hazardous materials on-site.

(Solid Waste Management Rules and Regulations, Department of Environmental Quality)

Appendix D

MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. DEPARTMENT OF TRANSPORTATION AND THE U.S. NUCLEAR REGULATORY COMMISSION FOR REGULATION OF SAFETY IN THE TRANSPORTATION OF RADIOACTIVE MATERIALS

Abstract. This agreement delineates the respective responsibilities of the Department of Transportation (DOT) and the Nuclear Regulatory Commission (NRC) for the regulation of safety in transportation of radioactive material. It supersedes the existing agreement executed on March 22, 1973, between the DOT and the Atomic Energy Commission. Generally, the DOT is responsible for regulating safety in transportation of all hazardous materials, including radioactive materials, and the NRC is responsible for regulating safety in receipt, possession, use and transfer of byproduct, source, and special nuclear materials. The NRC reviews and approves or denies approval of package designs for fissile materials and for other radioactive materials (other than low specific activity materials) in quantities exceeding Type A limits, as defined in 10 CFR Part 71.

Agreement Between the DOT and the NRC.

The Department of Transportation (DOT), under the Transportation of Explosives Act (18 U.S.C. 831-835), the Dangerous Cargo Act (R.S. 4472, as amended, 46 U.S.C. 170), Title VI and 902 (h) of the Federal Aviation Act of 1958 [49 U.S.C. 1421-1430 and 1472 (h)], the Department of Transportation Act (49 U.S.C. 1655), and the Hazardous Materials Transportation Act (49 U.S.C. 1801-1812), is required to regulate safety in the transportation of hazardous materials, including radioactive materials.

The Nuclear Regulatory Commission (NRC), under the Atomic Energy Act of 1954, as amended (42 U.S.C. Chapter 23), and Section 201 of the Energy Reorganization Act of 1974, as amended (42 U.S.C. 5841), is authorized to license and regulate the receipt, possession, use, and transfer of "byproduct material," "source material," and "special nuclear material" (as defined in 42 U.S.C. 2014). The NRC authority to license air shipment of plutonium is further governed by P.L. 94-79.

For the purpose of developing, establishing, and implementing consistent and comprehensive regulations and requirements for the safe transportation of radioactive materials, and avoiding duplication of effort, the DOT and the NRC agree, subject to their respective statutory authorities, as follows. Terms used in this agreement are defined in 49 CFR Parts 100-199 and 10 CFR Part 71.

I. Development of Safety Standards

- a. The DOT (in consultation with the NRC) will develop safety standards for the classification of radioactive materials; for the design specifications and performance requirements of packages for quantities of radioactive materials (other than fissile

1 (c) ANY REGULATION PROMULGATED UNDER SUBSECTION (b)
2 OF THIS SECTION SHALL BE EQUIVALENT IN REGULATORY RESULT
3 TO ITS CORRESPONDING UNITED STATES ENVIRONMENTAL PRO-
4 TECTION AGENCY REGULATION, UNLESS THE COUNCIL FINDS THAT:

5 (i) THE REGULATION OF THE ENVIRONMENTAL PRO-
6 TECTION AGENCY IS INADEQUATE TO PROTECT THE PUBLIC HEALTH
7 OR SAFETY, OR THE ENVIRONMENT OF THE STATE;

8 (iii) THE REGULATION ADDRESSES AREA-SPECIFIC
9 FEATURES OR NEEDS OF THE STATE WHICH DO NOT EXIST NATION-
10 WIDE, AND THE REGULATION DOES NOT POSE AN UNREASONABLE,
11 INCREMENTAL BURDEN ABOVE THAT IMPOSED BY THE ENVIRONMENTAL
12 PROTECTION AGENCY ON THE REGULATED PERSON; OR

13 (iiii) THE REGULATION GOVERNS HAZARDOUS WASTES
14 AT COMMERCIAL OR MUNICIPAL HAZARDOUS WASTE SITES.

15 ~~35-11-601. Applications; authority to grant; hear-~~
16 ~~ing; limitations; renewals; judicial review; emergencies.~~

17 (d) NOTHING IN THIS SECTION SHALL BE CONSTRUED TO
18 PERMIT AN APPLICATION FOR A HAZARDOUS WASTE TREATMENT,
19 STORAGE OR DISPOSAL FACILITY VARIANCE. APPLICATIONS FOR
20 HAZARDOUS WASTE TREATMENT, STORAGE OR DISPOSAL FACILITY
21 PERMITS SHALL BE MADE SOLELY UNDER THE PROVISIONS OF W.S.
22 35-11-504.

§ 35-4-223. Liability for damages.

Compliance with the requirements of this act [§§ 35-4-220 to 35-4-223] shall in no way release the owners or persons responsible for the operation of a sanitary public water supply from any liability for damage to persons or property caused by or resulting from the installation, operation or maintenance of a sanitary public water supply. (Laws 1957, ch. 222, § 4; W.S. 1957, § 35-200.)

Cross reference. — As to criminal offense of poisoning water supply, see § 6-4-603.

ARTICLE 3. RADIOACTIVE ISOTOPES OR MATERIAL**§ 35-4-301. Hospitals, manufacturers, processors, etc., to register with health department.**

Each hospital, clinic, manufacturing establishment, research or educational institution, experiment station, processing mill, or other institution or place of business or process where radioactive isotopes or materials are used, manufactured, processed, packaged, refined, produced, disposed or concentrated shall be registered with the state department of public health. The state mine inspector will register with the department of public health any mine, which is producing or has produced radioactive substances. (Laws 1953, ch. 61, § 1; 1955, ch. 153, § 1; W.S. 1957, § 35-201.)

Am. Jur. 2d reference. — 39 Am. Jur. 2d Health §§ 22 to 25.

§ 35-4-302. Application for registration; duties of health department upon receipt of application; issuance of certificate of registration.

It shall be the duty of each manager or officer in charge of any such institution or establishment as set forth in section one (1) of this act [§ 35-4-301], where radioactive isotopes or materials are used, as herein provided, to apply for registration in writing to the director of the department of public health. Upon receipt of such application the director of the state department of public health shall submit to the applicant a registration form calling for such information as may be necessary to determine whether the health of the public or persons working in such establishments may be adversely affected by using, manufacturing, processing, packing, refining, disposing, producing or concentrating of such radioactive isotopes and materials. The director of the department of public health, upon receipt of a properly executed application for registration and upon satisfactory compliance by such applicant with regulations and limits that are or shall be in effect governing the safe exposure to such isotope or material, shall issue to the applicant a certificate of registration. (Laws 1953, ch. 61, § 2; 1955, ch. 153, § 2; W.S. 1957, § 35-202.)

§ 35-4-303. Penalty.

All persons, firms, establishments or institutions as set forth in section 1 of this act [§ 35-4-301] who shall fail to obtain the necessary registration as provided for by this act [§§ 35-4-301 to 35-4-303] shall be deemed guilty of a misdemeanor and shall be punished by a fine of not to exceed one hundred dollars (\$100.00) for each offense. (Laws 1953, ch. 61, § 3; 1955, ch. 153, § 3; W.S. 1957, § 35-203.)

ARTICLE 4. FEDERAL MATERNITY BENEFITS**§ 35-4-401. Act of congress accepted.**

The state of Wyoming hereby accepts the provisions of the act of congress of the United States approved November 23, 1921, entitled: "An act for the promotion of the welfare and hygiene of maternity and infancy, and for other purposes." (Laws 1923, ch. 32, § 1; R.S. 1931, § 103-241; C.S. 1945, § 63-301; W.S. 1957, § 35-204.)

Cross reference. — As to aid to mothers and dependent children, see §§ 42-1-101 to 42-3-104.

Editor's note. — The federal act, formerly appearing as 42 U.S.C. §§ 161 to 175, referred to in this section, was repealed by act of January

22, 1927, ch. 53, § 2, 44 Stat. 1024, effective June 30, 1929. For present provisions as to the children's bureau and maternal and child health services, see 42 U.S.C. §§ 191 to 194, 701 to 716.

§ 35-4-402. Cooperation with federal bureau.

The state board of health of Wyoming is hereby directed to cooperate with the federal children's bureau in the administration of the benefits of the act of congress aforesaid; and to do all things necessary to entitle the state of Wyoming to receive all the benefits of said act. (Laws 1923, ch. 32, § 2; R.S. 1931, § 103-242; C.S. 1945, § 63-302; W.S. 1957, § 35-205.)

Editor's note. — The powers, duties and authority of the board of health have been transferred to the department of health and social services. See § 9-3-102.

§ 35-4-403. Custodian of funds.

The treasurer of the state of Wyoming is hereby designated as the custodian of all funds allotted to the state of Wyoming from appropriations made by congress under or in pursuance of said act, and he shall receive and provide for the proper custody and disbursement of the same in accordance with law. (Laws 1923, ch. 32, § 3; R.S. 1931, § 103-243; C.S. 1945, § 63-303; W.S. 1957, § 35-206.)

Effective date. — Section 4, ch. 32, Laws 1923, makes the act effective from and after passage. Approved February 20, 1923.

CHAPTER 15

Western Interstate Nuclear Compact

Sec.

9-15-101. Generally.

9-15-102. State member of board.

9-15-103. Cooperation with board.

9-15-104. Filing of bylaws and amendments thereto.

Sec.

9-15-105. Laws and benefits applicable to persons dispatched to another state.

Cross reference. — As to registration for use of radioactive isotopes, see §§ 35-4-301 to 35-4-303.

§ 9-15-101. Generally.

The Western Interstate Nuclear Compact, hereinafter called "the compact," is hereby enacted into law and entered into by the state of Wyoming as a party, and is in full force and effect between the state and any other states joining therein in accordance with the terms of the compact, which compact is substantially as follows:

Article I. Policy and Purpose

The party states recognize that the proper employment of scientific and technological discoveries and advances in nuclear and related fields and direct and collateral application and adaptation of processes and techniques developed in connection therewith, properly correlated with the other resources of the region, can assist substantially in the industrial progress of the West and the further development of the economy of the region. They also recognize that optimum benefit from nuclear and related scientific or technological resources, facilities and skills requires systematic encouragement, guidance, assistance, and promotion from the party states on a cooperative basis. It is the policy of the party states to undertake such cooperation on a continuing basis. It is the purpose of this compact to provide the instruments and framework for such a cooperative effort in nuclear and related fields, to enhance the economy of the West and contribute to the individual and community well-being of the region's people.

Article II. The Board

(a) There is hereby created an agency of the party states to be known as the "western interstate nuclear board" (hereinafter called the board). The board shall be composed of one (1) member from each party state designated or

(j) The board may establish and maintain such facilities as may be necessary for the transacting of its business. The board may acquire, hold, and convey real and personal property and any interest therein.

(k) The board shall adopt bylaws, rules, and regulations for the conduct of its business, and shall have the power to amend and rescind these bylaws, rules and regulations. The board shall publish its bylaws, rules, and regulations in convenient form and shall file a copy thereof, and shall also file a copy of any amendment thereto, with the appropriate agency or officer in each of the party states.

(m) The board annually shall make to the governor of each party state, a report covering the activities of the board for the preceding year, and embodying such recommendations as may have been adopted by the board, which report shall be transmitted to the legislature of said state. The board may issue such additional reports as it may deem desirable.

Article III. Finances

(a) The board shall submit to the governor or designated officer or officers of each party state a budget of its estimated expenditures for such period as may be required by the laws of that jurisdiction for presentation to the legislature thereof.

(b) Each of the board's budgets of estimated expenditures shall contain specific recommendations of the amount or amounts to be appropriated by each of the party states. Each of the board's requests for appropriations pursuant to a budget of estimated expenditures shall be apportioned equally among the party states. Subject to appropriation by their respective legislatures, the board shall be provided with such funds by each of the party states as are necessary to provide the means of establishing and maintaining facilities, a staff of personnel, and such activities as may be necessary to fulfill the powers and duties imposed upon and entrusted to the board.

(c) The board may meet any of its obligations in whole or in part with funds available to it under article II (h) of this compact; provided, that the board takes specific action setting aside such funds prior to the incurring of any obligation to be met in whole or in part in this manner. Except where the board makes use of funds available to it under article II (h), the board shall not incur any obligation prior to the allotment of funds by the party jurisdictions which are adequate to meet any such obligation.

(d) Any expenses and any other costs for each member of the board in attending board meeting shall be met by the board.

(e) The board shall keep accounts of all receipts and disbursements. The receipts and disbursements of the board shall be subject to the audit and accounting procedures established under its bylaws. However, all receipts and disbursements of funds handled by the board shall be audited yearly by a certified or licensed public accountant and the report of the audit shall be included in and become a part of the annual report of the board.

(f) The accounts of the board shall be open at any reasonable time for inspection to persons authorized by the board, and duly designated representatives of governments contributing to the board's support.

Article IV. Advisory Committees

The board may establish such advisory and technical committees as it may deem necessary, membership on which may include but not be limited to private citizens, expert and lay personnel, representatives of industry, labor, commerce, agriculture, civic associations, medicine, education, voluntary health agencies, and officials of local, state and federal government, and may cooperate with and use the services of any such committees and the organizations which they represent in furthering any of its activities under this compact.

Article V. Powers

(a) The board shall have power to:

(i) Encourage and promote cooperation among the party states in the development and utilization of nuclear and related technologies and their application to industry and other fields;

(ii) Ascertain and analyze on a continuing basis the position of the West with respect to the employment in industry of nuclear and related scientific findings and technologies;

(iii) Encourage the development and use of scientific advances and discoveries in nuclear facilities, energy, materials, products, by-products, and all other appropriate adaptations of scientific and technological advances and discoveries;

(iv) Collect, correlate, and disseminate information relating to the peaceful uses of nuclear energy, materials, and products, and other products and processes resulting from the application of related science and technology;

(v) Encourage the development and use of nuclear energy, facilities, installations, and products as part of a balanced economy;

(vi) Conduct, or cooperate in conducting, programs of training for state and local personnel engaged in any aspects of:

(A) Nuclear industry, medicine, or education, or the promotion or regulation thereof;

(B) Applying nuclear scientific advances or discoveries, and any industrial commercial or other processes resulting therefrom;

(C) The formulation or administration of measures designed to promote safety in any matter related to the development, use or disposal of nuclear energy, materials, products, by-products, installations, or wastes, or to safety in the production, use and disposal of any other substances peculiarly related thereto;

(vii) Organize and conduct, or assist and cooperate in organizing and conducting, demonstrations or research in any of the scientific, technological or industrial fields to which this compact relates;

(viii) Undertake such nonregulatory functions with respect to nonnuclear sources of radiation as may promote the economic development and general welfare of the West;

(ix) Study industrial, health, safety, and other standards, laws, codes, rules, regulations, and administrative practices in or related to nuclear fields;

(x) Recommend such changes in, or amendments or additions to the laws, codes, rules, regulations, administrative procedures and practices or local laws or ordinances of the party states or their subdivisions in nuclear and related fields, as in its judgment may be appropriate. Any such recommendations shall be made through the appropriate state agency, with due consideration of the desirability of uniformity but shall also give appropriate weight to any special circumstances which may justify variations to meet local conditions;

(xi) Consider and make recommendations designed to facilitate the transportation of nuclear equipment, materials, products, by-products, wastes, and any other nuclear or related substances, in such manner and under such conditions as will make their availability or disposal practicable on an economic and efficient basis;

(xii) Consider and make recommendations with respect to the assumption of and protection against liability actually or potentially incurred in any phase of operations in nuclear and related fields;

(xiii) Advise and consult with the federal government concerning the common position of the party states or assist party states with regard to individual problems where appropriate in respect to nuclear and related fields;

(xiv) Cooperate with the atomic energy commission, the national aeronautics and space administration, the office of science and technology, or any agencies successor thereto, any other officer or agency of the United States, and any other governmental unit or agency or officer thereof, and with any private persons or agencies in any of the fields of its interest;

(xv) Act as licensee, contractor or subcontractor of the United States government or any party state with respect to the conduct of any research activity requiring such license or contract and operate such research facility or undertake any program pursuant thereto, provided that this power shall be exercised only in connection with the implementation of one (1) or more other powers conferred upon the board by this compact;

(xvi) Prepare, publish and distribute (with or without charge) such reports, bulletins, newsletters or other materials as it deems appropriate;

(xvii) (A) Ascertain from time to time such methods, practices, circumstances, and conditions as may bring about the prevention and control of nuclear incidents in the area comprising the party states, to coordinate the nuclear incident prevention and control

plans and the work relating thereto of the appropriate agencies of the party states and to facilitate the rendering of aid by the party states to each other in coping with nuclear incidents;

(B) The board may formulate and, in accordance with need from time to time, revise a regional plan or regional plans for coping with nuclear incidents within the territory of the party states as a whole or within any subregion or subregions of the geographic area covered by this compact;

(C) Any nuclear incident plan in force pursuant to this paragraph shall designate the official or agency in each party state covered by the plan who shall coordinate requests for aid pursuant to article VI of this compact and the furnishing of aid in response thereto;

(D) Unless the party states concerned expressly otherwise agree, the board shall not administer this summoning and dispatching of aid, but this function shall be undertaken directly by the designated agencies and officers of the party states;

(E) However, the plan or plans of the board in force pursuant to this paragraph shall provide for reports to the board concerning the occurrence of nuclear incidents and the requests for aid on account thereof, together with summaries of the actual working and effectiveness of mutual aid in particular instances;

(F) From time to time, the board shall analyze the information gathered from reports of aid pursuant to article VI and such other instances of mutual aid as may have come to its attention, so that experience in the rendering of such aid may be available;

(xviii) Prepare, maintain, and implement a regional plan or regional plans for carrying out the duties, powers, or functions conferred upon the board by this compact;

(xix) Undertake responsibilities imposed or necessarily involved with regional participation pursuant to such cooperative programs of the federal government as are useful in connection with the fields covered by this compact.

Article VI. Mutual Aid

(a) Whenever a party state, or any state or local governmental authorities request aid from any other party state pursuant to this compact in coping with a nuclear incident, it shall be the duty of the requested state to render all possible aid to the requesting state which is consonant with the maintenance of protection of its own people.

(b) Whenever the officers or employees of any party state are rendering outside aid pursuant to the request of another party state under this compact, the officers or employees of such state shall, under the direction of the authorities of the state to which they are rendering aid, have the same powers, duties, rights, privileges and immunities as comparable officers and employees of the state to which they are rendering aid.

(c) No party state or its officers or employees rendering outside aid pursuant to this compact shall be liable on account of any act or omission on their part while so engaged, or on account of the maintenance or use of any equipment or supplies in connection therewith.

(d) All liability that may arise either under the laws of the requesting state or under the laws of the aiding state or under the laws of a third state on account of or in connection with a request for aid, shall be assumed and borne by the requesting state.

(e) Any party state rendering outside aid pursuant to this compact shall be reimbursed by the party state receiving such aid for any loss or damage to, or expense incurred in the operation of any equipment answering a request for aid, and for the cost of all materials, transportation, wages, salaries and maintenance of officers, employees and equipment incurred in connection with such requests: provided that nothing herein contained shall prevent any assisting party state from assuming such loss, damage, expense or other cost or from loaning such equipment or from donating such services to the receiving party state without charge or cost.

(f) Each party state shall provide for the payment of compensation and death benefits to injured officers and employees and the representatives of deceased officers and employees in case officers or employees sustain injuries or death while rendering outside aid pursuant to this compact, in the same manner and on the same terms as if the injury or death were sustained within the state by or in which the officer or employee was regularly employed.

Article VII. Supplementary Agreements

(a) To the extent that the board has not undertaken an activity or project which would be within its power under the provisions of article V of this compact, any two (2) or more of the party states (acting by their duly constituted administrative officials) may enter into supplementary agreements for the undertaking and continuance of such an activity or project. Any such agreement shall specify the purpose or purposes; its duration and the procedure for termination thereof or withdrawal therefrom; the method of financing and allocating the costs of the activity or project; and such other matters as may be necessary or appropriate.

(b) No such supplementary agreement entered into pursuant to this article shall become effective prior to its submission to and approval by the board. The board shall give such approval unless it finds that the supplementary agreement or activity or project contemplated thereby is inconsistent with the provisions of this compact or a program or activity conducted by or participated in by the board.

(c) Unless all of the party states participate in a supplementary agreement, any cost or costs thereof shall be borne separately by the states party thereto. However, the board may administer or otherwise assist in the operation of any supplementary agreement.

aid pursuant to article VI, unless that article has been enacted or otherwise adopted so as to have the full force and effect of law in the jurisdiction affected. Neither Guam nor American Samoa shall be entitled to voting participation on the board, unless it has become a full party to the compact.

Article X. Severability and Construction

The provisions of this compact and of any supplementary agreement entered into hereunder shall be severable and if any phrase, clause, sentence or provision of this compact or such supplementary agreement is declared to be contrary to the constitution of any participating state or of the United States or the applicability thereof to any government, agency, person, or circumstance is held invalid, the validity of the remainder of this compact or such supplementary agreement and the applicability thereof to any government, agency, person or circumstance shall not be affected thereby. If this compact or any supplementary agreement entered into hereunder shall be held contrary to the constitution of any state participating therein, the compact or such supplementary agreement shall remain in full force and effect as to the remaining states and in full force and effect as to the state affected as to all severable matters. The provisions of this compact and of any supplementary agreement entered into pursuant thereto shall be liberally construed to effectuate the purposes thereof. (Laws 1969, ch. 137, § 1.)

§ 9-15-102. State member of board.

The member of the western interstate nuclear board representing the state of Wyoming shall be appointed by the governor. The member may designate another person as his representative to attend meetings of the board. (Laws 1969, ch. 137, § 2.)

§ 9-15-103. Cooperation with board.

All departments, agencies and officers of this state and its subdivisions are directed to cooperate with the board in the furtherance of any of its activities pursuant to the compact. (Laws 1969, ch. 137, § 3.)

§ 9-15-104. Filing of bylaws and amendments thereto.

Pursuant to article II (k) of this compact, the western interstate nuclear board shall file copies of its bylaws and any amendments thereto with the secretary of state of the state of Wyoming. (Laws 1969, ch. 137, § 4.)

§ 9-15-105. Laws and benefits applicable to persons dispatched to another state.

The laws of the state of Wyoming and any benefits payable thereunder shall apply and be payable to any person dispatched to another state pursuant to article VI of the compact. If the aiding personnel are officers or employees of

I. GENERAL POLICY

The almost singular objective of the Radiological Health Services program within the Division of Health and Medical Services, is to eliminate or reduce unnecessary radiation exposure to the population of the State of Wyoming.

At the date of this writing, there is no statutory authority to carry out this responsibility, however, a program to carry out activities in pursuit of this objective has been formalized.

Due to the lack of statutory authority to carry on these radiation control functions, we must rely on cooperation among the radiation users for compliance with national standards and other recommendations we may make in furtherance of our objective.

It has become program policy to provide whatever services necessary or do whatever actions are necessary to create an atmosphere of acceptance and willingness to comply with sound radiological health principles. Some of these activities may include active participation and membership in state professional societies of radiation users, participation in in-service and other training seminars, providing consultation and assistance to radiation users throughout the state in all matters of radiation control including NRC licensing actions and providing any other services within our capability that time and resources will permit.

October, 1977

II. PROGRAM PLAN OF OPERATIONS

RADIOLOGICAL HEALTH SERVICES
PLAN OF OPERATIONS

I. State Agency Identification and Authorities

A. Identification

1. Name of Program - Radiological Health Services, Division of Health and Medical Services, Department of Health and Social Services.
2. Contact Persons/Program Manager - Dr. L.J. Cohen, Division Administrator; Edd Johnson, Chief of Radiological Health Services.
3. Telephone Number - (307) 777-7357
4. Mailing Address - Hathaway Building, Cheyenne, WY 82002

B. Authority

1. Article 3, Chapter 35, Sections 201-203, which requires the registration of any user or producer of radioactive materials with the Department.

II. Program Goals

Research has indicated that any amount of radiation exposure can increase the statistical probability of an individual or population group experiencing detrimental effects, such as cancer, leukemia, cataracts, or life shortening.

For this reason, the primary goal of the Radiological Health Services program is to reduce or eliminate unnecessary radiation exposure to the population of Wyoming.

Activities of the program in furtherance of the goal include the following described below:

- A. Radioactive Materials Registration - A current file is maintained on all radioactive material users in the state, which includes those persons from out of state who enter under reciprocity to perform work activities at temporary locations;
- B. X-Ray Registration - A current file is maintained on all facilities that have voluntarily registered their x-ray machines, including hospitals, private practice offices, clinics, etc.;
- C. X-Ray Compliance - In cooperation with the Medical Facilities program of DHMS, safety surveys are conducted on an annual basis at hospitals throughout the state, certifying the x-ray facilities. These safety surveys are also performed upon request at any other x-ray facility to check for compliance with national standards and recommendations of the National Council on Radiation Protection and Measurements.

- D. Quality Assurance Activities - Several quality assurance-oriented programs have been utilized in the furtherance of the stated goal. These programs have been highly successful as substitutes for regulations in the selected categories of x-ray usage where they have been applied:
1. Dental Exposure Normalization Technique (DENT)
In cooperation with the Dental Health Services program, every intraoral x-ray machine in Wyoming was screened to determine the skin exposure dosage. Those machines with abnormal exposures were physically resurveyed to optimize the exposure consistent with recommended dosage levels. The "DENT" program is a continuing program, and to date has resulted in a 50% decrease in the average radiation dosage delivered to the patient.
 2. Breast Exposure Nationwide Trends (BENT)
With assistance from the Bureau of Radiological Health (Food and Drug Administration), every x-ray machine used for mammography examinations is surveyed to optimize the dosage delivered to the breast consistent with the image receptor used.
 3. Nationwide Evaluation of X-ray Trends (NEXT)
Certain medical x-ray machines are surveyed using standardized procedures, the results of which are compared with the data from the over 30 state and local agencies using the identical survey techniques to aid in the establishment of program priorities.

III. Program Objectives

Data from compliance surveys may reorganize program priorities from year to year, however, the basic program objectives will essentially remain unchanged:

1. Annually survey and certify the x-ray facility in each hospital in the state.
2. Annually survey and certify at least 1/3 of the remaining x-ray facilities in the state.
3. Actively pursue and consummate the registration of every x-ray and radioactive material user in the state.
4. Actively promote a general atmosphere of willing compliance with applicable state regulations or federal guidelines among the radiation users of the state.
5. Maintain expertise and competence for responding to radiological incidents.
6. Promote and participate in educational/training activities, both in-house and user oriented.

Specific Objectives for FY 78 are:

1. Survey and certify every x-ray machine used in the practice of chiropractics that is registered with the Department.
2. Survey and certify every x-ray machine used in the practice of veterinary medicine that is registered with the Department.
3. Complete followup surveys on the "BENT" program and the first cycle of the "DENT" program and complete project reports for distribution to the participants.
4. Finalize and have ready for publication and implementation the "State Radiation Emergency Response Plan for Transportation Incidents".
5. Create an atmosphere of acceptance for radiation control legislation to be introduced into the 1979 session of the Wyoming Legislature.

IV. Federal and State Laws and Regulations

Article 3, Chapter 35, Sections 201-203, of the Wyoming Statutes requires that any producer or user of radioactive material register his activities with the Department. However, these statutes do not authorize the Department to promulgate Rules and Regulations for Radiation Control.

The vast majority of the radioactive material users in the state operate under the licensure of the U.S. Nuclear Regulatory Commission, or one of the 25 Agreement States. But there are some users whose activities do not fall within the purview of the Atomic Energy Act as amended in 1959, and are therefore exempted from licensure of any kind for their material usage in Wyoming.

There are no Federal or State laws governing the use of x-rays in the State of Wyoming.

Legislation to authorize the Department to promulgate comprehensive radiation control regulations, and authorizing the Governor to enter into an agreement with the Federal Government to assume regulatory control over certain categories of radioactive material has been introduced in the legislature on several occasions, but has never been successful.

Other attempts will be made in the future legislative sessions.

V. Coordinative Relationships with Other Programs

A. Medical Facilities Services and Medicare

Through a cooperative agreement, the program performs radiation safety surveys of hospital x-ray departments for the Medical Facilities Services program. These annual surveys satisfy some of the requirements for Medicare certification if the facility is in compliance with established criteria.

B. Department of Environmental Quality (D.E.Q.)

Through a cooperative agreement, the program analyzes environmental samples for radioactivity concentrations. These samples are collected and prepared for counting by DEQ, then analyzed by the program. The calculated data is then returned to DEQ for their compliance program.

C. Disaster and Civil Defense Agency

The Department, through the program, has been designated as the lead agency for responding to radiation related incidents, and is a participant in the "Hazardous Materials Annex" of the "State of Wyoming Natural Disaster Operation Plan" which is being formulated by the Disaster and Civil Defense Agency.

D. Wyoming Occupational Health and Safety Commission

The program is occasionally called upon by the Occupational Health and Safety Commission to provide radiation safety expertise and consultation in investigations of alleged violations of their regulations.

VI. Finanical Information

A. Funding

Funds to support the program are derived entirely from the General Fund, and support a staff of two, one being administrative/technical, and the other being technical/clerical.

B. Budget and Cost Allocation

Presented in Table I is a line item breakdown of the 1977-78 biennial appropriation along with the estimated percentages and amounts that are used for program administration.

House of Intro
To Com No. _____
Stand Report Do Amd Not
Com Whole Do Amd Not
2nd Reading Amd
3rd Reading Amd Pass Fail

Second House
To Com No. _____
Stand Report Do Amd Not
Com Whole Do Amd Not
2nd Reading Amd
3rd Reading Amd Pass Fail

1981

STATE OF WYOMING

81LSO-350.01

HOUSE BILL NO. 88

Radiation control.

Sponsored by: Representative CROWLEY

A BILL

for

1 AN ACT to create W.S. 35-4-304 through 35-4-308 relating
2 to radiation control; providing definitions; designating
3 the division of health and medical services, department of
4 health and social services as the radiation control agency
5 of Wyoming; specifying agency powers and duties; granting
6 rulemaking authority; specifying prohibited acts; provid-
7 ing penalties; providing for an appropriation; and provid-
8 ing for an effective date.

9 Be It Enacted by the Legislature of the State of Wyoming:

10 Section 1. W.S. 35-4-304 through 35-4-308 are

1 created to read:

2 35-4-304. This act shall be known and may be cited as
3 the "Wyoming Medical Radiation Control Act of 1981".

4 35-4-305. Definitions.

5 (a) As used in this act:

6 (i) "Department" means the division of health
7 and medical services, department of health and social
8 services, acting through the radiological health services
9 program;

10 (ii) "Healing arts" means diagnostic or heal-
11 ing treatment of human and animal maladies, including the
12 practice of medicine and its associated specialties, den-
13 tistry, veterinary medicine, osteopathy, chiropractic and
14 podiatry;

15 (iii) "Ionizing radiation" means gamma rays
16 and x-rays, and alpha particles, beta particles,
17 high-speed electrons, neutrons, protons and other
18 high-speed nuclear particles;

19 (iv) "Radioactive material" means any mate-
20 rial, solid, liquid or gas, used for healing arts purposes
21 which emits ionizing radiation spontaneously, but does not

1 include those materials licensed by the United States
2 nuclear regulatory commission;

3 (v) "Person" means any individual, corpora-
4 tion, partnership, institution, political subdivision or
5 agency thereof, who possesses or uses, x-ray machines or
6 radioactive materials for healing arts purposes;

7 (vi) "This act" means W.S. 35-4-304 through
8 35-4-308.

9 35-4-306. Radiation Control Agency; powers and
10 duties.

11 (a) The department is hereby designated as the
12 Wyoming radiation control agency and shall administer a
13 statewide radiation protection program consistent with
14 this act. The powers granted to the department herein
15 shall not be construed in any manner so as to conflict
16 with the powers exercised by the federal government or
17 duplicate the efforts thereof.

18 (b) The department has exclusive authority to and
19 shall:

20 (i) Require registration of all x-ray
21 machines;

1 (ii) Issue licenses to practitioners of the
2 healing arts permitting the possession and use of radio-
3 active materials not licensed by the United States nuclear
4 regulatory commission;

5 (iii) Develop and conduct programs for evalu-
6 ation and control of hazards associated with the use of
7 x-ray machines and radioactive materials within the juris-
8 diction of the department;

9 (iv) Formulate, adopt and promulgate rules and
10 regulations relative to:

11 (A) Registration of x-ray machines;

12 (B) Licensing of radioactive materials
13 used in healing arts practices;

14 (C) Permissible levels of exposure;

15 (D) Monitoring of exposure to personnel;

16 (E) Notification and reports of acci-
17 dents;

18 (F) Records to be maintained by regis-
19 trants and licensees;

1 (G) Technical qualifications of per-
2 sonnel;

3 (H) Handling, storage, transportation
4 and disposal of radioactive materials;

5 (J) Posting and labeling of hazardous
6 materials and areas;

7 (K) Application, issuance, renewal,
8 amendments, suspension or revocation of registrations and
9 licenses;

10 (M) Surveys to be performed by regis-
11 trants and licensees;

12 (N) Technical and equipment requirements
13 for x-ray machines;

14 (O) Notices and instructions to
15 employees;

16 (P) Administrative requirements for per-
17 sons using x-ray machines or radioactive materials.

18 (c) Rules and regulations adopted pursuant to this
19 section shall not be construed to limit the kind or amount
20 of radiation that may be intentionally applied to a person

1 for diagnostic or therapeutic purposes by a licensed
2 practitioner of the healing arts.

3 35-4-307. Injunction proceedings. If, upon determi-
4 nation by the department, any person has or is engaged in
5 any practices which constitute a violation of any provi-
6 sion of this act or any rule, regulation or order issued
7 thereunder, the attorney general, at the request of the
8 department, shall petition the district court of the
9 county where the alleged practices occur for an order
10 enjoining those practices or for an order directing
11 compliance with this act and all rules, regulations and
12 orders issued pursuant thereto.

13 35-4-308. Prohibited acts; violations; penalties.

14 (a) No person shall acquire, own, possess or use an
15 x-ray machine unless registered with the department.

16 (b) No person shall acquire, own, possess or use any
17 radioactive material for healing arts purposes without
18 having been granted a license therefor from the department
19 and no person shall transfer to another or dispose of such
20 materials without first having been granted approval by
21 the department.

22 (c) No person shall operate or use x-ray machines

1 that are not in compliance with this act and rules and
2 regulations of the department, nor in any manner that is
3 determined by the department to be unsafe.

4 (d) Any person who violates any of the provisions of
5 this act or any of the rules and regulations of the
6 department is guilty of a misdemeanor and upon conviction
7 shall be punished by a fine not to exceed one hundred
8 dollars (\$100.00). Each day's violation of any provision
9 of this act constitutes a separate offense.

10 (e) The provisions of this section are not effective
11 until ninety (90) days after rules and regulations have
12 been adopted by the department.

13 Section 2. There is appropriated to the department
14 from the general fund the sum of forty-eight thousand five
15 hundred dollars (\$48,500.00) for the fiscal year commenc-
16 ing July 1, 1981, or so much thereof as may be necessary
17 to carry out this act.

1 Section 3. This act is effective immediately upon
2 completion of all acts necessary for a bill to become law
3 as provided by Article 4, Section 8 of the Wyoming Con-
4 stitution.

5 (END)

FISCAL NOTE

Anticipated REVENUE to: Fiscal Year 19 Fiscal Year 19

TOTAL ESTIMATED REVENUE		

Anticipated COST to: Fiscal Year 19 82 Fiscal Year 19

General Fund	\$48,500.00	
TOTAL ESTIMATED COST	\$48,500.00	

This proposal carries an appropriation of \$48,500 to cover the expenses and personnel needs of this proposal.

ENGROSSED

1981

STATE OF WYOMING

81LSB-063/eng

HOUSE BILL NO. 152A

Hazardous waste program.

Sponsored by: Representative THORSON

A BILL

for

1 AN ACT to create W.S. 35-11-504 through 35-11-506; and to
2 amend W.S. 35-11-103(d) introductory paragraph and (i) and
3 by creating a new paragraph (ii), 35-11-109(a)(iv) and
4 (vi), 35-11-501, 35-11-502(b), 35-11-503 and 35-11-601 by
5 creating a new subsection (s) relating to the department
6 of environmental quality; establishing a system for con-
7 trol of solid and hazardous wastes; specifying permitting
8 and bonding requirements; granting rulemaking authority;
9 authorizing additional personnel; providing for an appro-
10 priation; and providing for an effective date.

11 Be It Enacted by the Legislature of the State of Wyoming:

1 Section 1. W.S. 35-11-504 through 35-11-506 are
2 created to read:

3 35-11-504. Hazardous waste disposal requirements.

4 (a) Except as provided in subsection (c) of this
5 section, no person may treat, store or dispose of any
6 hazardous wastes unless authorized by a valid permit
7 issued in accordance with the provisions of this section.

8 (b) Application for hazardous waste management
9 facility permits shall be made in writing to the director,
10 containing all information required by council rule and
11 regulation authorized under W.S. 35-11-503(b).

12 (c) Any person who owns or operates a facility
13 required to have a permit under this section, which facil-
14 ity was in existence on November 19, 1980, who has filed
15 an application for a permit within the time, containing
16 the information required by the regulations, and who com-
17 plies with those regulations shall be treated as having
18 been issued the permit until such time as final adminis-
19 trative disposition of the application is made.

20 35-11-505. Bonding for hazardous waste facilities.

21 (a) The purpose of any bond, trust or other evidence

1 of financial responsibility required to be filed with the
2 director by operators of hazardous waste treatment, stor-
3 age or disposal facilities shall be to assure:

4 (i) Compliance with this article and regula-
5 tions consistent with the degree and duration of risks
6 associated with the treatment, storage or disposal of
7 specified hazardous wastes;

8 (ii) During the operation of the facility, the
9 owner or operator has and maintains proof of financial
10 responsibility for claims arising out of injury to persons
11 or property from sudden, accidental, gradual or
12 steady-state releases or escapes of hazardous wastes into
13 the environment;

14 (iii) Upon facility closure, there are suffi-
15 cient funds available to provide for closing the facility
16 in a manner which renders the facility nonhazardous or
17 which otherwise assures the protection of the public
18 health and environment; and

19 (iv) Following facility closure, there are
20 sufficient funds available to monitor and maintain the
21 facility for any period of time determined to be necessary
22 to protect the public health and environment.

1 (b) All bonds shall be signed by the owner or oper-
2 ator as principal, by a good and sufficient corporate
3 surety licensed to do business in the state, and be made
4 payable to the state of Wyoming. Trust accounts, if pro-
5 vided for by regulations of the council, shall be estab-
6 lished by the facility owner or operator in a licensed
7 financial institution in the state and shall require the
8 concurrence of the director for withdrawal of funds.

9 (c) The requirements of W.S. 35-11-420 and 35-11-421
10 shall apply for bonds filed under this section. If the
11 forfeited bond or the proceeds from any trust or other
12 assurance of financial responsibility is inadequate to
13 cover the costs for which it was intended, the attorney
14 general shall bring suit to recover the costs if recovery
15 is deemed possible. The director shall have the power and
16 duty to reclaim or otherwise render nonhazardous any
17 affected hazardous waste treatment, storage or disposal
18 facility with respect to which a performance bond has been
19 forfeited.

20 (d) Any bond, trust or other evidence of financial
21 responsibility filed under this section may be released
22 only after ninety (90) days written notice to the director
23 and upon receipt of the director's written consent, which

1 may be granted only when the requirements of financial
2 assurance have been fulfilled.

3 35-11-506. Permit revocation. If the director deter-
4 mines that a facility holding a permit under W.S.
5 35-11-504 is not in compliance with the requirements of
6 this article, he may provide the facility owner or oper-
7 ator with a written notice of the intent to revoke the
8 permit, including the reasons for permit revocation, or
9 take such other action as he deems appropriate and neces-
10 sary. The revocation shall be effective twenty (20) days
11 from the date of receipt of the written notice, unless
12 within that time the notice is appealed to the council.

13 Section 2. W.S. 35-11-103(d) introductory paragraph
14 and (i) and by creating a new paragraph (ii),
15 35-11-109(a)(iv) and (vi), 35-11-501, 35-11-502(b),
16 35-11-503 and 35-11-601 by creating a new subsection (s)
17 are amended to read:

18 35-11-103. Definitions.

19 (d) Specific definition DEFINITIONS applying to
20 solid OR HAZARDOUS waste management:

21 (i) "Solid waste" means garbage and other
22 discarded solid materials, materials including solid

1 waste materials resulting from industrial, commercial, and
2 agricultural operations, and from community activities,
3 but does not include solids or dissolved material in
4 domestic sewerage or other significant pollutants in water
5 resources, such as silt, dissolved or suspended solids in
6 industrial waste water effluents, dissolved materials in
7 irrigation return flows or other common water pollutants;

8 (iii) "HAZARDOUS WASTE" MEANS ANY LIQUID,
9 SOLID, SEMISOLID OR CONTAINED GASEOUS WASTE OR COMBINATION
10 OF THOSE WASTES WHICH BECAUSE OF QUANTITY, CONCENTRATION
11 OR PHYSICAL, CHEMICAL OR INFECTIOUS CHARACTERISTICS MAY
12 CAUSE OR SIGNIFICANTLY CONTRIBUTE TO DETRIMENTAL HUMAN
13 HEALTH EFFECTS, OR POSE A SUBSTANTIAL PRESENT OR POTENTIAL
14 HAZARD TO HUMAN HEALTH OR THE ENVIRONMENT. CRITERIA
15 SETTING FORTH CHARACTERISTICS WHICH CAUSE A WASTE TO BE
16 CLASSIFIED OR LISTED AS A HAZARDOUS WASTE SHALL BE ESTAB-
17 LISHED BY RULES AND REGULATIONS PROMULGATED BY THE COUN-
18 CIL. THE TERM "HAZARDOUS WASTE" DOES NOT INCLUDE THOSE
19 HAZARDOUS WASTES EXEMPTED UNDER THE RESOURCE CONSERVATION
20 AND RECOVERY ACT, P.L. 94-580, (OCTOBER 21, 1980), OR
21 UNDER THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S
22 HAZARDOUS WASTE MANAGEMENT REGULATIONS FOR THE PERIOD THAT
23 THEY REMAIN EXEMPTED BY CONGRESSIONAL OR ADMINISTRATIVE
24 ACTION;

1 (iii) "WASTE" FOR THE PURPOSE OF SUBSECTION
2 (d)(ii) OF THIS SECTION MEANS ANY MATERIAL WHICH:

3 (A) IS DISCARDED OR IS BEING ACCUMU-
4 LATED, STORED, OR PHYSICALLY, CHEMICALLY, OR BIOLOGICALLY
5 TREATED PRIOR TO BEING DISCARDED; OR

6 (B) HAS SERVED ITS ORIGINAL INTENDED USE
7 AND IS SOMETIMES DISCARDED; OR

8 (C) IS A MANUFACTURING OR MINING BY-
9 PRODUCT AND IS SOMETIMES DISCARDED.

10 35-11-109. Powers and duties of director.

11 (a) In addition to any other powers and duties
12 imposed by law, the director of the department shall:

13 (iv) Conduct, encourage, request and partici-
14 pate in, studies, surveys, investigations, research,
15 experiments, training and demonstrations by contract,
16 grant or otherwise; prepare and require permittees OR
17 OTHER PERSONS SUBJECT TO THE PROVISIONS OF THIS CHAPTER to
18 prepare reports and install, use and maintain any
19 monitoring equipment or methods reasonably necessary for
20 compliance with the provisions of this act; and collect
21 information and disseminate to the public such information

1 as is deemed reasonable and necessary for the proper
2 enforcement of this act CHAPTER;

3 (vi) Designate authorized officers, employees
4 or representatives of the department to enter and inspect
5 any property, premise or place, except private residences,
6 on or at which an air, water or land pollution source is
7 located or is being constructed or installed, or any prem-
8 ises in which any records required to be maintained by a
9 surface coal mining permittee are located, OR PREMISES
10 IN WHICH SOLID OR HAZARDOUS WASTES ARE GENERATED, STORED,
11 TREATED, DISPOSED OF OR TRANSPORTED. Persons so designated
12 may inspect and copy any records during normal office
13 hours, and inspect any monitoring equipment or method of
14 operation required to be maintained pursuant to this act
15 at any reasonable time upon presentation of appropriate
16 credentials, and without delay, for the purpose of
17 investigating actual or potential sources of air, water or
18 land pollution and for determining compliance or noncom-
19 pliance with this act, and any rules, regulations, stan-
20 dards, permits or orders promulgated hereunder. For sur-
21 face coal mining operations, right of entry to or inspec-
22 tion of any operation, premises, records or equipment
23 shall not require advance notice. The owner, occupant or
24 operator shall receive a duplicate copy of all reports

1 made as a result of such inspections within thirty (30)
2 days. The department shall reimburse any operator for the
3 reasonable costs incurred in producing copies of the
4 records requested by the department under this section;

5 35-11-501. Other powers and duties of director. In
6 addition to the other powers and duties enumerated in this
7 act, the director of the department shall coordinate the
8 activities of all state agencies concerned with solid AND
9 HAZARDOUS waste management and disposal. In this capacity
10 the director shall advise and consult with any person or
11 municipality with respect to provisions of technical
12 assistance in solid AND HAZARDOUS waste management tech-
13 nology, including collection, storage and disposal.

14 35-11-502. Solid waste disposal requirements.

15 (b) The director may request and obtain similar
16 information regarding present sites, for the purpose of
17 determining the adequacy and approvability of existing
18 solid waste disposal sites. The municipality having juris-
19 diction shall consult with and submit information to the
20 director for initial review of the site with respect to
21 its adequacy, absence of water or air quality effect, and
22 overall utility as a disposal site. ~~any-water-quality-or~~
23 ~~air-quality-violation-at-such-existing-sites-will-be-cause~~

1 ~~to require abatement and relocation aspects of undesirable~~
2 ~~although nonviolating character such as poor~~
3 ~~access aesthetic site management or other such aspects of~~
4 ~~undesirability shall be cause for the director to study~~
5 ~~the site for the purpose of recommending improvements.~~ THE
6 DIRECTOR MAY ORDER CLOSURE AND RECLAMATION, OR CONVERSION
7 OF INADEQUATE DISPOSAL SITES TO APPROVED DISPOSAL SITES AS
8 NECESSARY.

9 35-11-503. Director authorized to promulgate rules
10 and regulations for operation of solid waste disposal
11 sites and hazardous waste management.

12 (a) The director, after consultation with the land
13 advisory board, is authorized to promulgate RECOMMEND TO
14 THE COUNCIL THE PROMULGATION OF rules and regulations for
15 the operation of solid waste disposal sites. The director
16 is also authorized to promulgate guidelines, recommend
17 procedures and other technical information relevant to the
18 collection, storage and management of solid wastes.

19 (b) THE DIRECTOR, AFTER CONSULTATION WITH THE LAND
20 ADVISORY BOARD, IS AUTHORIZED TO RECOMMEND TO THE COUNCIL
21 THE PROMULGATION OF RULES AND REGULATIONS FOR THE MANAGE-
22 MENT OF HAZARDOUS WASTES. THE REGULATIONS SHALL TO THE
23 MAXIMUM EXTENT PRACTICABLE, CONSIDER THE DEGREE AND DURA-

1 TION OF RISK POSED BY EACH WASTE TYPE OR CATEGORY OF WASTE
2 BEING REGULATED, CONSIDER ANY UNIQUE GEOLOGIC, HYDROLOGIC,
3 DEMOGRAPHIC, OR OTHER FEATURES OF THE STATE, AND SHALL
4 PROVIDE FOR THE USE OF BEST ENGINEERING JUDGMENT IN DETER-
5 MINING PERMIT STANDARDS AND OTHER APPLICABLE REQUIREMENTS.
6 THE REGULATIONS SHALL INCLUDE, BUT NOT BE LIMITED TO,
7 PROVISIONS:

8 (ii) ESTABLISHING PERFORMANCE STANDARDS AND
9 PROCEDURES FOR THE GENERATION, IDENTIFICATION, TREATMENT,
10 STORAGE, TRANSPORTATION AND DISPOSAL OF HAZARDOUS WASTES;

11 (iii) GOVERNING LOCATION, DESIGN, CONSTRUCTION,
12 OPERATION AND MAINTENANCE OF ALL HAZARDOUS WASTE TREAT-
13 MENT, STORAGE OR DISPOSAL FACILITIES, INCLUDING BUT NOT
14 LIMITED TO CONTINGENCY PLANS TO MINIMIZE UNANTICIPATED
15 DAMAGE TO PUBLIC HEALTH OR THE ENVIRONMENT FROM THOSE
16 FACILITIES, QUALIFICATIONS AS TO OWNERSHIP, PERSONNEL
17 TRAINING AND CONTINUITY OF OPERATION AND FINANCIAL
18 RESPONSIBILITY; AND

19 (iiii) PROVIDING FOR A PERMIT PROGRAM TO ASSURE
20 COMPLIANCE WITH THE LAWS AND REGULATIONS GOVERNING HAZARD-
21 OUS WASTE STORAGE, TREATMENT, DISPOSAL OR OTHER MANAGEMENT
22 PRACTICES.

1 Section 3. There is hereby authorized one additional
2 position and is appropriated the sum of seventy thousand
3 nine hundred seventy dollars (\$70,970.00) to the depart-
4 ment of environmental quality from the general fund for
5 fiscal years 1981 and 1982 to carry out the purposes of
6 this act.

7 Section 4. This act is effective May 20, 1981.

8 (END)

House of Intro
____ To Com No. _____
____ Stand Report Do ____ Amd ____ Not ____
____ Com Whole Do ____ Amd ____ Not ____
____ 2nd Reading Amd ____
____ 3rd Reading Amd ____ Pass ____ Fail ____

Second House
____ To Com No. _____
____ Stand Report Do ____ Amd ____ Not ____
____ Com Whole Do ____ Amd ____ Not ____
____ 2nd Reading Amd ____
____ 3rd Reading Amd ____ Pass ____ Fail ____

1981

STATE OF WYOMING

81LSO-063.01

HOUSE BILL NO. 152

Hazardous waste program.

Sponsored by: Representative THORSON

A BILL

for

1 AN ACT to create W.S. 35-11-504 through 35-11-506; and to
2 amend W.S. 35-11-103(d) introductory paragraph and (i) and
3 by creating a new paragraph (ii), 35-11-109(a)(iv) and
4 (vi), 35-11-501, 35-11-502(b), 35-11-503 and 35-11-601 by
5 creating a new subsection (s) relating to the department
6 of environmental quality; establishing a system for con-
7 trol of solid and hazardous wastes; specifying permitting
8 and bonding requirements; granting rulemaking authority;
9 authorizing additional personnel; providing for an appro-
10 priation; and providing for an effective date.

11 Be It Enacted by the Legislature of the State of Wyoming:

1 Section 1. W.S. 35-11-504 through 35-11-506 are
2 created to read:

3 35-11-504. Hazardous waste disposal requirements.

4 (a) Except as provided in subsection (c) of this
5 section, no person may treat, store or dispose of any
6 hazardous wastes unless authorized by a valid permit
7 issued in accordance with the provisions of this section.

8 (b) Application for hazardous waste management
9 facility permits shall be made in writing to the director,
10 containing all information required by council rule and
11 regulation authorized under W.S. 35-11-503(b).

12 (c) Any person who:

13 (i) Owns or operates a facility required to
14 have a permit under this section, which facility is in
15 existence on the effective date of regulations of the
16 council implementing this section, and who has filed an
17 application for a permit within the time and containing
18 the information required by the regulations, shall be
19 treated as having been issued the permit until such time
20 as final administrative disposition of the application is
21 made;

1 (ii) Owns or operates a facility pursuant to a
2 valid permit issued by the department which is in force as
3 of the effective date of the regulations of the council
4 implementing this section, may continue to do so until the
5 expiration of the permit. When the permit expires, the
6 owner or operator shall apply for a permit in accordance
7 with this section.

8 35-11-505. Bonding for hazardous waste facilities.

9 (a) The purpose of any bond, trust or other evidence
10 of financial responsibility required to be filed with the
11 director by operators or generators of hazardous waste
12 treatment, storage or disposal facilities shall be to
13 assure:

14 (i) Compliance with this article and regula-
15 tions consistent with the degree and duration of risks
16 associated with the treatment, storage or disposal of
17 specified hazardous wastes;

18 (ii) During the operation of the facility, the
19 owner or operator has and maintains proof of financial
20 responsibility for claims arising out of injury to persons
21 or property from sudden, accidental, gradual or
22 steady-state releases or escapes of hazardous wastes into

1 the environment;

2 (iii) Upon facility closure, there are suffi-
3 cient funds available to provide for closing the facility
4 in a manner which renders the facility nonhazardous or
5 which otherwise assures the protection of the public
6 health and environment; and

7 (iv) Following facility closure, there are
8 sufficient funds available to monitor and maintain the
9 facility for any period of time determined to be necessary
10 to protect the public health and environment.

11 (b) All bonds shall be signed by the owner or oper-
12 ator as principal, by a good and sufficient corporate
13 surety licensed to do business in the state, and be made
14 payable to the state of Wyoming. Trust accounts, if pro-
15 vided for by regulations of the council, shall be estab-
16 lished by the facility owner or operator in a licensed
17 financial institution in the state and shall require the
18 concurrence of the director for withdrawal of funds.

19 (c) The requirements of W.S. 35-11-420 and 35-11-421
20 shall apply for bonds filed under this section. If the
21 forfeited bond or the proceeds from any trust or other
22 assurance of financial responsibility is inadequate to

1 cover the costs for which it was intended, the attorney
2 general shall bring suit to recover the costs if recovery
3 is deemed possible. The director shall have the power and
4 duty to reclaim or otherwise render nonhazardous any
5 affected hazardous waste treatment, storage or disposal
6 facility with respect to which a performance bond has been
7 forfeited.

8 (d) Any bond, trust or other evidence of financial
9 responsibility filed under this section may be released
10 only after ninety (90) days written notice to the director
11 and upon receipt of the director's written consent, which
12 may be granted only when the requirements of financial
13 assurance have been fulfilled.

14 35-11-506. Permit revocation. If the director deter-
15 mines that a facility holding a permit under W.S.
16 35-11-504 is not in compliance with the requirements of
17 this article, he shall provide the facility owner or oper-
18 ator with a written notice of the intent to revoke the
19 permit, including the reasons for permit revocation. The
20 revocation shall be effective twenty (20) days from the
21 date of receipt of the written notice, unless within that
22 time the notice is appealed to the council.

23 Section 2. W.S. 35-11-103(d) introductory paragraph

1 and (i) and by creating a new paragraph (ii),
2 35-11-109(a)(iv) and (vi), 35-11-501, 35-11-502(b),
3 35-11-503 and 35-11-601 by creating a new subsection (s)
4 are amended to read:

5 35-11-103. Definitions.

6 (d) Specific ~~definition~~ DEFINITIONS applying to
7 solid OR HAZARDOUS waste management:

8 (i) "Solid waste" means garbage, and other
9 discarded solid materials, materials, including solid
10 waste materials resulting from industrial, commercial, and
11 agricultural operations, and from community activities,
12 but does not include solids or dissolved material in
13 domestic sewerage or other significant pollutants in water
14 resources, such as silt, dissolved or suspended solids in
15 industrial waste water effluents, dissolved materials in
16 irrigation return flows or other common water pollutants;

17 (ii) "HAZARDOUS WASTE" MEANS ANY LIQUID,
18 SOLID, SEMISOLID OR CONTAINED GASEOUS WASTE OR COMBINATION
19 OF THOSE WASTES WHICH BECAUSE OF QUANTITY, CONCENTRATION
20 OR PHYSICAL, CHEMICAL OR INFECTIOUS CHARACTERISTICS MAY
21 CAUSE OR SIGNIFICANTLY CONTRIBUTE TO DETRIMENTAL HUMAN
22 HEALTH EFFECTS, OR POSE A SUBSTANTIAL PRESENT OR POTENTIAL

1 HAZARD TO HUMAN HEALTH OR THE ENVIRONMENT. CRITERIA
2 SETTING FORTH CHARACTERISTICS WHICH CAUSE A WASTE TO BE
3 CLASSIFIED OR LISTED AS A HAZARDOUS WASTE SHALL BE ESTAB-
4 LISHED BY RULES AND REGULATIONS PROMULGATED BY THE COUN-
5 CIL. THE TERM "HAZARDOUS WASTE" DOES NOT INCLUDE:

6 (A) SOLID OR DISSOLVED MATERIAL IN
7 DOMESTIC SEWAGE;

8 (B) SOLID OR DISSOLVED MATERIALS IN
9 IRRIGATION RETURN FLOWS; AND

10 (C) INDUSTRIAL DISCHARGES WHICH ARE
11 POINT SOURCES SUBJECT TO PERMITS ISSUED UNDER ARTICLE 3 OF
12 THIS CHAPTER.

13 35-11-109. Powers and duties of director.

14 (a) In addition to any other powers and duties
15 imposed by law, the director of the department shall:

16 (iv) Conduct, encourage, request and partici-
17 pate in, studies, surveys, investigations, research,
18 experiments, training and demonstrations by contract,
19 grant or otherwise; prepare and require permittees OR
20 OTHER PERSONS SUBJECT TO THE PROVISIONS OF THIS CHAPTER to
21 prepare reports and install, use and maintain any

1 monitoring equipment or methods reasonably necessary for
2 compliance with the provisions of this act; and collect
3 information and disseminate to the public such information
4 as is deemed reasonable and necessary for the proper
5 enforcement of this ~~act~~ CHAPTER;

6 (vi) Designate authorized officers, employees
7 or representatives of the department to enter and inspect
8 any property, premise or place, except private residences,
9 on or at which an air, water or land pollution source is
10 located or is being constructed or installed, or any prem-
11 ises in which any records required to be maintained by a
12 surface coal mining permittee are located, - OR PREMISES
13 IN WHICH SOLID OR HAZARDOUS WASTES ARE GENERATED, STORED,
14 TREATED, DISPOSED OF OR TRANSPORTED. Persons so designated
15 may inspect and copy any records during normal office
16 hours, and inspect any monitoring equipment or method of
17 operation required to be maintained pursuant to this act
18 at any reasonable time upon presentation of appropriate
19 credentials, and without delay, for the purpose of
20 investigating actual or potential sources of air, water or
21 land pollution and for determining compliance or noncom-
22 pliance with this act, and any rules, regulations, stan-
23 dards, permits or orders promulgated hereunder. For sur-
24 face coal mining operations, right of entry to or inspec-

1 tion of any operation, premises, records or equipment
2 shall not require advance notice. The owner, occupant or
3 operator shall receive a duplicate copy of all reports
4 made as a result of such inspections within thirty (30)
5 days. The department shall reimburse any operator for the
6 reasonable costs incurred in producing copies of the
7 records requested by the department under this section;

8 35-11-501. Other powers and duties of director. In
9 addition to the other powers and duties enumerated in this
10 act, the director of the department shall coordinate the
11 activities of all state agencies concerned with solid AND
12 HAZARDOUS waste management and disposal. In this capacity
13 the director shall advise and consult with any person or
14 municipality with respect to provisions of technical
15 assistance in solid AND HAZARDOUS waste management tech-
16 nology, including collection, storage and disposal.

17 35-11-502. Solid waste disposal requirements.

18 (b) The director may request and obtain similar
19 information regarding present sites, for the purpose of
20 determining the adequacy and approvability of existing
21 solid waste disposal sites. The municipality having juris-
22 diction shall consult with and submit information to the
23 director for initial review of the site with respect to

1 its adequacy, absence of water or air quality effect, and
2 overall utility as a disposal site. ~~Any-water-quality-or~~
3 ~~air-quality-violation-at-such-existing-sites-will-be-cause~~
4 ~~to-require-abatement-and-relocation.-Aspects--of--undesir-~~
5 ~~able,---although--nonviolating--character,--such--as--poor~~
6 ~~access,--aesthetic-site-management-or-other-such-aspects-of~~
7 ~~undesirability-shall-be-cause-for-the--director--to--study~~
8 ~~the-site-for-the-purpose-of-recommending-improvements.~~ THE
9 DIRECTOR MAY ORDER CLOSURE AND RECLAMATION, OR CONVERSION
10 OF INADEQUATE DISPOSAL SITES TO APPROVED DISPOSAL SITES AS
11 NECESSARY.

12 35-11-503. Director authorized to promulgate rules
13 and regulations for operation of solid waste disposal
14 sites.

15 (a) The director, after consultation with the land
16 advisory board, is authorized to promulgate rules and
17 regulations for the operation of solid waste disposal
18 sites. The director is also authorized to promulgate
19 guidelines, recommend procedures and other technical
20 information relevant to the collection, storage, and man-
21 agement of solid wastes.

22 (b) THE DIRECTOR, AFTER CONSULTATION WITH THE LAND
23 ADVISORY BOARD, IS AUTHORIZED TO PROMULGATE RULES AND

1 REGULATIONS FOR THE MANAGEMENT OF HAZARDOUS WASTES,
2 INCLUDING, BUT NOT LIMITED TO:

3 (i) ESTABLISHING PERFORMANCE STANDARDS AND
4 PROCEDURES FOR THE GENERATION, IDENTIFICATION, TREATMENT,
5 STORAGE, TRANSPORTATION AND DISPOSAL OF HAZARDOUS WASTES;

6 (ii) GOVERNING LOCATION, DESIGN, CONSTRUCTION,
7 OPERATION AND MAINTENANCE OF ALL HAZARDOUS WASTE TREAT-
8 MENT, STORAGE OR DISPOSAL FACILITIES, INCLUDING BUT NOT
9 LIMITED TO CONTINGENCY PLANS TO MINIMIZE UNANTICIPATED
10 DAMAGE TO PUBLIC HEALTH OR THE ENVIRONMENT FROM THOSE
11 FACILITIES, QUALIFICATIONS AS TO OWNERSHIP, PERSONNEL
12 TRAINING AND CONTINUITY OF OPERATION AND FINANCIAL
13 RESPONSIBILITY; AND

14 (iii) PROVIDING FOR A PERMIT PROGRAM TO ASSURE
15 COMPLIANCE WITH THE LAWS AND REGULATIONS GOVERNING HAZARD-
16 OUS WASTE STORAGE, TREATMENT, DISPOSAL OR OTHER MANAGEMENT
17 PRACTICES.

18 35-11-601. Applications; authority to grant; hear-
19 ing; limitations; renewals; judicial review; emergencies.

20 (s) NOTHING IN THIS SECTION SHALL BE CONSTRUED TO
21 PERMIT AN APPLICATION FOR A HAZARDOUS WASTE TREATMENT,
22 STORAGE OR DISPOSAL FACILITY VARIANCE. APPLICATIONS FOR

1 HAZARDOUS WASTE TREATMENT, STORAGE OR DISPOSAL FACILITY
2 PERMITS SHALL BE MADE SOLELY UNDER THE PROVISIONS OF W.S.
3 35-11-504.

4 Section 3. There are hereby authorized two addi-
5 tional positions and is appropriated the sum of one hun-
6 dred sixteen thousand four hundred thirty dollars
7 (\$116,430.00) to the department of environmental quality
8 from the general fund for fiscal years 1981 and 1982 to
9 carry out the purposes of this act.

10 Section 4. This act is effective May 20, 1981.

11 (END)

FISCAL NOTE

Anticipated REVENUE to: Fiscal Year 19 Fiscal Year 19

TOTAL ESTIMATED REVENUE		

Anticipated COST to: Fiscal Year 19 81 Fiscal Year 19 82

General Fund	\$116,430.00	
TOTAL ESTIMATED COST	\$116,430.00	

1. This proposal carries an appropriation of \$116,430 for fiscal years 1981 and 1982.

2. This proposal also authorizes two additional positions to the Department of Environmental Quality.

APPENDIX D

MEDIA

MAJOR ACCOMPLISHMENTS

RADIOLOGICAL SYSTEMS MAINTENANCE

Objectives

The Radiological Maintenance and Calibration Facility of the Wyoming Disaster and Civil Defense Division is located at 624 East Pershing Boulevard, Cheyenne, and is operated under a 100% funded federal contract (\$54,376 federal funds expended) to maintain the statewide radiological defense data collecting and reporting system. The facility is staffed by two full time employees who travel the entire state to: (1) exchange radiological detection instruments at local weapons effects reporting stations, shelter monitoring stations, self protection monitoring stations, and emergency services monitoring stations to perform preventive and remedial maintenance and calibration on a four year basis and to provide replacement instrument batteries bi-annually; (2) assist local coordinators with the selection of radiological monitoring facilities, recruitment of radiological defense officers, radiological defense instructors, and radiological monitors and updating the Radiological Defense (RADEF) annex to the local operations plan; (3) provide specialized training for radiological defense officers, radiological defense instructors, radiological monitors and other RADEF staff; (4) administer the division's radioactive materials program to ensure compliance with applicable state and federal regulations.

Accomplishments

Traveled 15,938 miles and spent 105 man-days (46 man-days spent in travel alone) to: (1) provide direct exchange of 325 operational monitoring sets and 236 shelter monitoring sets in 9 counties; (2) deliver 70 new instrument sets to new emergency services monitoring stations; (3) conduct 3 radioactive defense officer courses for 38 participants; (4) conduct 20 radiological monitoring courses for 174 participants in 10 jurisdictions; (5) conduct 3 peace-time radiological emergency response courses for 18 participants; (6) assist coordinators in 3 counties update or revise the RADEF annex to the local plan; (7) assist with the conduct of 2 action exercises in 2 jurisdictions; (8) participated in the conduct of 2 training seminars for local coordinators; (9) perform or assure the performance of the semi-annual leak tests on the 10 Co60 source sets on loan to the state. Time in shop was spent to: (1) retrofit 140 CDV-715 Landers, Frarry and Clark survey meters to bring them up to current operability standards; (2) replace batteries, check for operability, perform preventive maintenance, and calibrate the instrument components of 90 operational radiation detection sets, 94 shelter radiation detection sets and 70 emergency services radiation detection sets; (3) replace batteries and perform operational checks on the instrument components of an additional 89 operational radiation detection sets and 142 shelter radiation detection sets; (4) replace batteries, check for operability, and perform preventive maintenance on an additional 1,004 radiation detection instruments that are not components of instrument sets; (5) performed remedial maintenance on 100 radiation detection instruments (3.4% of all instruments serviced); (6) calibrate 469 high range survey meters; (7) check the radiation response of 704 low range survey meters; (8) maintain, for FEMA, a computerized directory of weapons effects reporting stations,

self protection monitoring stations, shelter monitoring stations, emergency services monitoring stations, and a radioactive materials inventory; (9) administer and control the use and storage of 10 FEMA Cobalt 60 radiation source sets; (10) maintain an inventory of repair and maintenance parts, replacement batteries, necessary publications, tools, and testing equipment; (11) prepare audio and visual training aids to support the various courses, seminars, workshops and conferences; (12) prepare and submit various reports for FEMA, state, and other federal agencies, and perform other administrative services.

APPENDIX D

MEDIA

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

MEDIA

Newspapers

	<u>Telephone</u>	<u>Circulation</u>
Star-Tribune 111 South Jefferson Casper, WY 86201 Thomas Howard - Publisher	307-237-8451	32,861
Sunday Tribune-Eagle 110 E. 17th Street Cheyenne, WY 82001 Robert McCracken - Publisher	307-634-3361	20,268
The Riverton Ranger P. O. Box 993 Riverton, WY 82501 Roy Peck & Robert Peck - Publishers	307-856-2244	6,801
Daily Rocket-Miner 215 D Street Rock Springs 82901	307-362-3736	7,329
The Press P. O. Box 2006 Sheridan, WY 82901 Milton Chilcott - Publisher	307-672-2431	6,496

TV STATIONS

Casper:

KTWO (ABC/NBC/CBS) Channel 2
Box 2720, 82602
New Director: Pete Williams
CATV: Yes (24 systems)

307-237-3711

Cheyenne:

KYCU (ABC/NBC/CBS) Channel 5
2923 E. Lincolnway, 82001
Program Director: Stu Seibel
CATV: Yes (16 systems)

307-634-7755

Riverton:

KWRB (NBC/CBS) Channel 10
500 Arapahoe, Thermopolic, 82443
New Director: Karl Kerston
CATV: Yes (7 systems)

307-864-2351

Radio Stations

Casper:

KATI (AM) 1400 kHz CBS
Box 2006, 82602 307-266-1440
New Director: Ken Johnson

KAWY (FM) 94.5 MHz
Co-owned with KATI-AM 307-235-1515
Separate Programming
New Director: Doc Mueller

KTWO (AM) 1030 kHz NBC
Box 2720, 82602 307-237-3711
News Director: Terry Manna

Cheyenne:

KRAG (AM) 1480 kHz
2109 E. 10th St., 82001 307-638-8921
News Director: Ralph Graczak

KUUY (AM) 1530 MHz
Box 926, 82001 307-632-0551

KLEN (FM) 100.7 MHz
Co-owned with KUUY-AM
Separate format
Program Director: Jerry Gebhand

Gillette:

KIML (AM) 1270 kHz
Box 1009, 82716 307-682-4747
News Director: David King

KOLL (FM) 93.5 MHz ABC
917 E. Longmont, 92716 307-862-5101
Station Manager: Daniel Tuscher

Grey Bull:

KMMZ (AM) 1140 kHz
Box 806, 82426 307-765-2332
President and General
Manager: Robert Zellmer

Jackson:

KMTN (FM) 96.9 MHz
Box 927, 83001 307-733-4500
News Director: Ed Baldwin

KSGT (AM) 1340 kHz ABC
Box 100, 83001
News Director: Don Richards

307-733-2120

Laramie:

KOWB (AM) 1290 kHz ABC
Box 1290, 82070
News Director: Gary Lopez

307-745-4888

KUWR (FM) 91.9 MHz Non-commercial
Box 2984, Univ. Station, 82701
General Manager: John McMullen

Powell:

KPOW (AM) 1260 kHz ABC
Box 968, 82435
News Director: Dean Abbott

307-754-2251

Rocks Springs:

KRKK (AM) 1360 kHz
Box 2128, 82901
Program Director: Rod Tucker

307-362-3793

KQSW (FM) 96.5 MHz
Co-owned with KRKK-AM
Separate Programming
Program Manager: Jon Collins

Sheridan:

KROE (AM) 930 kHz CBS
Box 5086, 82801
News Director: Beverly Bradhorse

307-672-7422

KROE (FM) 94.9 MHz
Format: Top 40

KWYO (AM) 1410 kHz ABC
Box 727, 82801
News Director: Kenneth Baka

KLWD (FM) 96.5 MHz
Co-owned with KWYO-AM
Separate Format

Cheyenne, WY. Eagle, March 24, 1981

A-waste firm to challenge disposal ban

A suit challenging Initiative 383, the "Don't Waste Washington" measure, will be filed late this week or next week, officials said today.

The suit will challenge the constitutionality of the approaching ban on the disposal of out-of-state nuclear waste at Hanford, said Tom Gerdis, spokesman for U.S. Ecology, operator of the Hanford site.

The initiative, passed overwhelmingly by the voters in November, is to take effect July 1.

Gerdis said the suit will challenge the initiative on the basis that it unconstitutionally interferes with interstate commerce.

He said about 10 plaintiffs are involved in the suit but refused to name the other participants.

Portland General Electric, owners of the Trojan nuclear plant, Tri-State Motor Transport, Joplin, Mo., haulers of nuclear waste, and other industry groups have been named as possible plaintiffs.

In a related matter, Gerdis said nuclear waste being shipped to Hanford is not "swelling to massive proportions" as was reported earlier.

According to Associated Press reports, waste deposited at the site has increased four-fold in the last year and has reached levels 10 to 20 times as high as three years ago.

Those figures are wrong, Gerdis said.

Wastes for January and February this year were running $2\frac{1}{2}$ times as high as the same two months in 1980, Gerdis said. He said 187,791 cubic feet of waste was deposited at the site in January and February.

The amount of waste deposited at the site in 1978 was 236,229 cubic feet, compared with 876,469 cubic feet deposited in 1980, a four-fold increase, he said.

March's total is expected to be less than 100,000 cubic feet, compared with 86,000 cubic feet deposited at the site last March, said Vern Apple, manager of the Richland site.

Gerdis said the increases over the last year were due to closing and restrictions on the nation's two other low-level waste sites, not the approaching ban.

Wyoming is potential dump site

Low population is major factor

By PENELOPE PURDY
Of The Star-Tribune Staff

Second of a series

CASPER — Wyoming might be an attractive location for toxic chemical and radioactive waste dumps.

State officials say there are no plans to locate either type of disposal facility in Wyoming in the near future. But Wyoming's sparse population, dry climate and low groundwater tables make the state a potential site.

The state now has no large governmental or commercial hazardous waste facilities, said Dave Finley, an engineer for the state's Department of Environmental Quality.

But there are about 30 small, private toxic chemical waste dumps and at least one site for disposal of low-level, or moderately radioactive materials, Finley said.

Most of Wyoming's chemical dumps sites are located on property owned by the companies generating the wastes, Finley said. These facilities include oil refineries, timber processors and iron ore smelters.

IN ADDITION, the University of Wyoming has a dump near the Laramie Airport for radioactive wastes produced from laboratory experiments.

But, he added, Wyoming has several other areas well-suited for a hazardous dump.

A primary concern when locating disposal sites is to keep the material out of the groundwater supply. In many areas of the country, groundwater tables are only a few feet from the surface, making it impossible to bury wastes without contaminating the water.

Water tables in much of Wyoming are very low, sometimes hundreds of feet

underground, making contamination less likely.

Similarly, sparse rainfall keeps moisture from the surface from entering waste containers.

And a small population reduces the danger to large numbers of people.

But Wyoming is also isolated from industrial areas where the wastes are produced, Finley pointed out. To date, it has been too costly to ship the wastes to the state.

THERE ARE TWO general categories of radioactive waste: low-level and high-level. Low level wastes are moderately radioactive, and high-level wastes are extremely radioactive and sometimes dangerous for thousands of years.

Low-level waste is often buried until it decays and becomes harmless. UW's disposal site contains this type of material. High-level waste tends to remain dangerous.

A report prepared last year by several federal agencies proposed two methods of storing high-level wastes that might make Wyoming a potential dump site, says a staff member of the Senate's Environment

and Public Works Committee.

Neither method is technically feasible at present, though both might be workable in the future, the report said.

Currently, high-level wastes produced by civilian facilities, such as nuclear reactors, are stored in concrete, water-filled structures near nuclear power plants, or at two facilities that were to have reprocessed spent fuel into a usable form.

Dumps

Neither reprocessing plant is operating now, the staff member said, and most high-level wastes are being stored at the reactors that produce them.

FEDERAL POLICY HAS always assumed the government would eventually handle the disposal of high-level wastes. But many reactor-site dumps are reaching capacity, and the federal government is seeking other disposal sites for an interim period of tens of years.

Two of six methods the inter-agency report recommended for disposing of high-level wastes might involve Wyoming, the staff member said.

One method is to dig deep mine-like shafts in rock formations, and allow the radioactive material to melt the rock surrounding it.

The U.S. Department of Energy is now studying various regions of the country to find locations suited to this method.

Preliminary findings indicate that Wyoming's geological formations might not meet requirements for that type of dumps, the staff member said.

But the report also suggested placing the wastes into deep drill holes, such as those left from oil and gas operations. That method, however, will probably not be technically feasible for 10-15 years.

Next: interstate nuclear compact

Rawlins, WY. Times, July 29, 1981

Rawlins man clarifies nuclear world

By Helen R. Peterson
Times Today editor

Dr. Arnold P. Jacobson, a professor at the University of Michigan in the field of radiological health, department of environmental and industrial health, is in Rawlins visiting family members, including his brother, Jake Jacobson and his family, and his mother, Mrs. Jennie Jacobson.

Dr. Jacobson is a graduate of Rawlins High School. He received an MA (master's degree) in zoology from the University of Wyoming in 1960, an MPH (masters in public health) from the University of Michigan in 1962, and a PhD (doctor of philosophy) in radiological health in 1966.

We asked Dr. Jacobson to clarify some of the aspects of radiation — a complex subject about which there exists much controversy, confusion, and in some cases, a fear that approaches panic.

An editorial printed in the Washington Post and quoted by Dr. Jacobson stated that 30 years after Hiroshima, and more than 80 years after the discovery of radiation, the vast majority of Americans do not have the vaguest idea of what it is. The article remarks that society could live with nuclear energy more comfortably and more safely if Americans had a basic knowledge of what radioactivity is, its properties, human vulnerability, what doses are safe and which amounts are dangerous. Neither the schools, the government nor the scientific community have done a very good job of disseminating that knowledge.

"Radiation is not a recent phenomena," Dr. Jacobson remarked. "In 1895, Wilhelm Konrad Rontgen, a German physicist, discovered how to generate X-rays. In 1896, Antoine Henri Becquerel, a French physicist, discovered the natural radioactivity of certain ores, such as uranium. Madame Marie

Curie eventually became a victim of the radioactive bodies she and her husband discovered. She died in Sancellemont on July 4, 1934, of an aplastic pernicious anemia. The bone marrow did not react, probably because it had been injured by long accumulations of radiation. Her daughter, also a scientist, succumbed to the same disease."

Dr. Jacobson remarked that radiation permeates our environment.

"We are exposed to cosmic and solar radiation, from outer space and from the sun. There is radioactivity in the earth's crust," he states. "Radioactivity is ingested into the body through food, water and air, so it is in every person's body whether he is actively exposed or not."

The amount of energy that particulate and electromagnetic radiations deposit in living matter is referred to as a dose. Health professionals, such as Dr. Jacobson, try to determine risk analysis from low doses.

"Any dose," explains Dr.

Jacobson, "carries some risk. We cannot say how much in quantitative terms."

Radiation, Dr. Jacobson noted, is tremendously helpful in the medical field. As an example, radiation therapy is used in the treatment of cancer. Radioprotective compounds sensitize the tumor and desensitize the area around the cancer or the tumor.

On March 28, 1979, the U.S. experienced the worst accident in the history of commercial nuclear electric power generation. The accident occurred at the Three Mile Island nuclear power plant near Middletown, Pa. A President's Commission concluded that radiation doses as a result of the accident were low, and that the health effects were minimal. No one was measurably harmed. The accident was initiated by mechanical malfunctions in the plant, exacerbated by human misjudgments on the part of improperly trained personnel. "Actually Three Mile Island

was a boon," says Dr. Jacobson. "We learned how dangerous technically complicated industrial plants can be."

It is his belief that a repetition of that accident, in spite of the need for nuclear power, will result in the shutdown of nuclear utilities from now on.

Nuclear-related health care professions rose in the 1940's, simultaneously with the development of nuclear weapons. The Atom Bomb Casualty Commission, a multinational group, was formed in 1945 right after the bombing of Hiroshima, which occurred August 6 of that year, and was the first atomic bomb ever used in warfare. Japan was the parent group for the committee. Many world experts meet nationally and internationally for discussion of radiation, its effects and control. An example is the United Nations Scientific Committee on the effects of Atomic Radiation.

Regulatory agencies in the U.S. enforce radiation standards. These include the Environmental

Protection Agency, the Nuclear Regulatory Commission, as well as the Dept. of Human Services and the Food and Drug Administration.

"Humans cannot afford a widespread nuclear war," Dr. Jacobson avers. "In my opinion, it would push us to the brink of extinction."

Dr. Jacobson discussed low energy radiation.

External radiation sources are those which generate radiation outside the body and are typified by the X-ray unit used by dentists and physicians, CB radios, microwave ovens and TV sets (particularly color TV which operates at higher voltages). Dr. Jacobson reiterated that although there is no totally risk-free dose, the impact statistically estimated is considered extremely small, especially when compared to other societal health risks such as the risks of improper diet, lack of exercise, or

—Rawlins
(continued on page 7)

—Rawlins

(Continued from front page)

uncontrolled smoking of tobacco and consumption of alcohol.

Dr. Jacobson says that nuclear medicine has demonstrated the advantages of the use of nuclear materials for prevention and treatment of disease. Radiotherapy can be used in conjunction with chemotherapy in the treatment of cancer. Radioactive iodine can kill off the thyroid.

The two general categories of serious health effects induced by radiation, says Dr. Jacobson, are hereditary (or genetic) defects and cancer. Of the cancers, leukemia is considered the more serious because its incidence within a population can be affected more by low doses of radiation than the incidence of hereditary defects.

"In Japan," says Dr. Jacobson, "no statistically significant hereditary defects related to the nuclear radiation of Hiroshima and Nagasaki were found in the offspring of exposed parents."

Dr. Jacobson concludes that the effluents from nuclear materials are not as hazardous as those from coal.

"Nuclear power is an unfamiliar beast," he observes. "The risks are involuntary and largely unknown. Coal has been around so long we are used to the hazards, such as brown lung. The subtle health effects of ingestion and inhalation are greater for coal than for uranium."

A particular risk that he cautions people in this area about is the intensity of ultraviolet light at high altitudes. Sun-worshippers should get their exposure in the early morning or late afternoon.

People can be comforted, says Dr. Jacobson, by the fact that an enormous body of scientific knowledge has been generated. Scientists have studied radiation effects on people exposed to radiation by accident, warfare or for medical purposes — including 150,000 survivors of the atomic bombing in Japan, 240 Marshall Islanders and 23 Japanese fishermen.