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New Jersey State Briefing Book for Low-Level Radioactive Waste Management

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NEW JERSEY STATE BRIEFING BOOK FOR LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

Prepared for

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1. INTRODUCTION

The New Jersey State Briefing Book for low-level radioactive waste management has been prepared to assist in the planning and formulation of an implementation strategy leading to the creation of a suitable low-level radioactive waste management program in the United States. The New Jersey Briefing Book is one of a series of briefing books now being prepared that will provide coverage on waste management practices in the States, along with relevant demographic, government, and media information.

Low-level radioactive waste management is increasingly becoming a major concern in the United States. Low-level radioactive waste may contain less than 10 nanocuries of transuranic contaminants per gram of material or only be suspected of radioactive contamination.[1] These wastes are disposed of according to the type and/or concentration of radioactivity. Low-level radioactive waste may consist of a solid, liquid or gas.. A significant amount of solid low level waste that is buried consists of dry waste materials with low levels of radioactivity. Examples of these wastes are paper trash, packing material, protective clothing, broken glassware, plastic sheeting and tubing, defective or obsolete equipment, building rubble, etc.

The low-level radioactive waste that has been disposed of at burial sites has generally come from several different sources: institutional and industrial (41 percent); commercial power reactors (50 percent); and government/military wastes (nine percent).[2] Forty-nine of 50 States and the District of Columbia generate both institutional and industrial waste, 24 States generate commercial power reactor waste, and 14 States generate government waste.

Part of the reason for producing this report is to obtain more accurate information on the volume of low-level radioactive waste shipped, the sources of the waste (e.g., nuclear reactor, sealed or unsealed sources,

etc.), the physical form of the waste, the disposal method (e.g., release to sewer, ship to commercial repository, burn on site, etc.) and the type of processing of the waste (e.g., absorption, mechanical compaction, solidification, etc.).

The need to develop a program that is able to effectively manage the low-level wastes in the nation is due to the fact that as medical, engineering and other disciplines use more nuclear materials for health care, academic and industrial research and for energy production, the volume of low-level waste has, and will continue to increase. To date, there are only three sites in the United States that accept low-level waste for burial. Two of these three sites have been closed intermittently because of the concern over packaging and shipping operations. The Governors of Washington State, Nevada, and South Carolina, where such commercial low-level radioactive waste facilities are located, are extremely concerned about the volume and packaging used in the disposal of waste.

When the Governors of Washington and Nevada took action in 1979 to temporarily close the commercial low-level radioactive waste burial sites located in their respective States, the action shocked many of the waste generators as well as many of the States in which large amounts of low-level waste are generated. Preliminary projections of total national low-level waste generation and capacity of existing commercial disposal facilities indicate that if no changes in current practices or trends occur, the current disposal sites could be filled by the mid-1990s.[3] This capacity could also be suddenly reduced if the Governors of the States where waste disposal facilities are located decide to further restrict the volumes accepted for disposal.

Limitations were imposed on the yearly burial quantities to be accepted by the Barnwell disposal site in South Carolina in October, 1979. Washington State passed an initiative in November, 1980 that will restrict the Richland site to in-State or medical waste by July, 1981. These actions will further reduce the availability of burial space. Another concern is

the current escalation of costs for transporting and disposing each drum of low-level waste. Price escalation is increasing the costs for utilities, medical institutions, and industrial facilities using nuclear materials that require commercial disposal.

These concerns have led the U.S. Department of Energy, as the lead agency for formulating a low-level waste management plan, to embark upon a cooperative effort involving the National Governors' Association (NGA), the National Conference of State Legislatures (NCSL) and other interest groups to formulate an approach for a low-level radioactive waste management program.

Section 2.0 of this briefing book presents an overview of past and present low-level radioactive waste management practices in New Jersey. Section 3.0 identifies relevant topography, demography, and energy trends that may affect the quantity and nature of low-level radioactive wastes within the State. An overview of the government and politics of the State is presented in Section 4.0. Section 5.0 reviews present and proposed low-level radioactive waste management policy. Policies affecting the generation, handling and disposal of radioactive waste are reviewed. A review of interest group concerns vis a vis low-level waste management is presented in Section 6.0. A review of public official views and media concerns is presented in Section 7.0. Comparisons are made of mass media coverage of low-level radioactive waste concerns. The survey methodology used to gather information on the volume, method of disposal, physical form and other relevant information pertaining to the shipment of low-level waste is presented in Section 8.0. Finally, the results of the low-level waste generator survey are presented in Section 9.0.

REFERENCES

1. U.S. Department of Energy, Interagency Review Group Final Report, p. 106.

2. N.U.S. Corporation, The 1979 State-by-State Assessment of Low-level Radioactive Wastes Shipped to Commercial Burial Grounds, 1979.

3. National Governors' Association, Task Force on Low-level Radioactive Waste Disposal, Final Report, (August, 1980).

2. OVERVIEW OF LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT IN NEW JERSEY.

New Jersey currently has several sites that may obtain Federal assistance as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). These sites were either Federally, privately, and/or institutionally owned and were used primarily for research, processing, and storing of uranium and thorium ores, concentrates, or residues. Two sites are of major interest: Middlesex and Kellex.

Middlesex is near New Brunswick, New Jersey. The site currently houses a U.S. Marine base and 27 parcels of privately owned property that have no relationship to the processes that generate low-level waste. The site was actively used in the 1940s as a uranium processing facility for the Manhattan Project. Currently, Middlesex has completed the site characterization and radiological phase of FUSRAP and remedial action is underway.

This facility was involved in the uranium enrichment process and is currently undergoing a site characterization study. The Kellex site is currently owned by Delco-Levco and Pierpoint Associates.

New Jersey is a State which has shown considerable concern over the proper disposal of hazardous wastes. Besides the FUSRAP sites, New Jersey public officials have expressed concern over the possible location of a low-level radioactive waste site in the State as a result of a 1978 DOE conducted study in New Jersey to review disposals sites of low-level radioactive waste.

New Jersey has also expressed concern over the transportation of nuclear waste through the State. Section 5.0 of this report reviews the

conditions in which nuclear shipments must be registered with the Department of Environmental Protection. In addition, New Jersey is concerned about the offshore dumping of radioactive materials in the Atlantic Ocean. Currently, the New Jersey Department of Energy is conducting its own study of low-level radioactive waste in the State. Data is being obtained on the volume and type of radioactive material sent and received by either low-level waste generators, transportation firms, or commercial disposal facilities.

In New Jersey, a significant number of NRC licensees have two or more licenses to handle radioactive materials. Excluding multiple license holders, NRC data shows that there are 489 separate license holders in the State. A facility with two or more licenses was considered one licensee for survey analysis. A firm having multiple locations in a State was considered a separate potential generator for surveying. This distinction was made in order to prevent multiple reporting and to reduce survey costs.

Information on the disposal practices was solicited from the survey presented in Section 9.0 of this report. Appendix A presents the name and address of each license holder, the type of contact made to obtain information, the degree of response to the questionnaire, the type of facility, and whether low-level radioactive waste is shipped to a commercial disposal site.

The type of facility was classified as either medical, educational, industrial, power reactor, or governmental, according to Part I of the survey. It should also be noted that the medical classification includes medical education facilities, and that the governmental classification excludes both medical and educational facilities. Also, pharmaceutical firms were counted as industrial even though the survey showed them to be medical.

Of the 489 potential low-level waste generators contacted in New Jersey, responses were received from 185, of which 53 indicated that they

shipped low-level radioactive wastes to commercial disposal facilities (Table 2-1). Data is also provided on the type of license holder by priority category, type of facility, responses to the questionnaire (telephone or written), and the number of facilities using commercial disposal facilities. The "percent of all respondents" was calculated as the number of respondents shipping waste divided by the total number of respondents times 100. The percent of facility respondents was calculated as the number of respondents shipping waste divided by the total number of respondents in a facility classification times 100.

The data in Table 2-1 show that the overall response rate was 24 percent, but the response rate for the top and middle priority categories was 50 percent. However, the response rate for various facility types identified in the table did not exceed 50 percent. Survey data further show that 30 percent of the medical facilities reported using a commercial waste management firm.

The priority categories listed are based on consultation with NRC regional offices near Chicago, Illinois, and in King of Prussia, Pennsylvania, regarding the NRC category and priority codes that are expected to include generators producing significant volumes of low-level radioactive waste. The following categories of licensees are expected to be major generators of low-level radioactive waste:

- I-B Processors/Distributors
- III-F1A Academic, Type A, Broad
- III-G1 Medical, Broad License
- IV-E Industrial
- IV-E1A Industrial, Type A, Broad
- IV-G Medical
- VI-F Academic

TABLE 2-1. USE OF COMMERCIAL WASTE FACILITIES

PRIORITY CATEGORY	Number of Licensees	Number of Respondents	Percent of Response	Respondents Using a Commercial Facility		
				Number	Percent of all Respondents	Percent of Respondents in Priority/Facility
1. Top Priorities	19	13	62.42	11	5.94	84.62
2. Middle Priorities	242	117	48.35	36	19.46	30.77
3. All Others	228	55	24.12	5	2.70	9.09
TYPE OF FACILITY (All Priorities)						
Medical	157	76	48.41	23	12.43	30.26
Educational	32	14	43.75	4	2.16	28.57
Industrial	275	85	30.91	23	12.43	27.05
Governmental	23	9	39.13	2	1.08	22.22
Power Reactor	2	1	50.00	1	0.54	100.00
TOTAL	489	185	37.83	53	28.65	28.65

These categories were stratified into "top" and "middle" priorities. The top priorities being I-B, III-F1A, III-G1, and IV-E1A. Nuclear reactor licensees were also added to the top priority. The second priority consists of VI-F, IV-G, and IV-E. The "all others" category includes the remaining NRC licensees surveyed.

Table 9-2 further disaggregates the survey data by showing the type of survey responses (written, telephone, or postcard) received from the licensees.

Table 2-2 presents data on the waste disposal practices employed, including disposal method other than shipment to commercial disposal facilities. In this table, the total of "number using" exceeds the total number of respondents due to the use of several disposal practices used by some facilities. Fifty percent of the medical institutions reported combining low-level radioactive waste with common refuse after it decayed to background levels. Close to 30 percent of the medical institutions reported venting the waste to the atmosphere. Government and industry reported the largest proportion of waste returned to vendors.

Table 2-3 provides data on the sources of radioactivity requiring disposal. The data show that 81 percent of the medical facilities answering the question used unsealed radioactive material, while 65 percent of the industrial facilities reported using sealed sources.

Hospital respondents contacted as part of the telephone survey stated that all hospitals using unsealed material were required by law to have sealed calibration sources as well. Thus, though not reported as such, the number of sealed source responses should be greater than or equal to the number of unsealed material responses.

TABLE 2-2. DISPOSAL PRACTICES USED FOR LOW-LEVEL WASTES

Type Of Facility	Number Of Respondents	Ship To Commercial Repository		Release To Sewer		Combine With Refuse		Vent To Atmosphere		Return To Vendor		Distribute In Product		No Waste Generated	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Medical	76	23	30.3	21	27.6	38	50.0	22	28.9	14	18.4	4	5.3	13	17.1
Educational	14	4	28.6	2	14.3	0	0.0	0	0.0	0	0.0	0	0.0	10	71.4
Industrial	85	23	27.1	4	4.7	0	0.0	4	4.7	29	34.1	6	7.1	32	37.7
Power Reactor	1	1	100.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0
Governmental	9	2	22.2	1	11.1	0	0.0	1	11.1	4	44.4	1	11.1	4	44.4
TOTAL	185	53	28.6	28	15.1	38	20.5	28	15.1	47	25.4	11	5.9	59	31.9

TABLE 2-3. SOURCES OF RADIOACTIVITY REQUIRING DISPOSAL

Type Of Facility	Number Of Respondents	Nuclear Reactor		Sealed Sources		Unsealed Radioactive Material	
		Number	Percent	Number	Percent	Number	Percent
Medical	63	0	0.0	18	28.6	50	79.4
Educational	4	0	0.0	3	75.0	4	100.0
Industrial	53	1	1.9	47	88.7	21	39.6
Power Reactor	1	1	0.0	0	0.0	0	0.0
Governmental	5	0	0.0	5	100.0	2	40.0
TOTAL	126	2	1.6	73	57.9	77	61.1

3. ENVIRONMENTAL CHARACTERISTICS

This section provides a description of the physical and economic parameters which impact on low-level radioactive waste generation and disposal. Information is provided concerning such physical attributes as geology, hydrology, and climate. Data describing the composition, growth and distribution of economic activity are also presented. Finally, an energy profile of the State is developed including electrical generation and the present and projected utilization of nuclear power plants.

3.1 Physical Characteristics

3.1.1. Location

New Jersey is located along the Eastern Seaboard. It is separated from Pennsylvania to the west and Delaware to the south by the Delaware River. New Jersey also shares a northern border with New York State. It is the fifth smallest State in the country ~~in~~ terms of land area. Figure 3-1 shows the counties of New Jersey.

3.1.2. Geology

The State of New Jersey is divided into four physiographic regions, all of which extend generally from southwest to northeast across the State. From north to south, these regions are the Appalachian Ridge and Valley Region, the Highlands, the Piedmont, and the Atlantic Coastal Plain.

The Appalachian Ridge and Valley Region which covers less than one-tenth of the total area of the State is a very small part of the greater Appalachian Mountain region which extends from New York to northern Alabama. Present in this region are the shale and limestone of the Kittatinny and Delaware Valleys. High Point, in the north, is the State's highest elevation, reaching 1,801 feet.

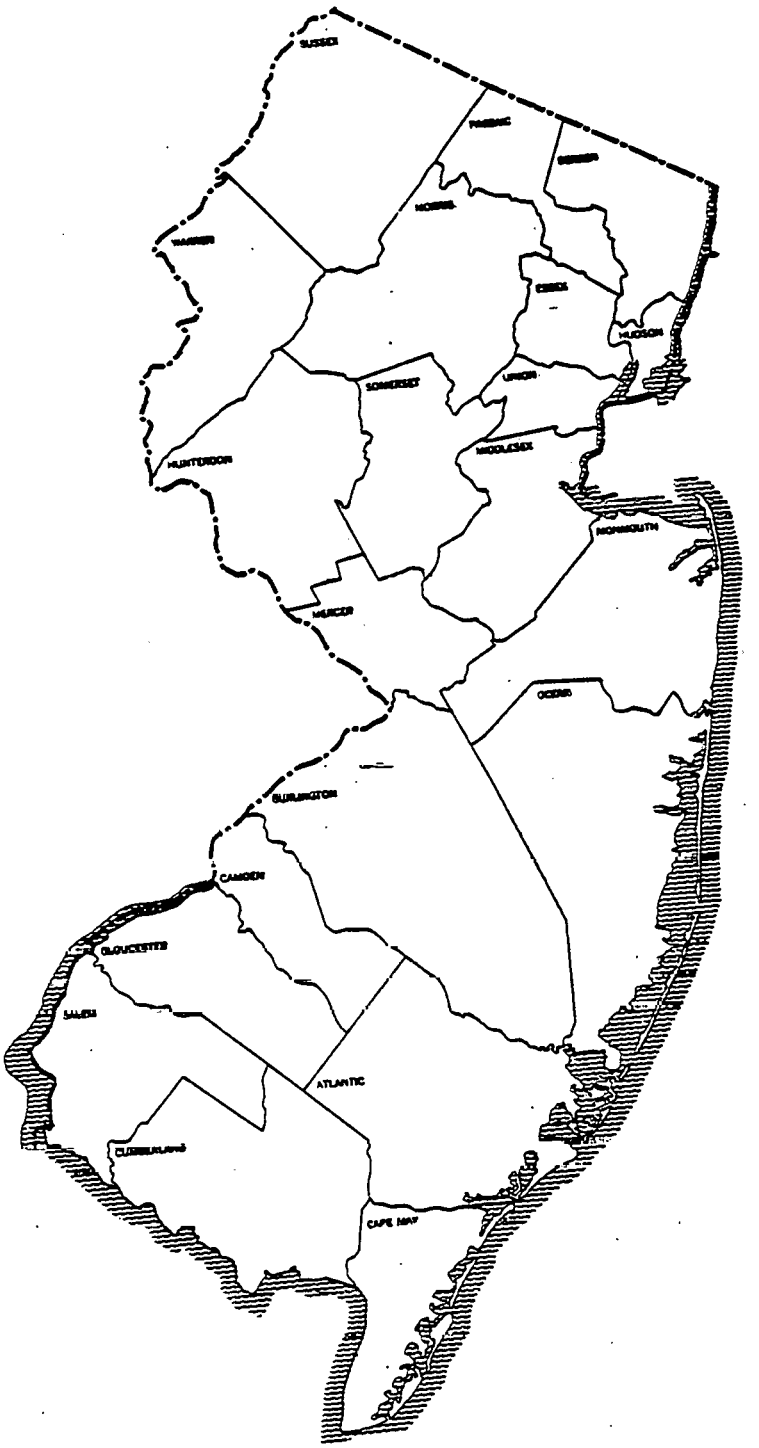

Figure 3-1. New Jersey county map.

Source: American Map Company

The Highlands consist of a series of granite-like mountains and limestone valleys which are a spur of the New England Upland Range. These ranges, covering only one tenth of New Jersey's area, are generally flat-topped with an average elevation of 1000 feet. The soils of the valleys tend to be well drained.

The Piedmont covers about one-fifth of the State, consisting of low plains broken by high ridges, such as the picturesque Palisades, which border the Hudson River and the Watching Mountains. Some peaks rise as high as 900 feet. The Sourland, Rocky Hill and Watching Mountains are quite stony, but soils are mostly well drained. Most of the Piedmont is red shale with shallow and somewhat arid soils on the rolling plains. Soils tend to be wet in the low areas, especially west of Flemington where drainage problems are common.

The Atlantic Coastal Plain covers the entire southern portion of New Jersey, separated from the Piedmont by a line running from Trenton northeast to Perth Amboy. The surface is gently sloping, with a few fairly deep valleys cut by streams. The plain rises gradually from sea level at the eastern, southern and western coasts, reaching a maximum elevation of about 400 feet in central New Jersey. The outer coastal plain consists of dry, coarse sands, with arid, leached and acid soils. Due to a high water table, the low areas form cedar swamps. An example of this type of area is the Pine Barrens, covering 2000 square miles. The inner coastal plain contains unconsolidated sands, silts and clays, with the higher areas having some of the best agricultural soils found in America. Most of the low areas have slow drainage, causing special water pollution problems.

3.1.3 Hydrology

New Jersey's entire coast from New York south to Cape May Point and north along the Delaware River to Trenton is treated with special regard. The New Jersey coast contains wetlands which serve as natural flood controls, water purifiers, and marine nurseries. This area, including many

reservoirs, aquifers, riverbanks and forested areas, is controlled by the Wetlands Act of 1970 and the Floodplains Act of 1972.[1]

New Jersey drains into two river systems: the Hudson along the northeast boundary with New York; and the Delaware constituting the entire western border of the State south to the Delaware Bay.

The Appalachian Ridge and Valley Region is drained by streams flowing northeastward to the Hudson River. Streams from the Highlands and the Piedmont flow into Newark Bay, Rapitan Bay and the Delaware River. The Atlantic Coastal Plain is drained by the tributaries of the Delaware River and by streams emptying into the Atlantic Ocean and the Delaware Bay.

Of the 1,181 lakes in New Jersey, only two are natural. The remaining 1,179 man-made lakes range in size from one to 1,200 surface acres. As of last count, 100 lakes were greater than 50 acres. Most lakes are found in Morris and Suffolk Counties of north central New Jersey.

Surface water accounts for only 50 percent of total water consumption by the State. New Jersey possesses a tremendous reserve of groundwater, constituting 75 percent of all fresh water available, located primarily in the southern portion of the State. The groundwater beneath major northern cities cannot be used due to industrial pollution; therefore, the entire northern region is supplied by reservoirs. The Pine Barrens is a particularly efficient water supply zone which absorbs half of all rainfall into sand and gravel aquifers at a maximum rate of six inches per hour. Of the aquifers existing in the State, half are either artesian or water table and half are fractured rock. The clay soils of central New Jersey and the loamy soils of northern New Jersey protect deeper water tables of up to 300 feet. The breakdown for 1970 groundwater consumption in million gallons per day (Mgd) follows:[2]

Use	Mgd
Public supply	340.0
Industrial supply	550.0
Irrigation	56.0
Domestic/Rural supply	81.0
Total Use	1,027.0

As can be seen, industrial water use constitutes slightly over 50 percent of total water use, followed by public water supply uses (33 percent).

The excellent quality of groundwater is protected by various legislation. The New Jersey Pollution Act of 1977 regulates all discharges to groundwater. New Jersey prides itself on being the first State to take primacy on the Underground Injection Control section of the Federal Safe Drinking Water Act. In addition, the State plans to include groundwater in its State National Pollution Disposal Elimination Program to take effect in spring of 1981. The Department of Environmental Protection maintains an extensive monitoring program including 25 decontamination treatment systems.

3.1.4 Climate

Precipitation is fairly constant throughout the year, with much of the rain and snow resulting from storms originating in the South Atlantic and traveling along the coast, especially during the fall and winter. Snowfall increases from south to north and east to west. A major snowfall (greater than 8 inches) can be expected every other year. Severe weather is uncommon and is usually associated with uncommon powerful summer thunderstorms or coastal storms. Occasionally a hurricane or tropical storm will follow the coast and travel northward resulting in extremely heavy rainfull. Table 3-1 provides a summary of relevant climatological data.[3]

3.1.5 Special Areas

Preserved areas, which constitute most of the non-urban lands in the State of New Jersey, fall into the following categories: national parks,

TABLE 3-1. CLIMATOLOGICAL DATA FOR SELECTED CITIES

City	Temperature					Annual Precipitation (in.)	Annual Snowfall (in.)
	Annual Average (F^{O})	January		July			
		Daily Max. (F^{O})	Daily Min. (F^{O})	Daily Max. (F^{O})	Daily Min. (F^{O})		
Atlantic City	54	41	24	85	65	45.5	17.0
Newark	54	39	24	86	67	41.5	28.6
Trenton	54	39	25	85	67	40.2	23.6
Allentown (Pa.)	51	36	20	85	63	42.5	32.4
Philadelphia (Pa.)	54	40	24	87	67	39.9	21.9

Source: U. S. Department of Commerce, National Oceanic and Atmospheric Information Data Source, Local Climate Data

State parks, State forests, Fish and Wildlife Management Areas (FWMA), Pinelands and Geographic Areas of Particular Concern (GAPC).

Two national parks are situated at the Delaware Water Gap and the Morristown Historical Reserve. The Department of Environmental Protection (DEP) Division of Parks and Forests administers 267,940 acres, including 35 State parks covering 57,997 acres.

The Pinelands National Reserve is approximately one million acres, ranging from Monmouth County in the north, to Cape May County in the south, and from Gloucester and Camden Counties in the west to the barrier islands in the Atlantic Ocean. The Pinelands Protection Area is slightly smaller in size and designated for State Regulation by the Pinelands Protection Act of 1979.

Within New Jersey are a number of geographic areas of particular concern including: all coastal wetlands, Higbee Beach-Pond Creek Meadow Area (424 acres), wet sand beaches (126 miles), 10 State-owned natural areas (4,000 acres), and the Hackensack Meadowlands district (19,730 acres).[4]

3.2 Population

New Jersey's population increased rapidly from the end of the depression until 1970, increasing from 4.2 million to over 7.3 million during this period. The annual rate of population growth in New Jersey during this period was 1.8 percent, compared to the national growth rate of 1.4 percent, and the growth rate of 1.2 percent for the eastern industrial States as a group.[5]

As Table 3-2 demonstrates New Jersey's rapid growth came to an abrupt halt during the last decade. During the 1970's there was a substantial shift in migration patterns with over two million people leaving the eastern industrial States for the sunbelt States. New Jersey, to which almost a half million people migrated during the 1960's, experienced net out-migration for the first time during the last decade. In this period, New Jersey's

TABLE 3-2. NEW JERSEY POPULATION DATA AND PROJECTIONS

Region	Population			Annual Growth Rate	
	1970[1]	1980[2]	2000[3]	1970-1980 (%)	1980-2000 (%)
United States	203,211,926	226,504,825	265,637,000	1.09	0.80
New Jersey	7,171,112	7,335,808	9,007,000	0.23	1.03
Counties:					
Atlantic	175,043	189,316	326,500	0.73	2.76
Bergen	897,148	844,248	916,200	-0.61	0.41
Burlington	323,132	360,824	573,900	1.11	2.35
Camden	456,291	471,009	552,300	0.32	0.80
Cape May	59,554	82,068	163,100	3.26	3.49
Cumberland	121,374	132,278	167,600	0.86	1.19
Essex	932,526	848,969	818,400	-0.94	-0.18
Gloucester	172,681	199,378	287,700	1.45	1.85
Hudson	607,839	555,478	556,700	-0.90	0.01
Hunterdon	69,718	87,093	110,700	2.25	1.21
Mercer	304,116	305,596	386,400	0.05	1.18
Middlesex	583,813	594,984	735,100	0.13	1.06
Monmouth	461,849	496,313	644,000	0.72	1.31
Morris	383,454	407,707	492,200	0.62	0.95
Ocean	208,470	343,948	555,400	5.13	2.42
Passaic	460,782	447,698	538,200	-0.29	0.92
Salem	60,346	64,579	72,400	0.68	0.57
Somerset	198,372	201,771	304,700	0.17	2.08
Sussex	77,528	116,118	192,000	4.12	2.55
Union	543,116	502,464	512,700	-0.78	0.10
Warren	73,960	83,969	100,900	1.28	0.92

Source: 1. U. S. Department of Commerce, Bureau of Census, Statistical Abstract of the United States

2. Ibid, 1980 Preliminary Population Figures For New Jersey

3. New Jersey Department of Labor and Industry, Division of Planning And Research, Provisional Population Estimates

population grew at an annual rate of only 0.23 percent, compared to a national growth rate of 1.1 percent.

As Figure 3-2 shows, The entire State, except for Ocean, Hunterdon, Sussex, and Cape May counties, belongs to Standard Metropolitan Statistical Areas (SMSA). New Jersey is located along the most urbanized stretch of land in the United States; this area is frequently refered to as the Northeast Corridor, running from Washington, D.C. to Boston, Massachusetts. Within the Northeast Corridor, the area from Wilmington, Delaware to New York City consists of a series of SMSA's. Figure 3-3 shows New Jersey population densities. New Jersey has the highest population density of any State.[6] The highest population densities in the State are in the Trenton, New York City and Philadelphia areas.

New Jersey can be considered two separate States for purposes of analyzing demographic changes. The counties north of Trenton, including Mercer and Monmouth, are considered "North Jersey." North Jersey is socially and economically linked with New York City, while South Jersey has linkages with Philadelphia.

The bulk of the population is located in North Jersey, with a population of almost 5.5 million. During the last decade the population of North Jersey declined by 101,813; however, the five counties closest to New York City--Passaic, Bergen, Essex, Hudson and Union--lost almost a quarter-million people. The largest growth was recorded in the three western counties, especially Sussex (38,590) and Monmouth Counties (34,464).[7]

South Jersey experienced growth in every county with a total increase of 266,509. The counties which grew the most were Ocean (135,478), Burlington (37,692), and Gloucester (26,697). One reason South Jersey may still be growing is its relatively lower population density, allowing room for development and a more attractive environment.[8]

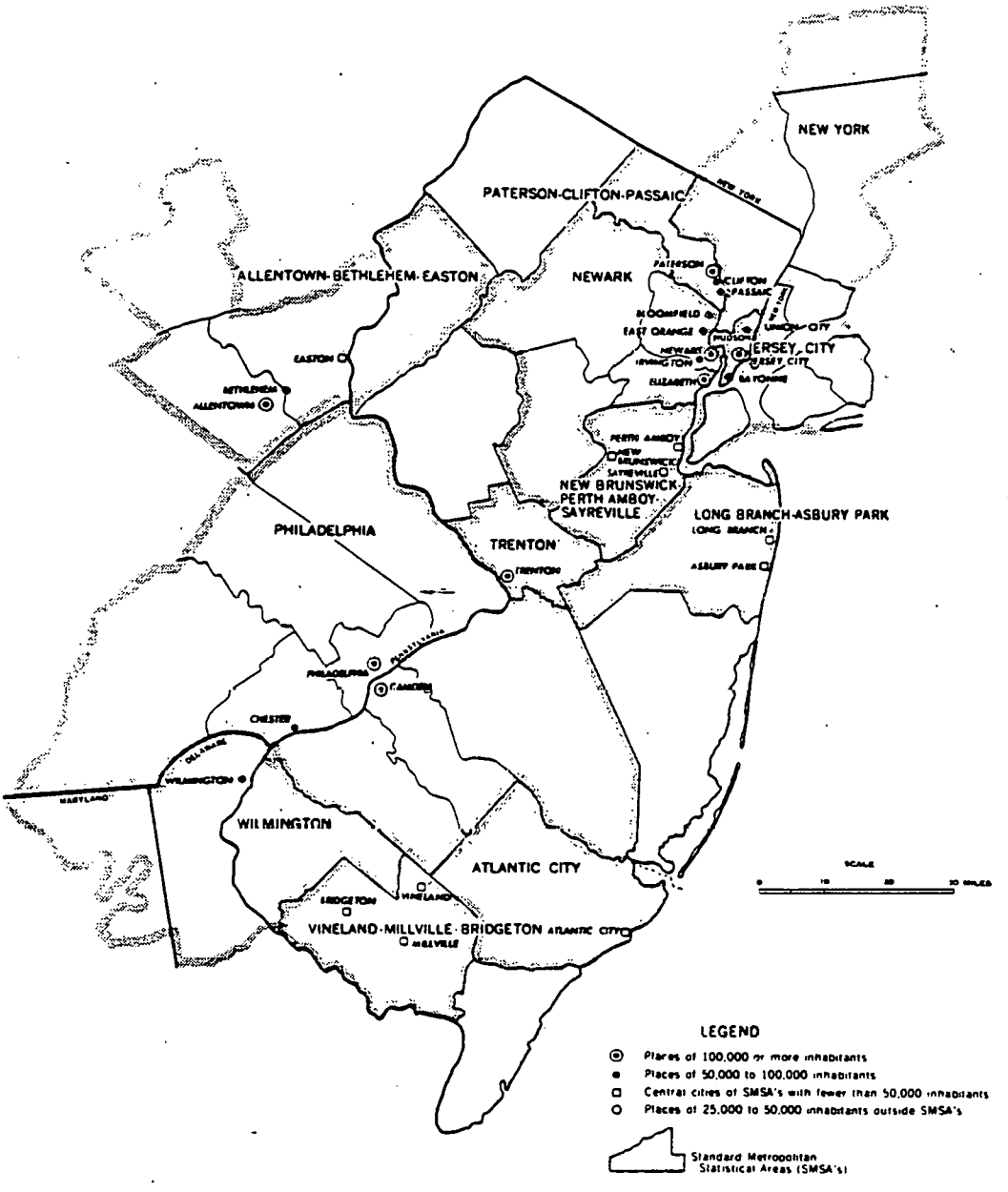

Figure 3-2. Standard metropolitan statistical areas (SMSA's) map of New Jersey.

Source: New Jersey Department of Labor And Industry, Division Of Planning And Research, New Jersey Provisional Population Estimates.

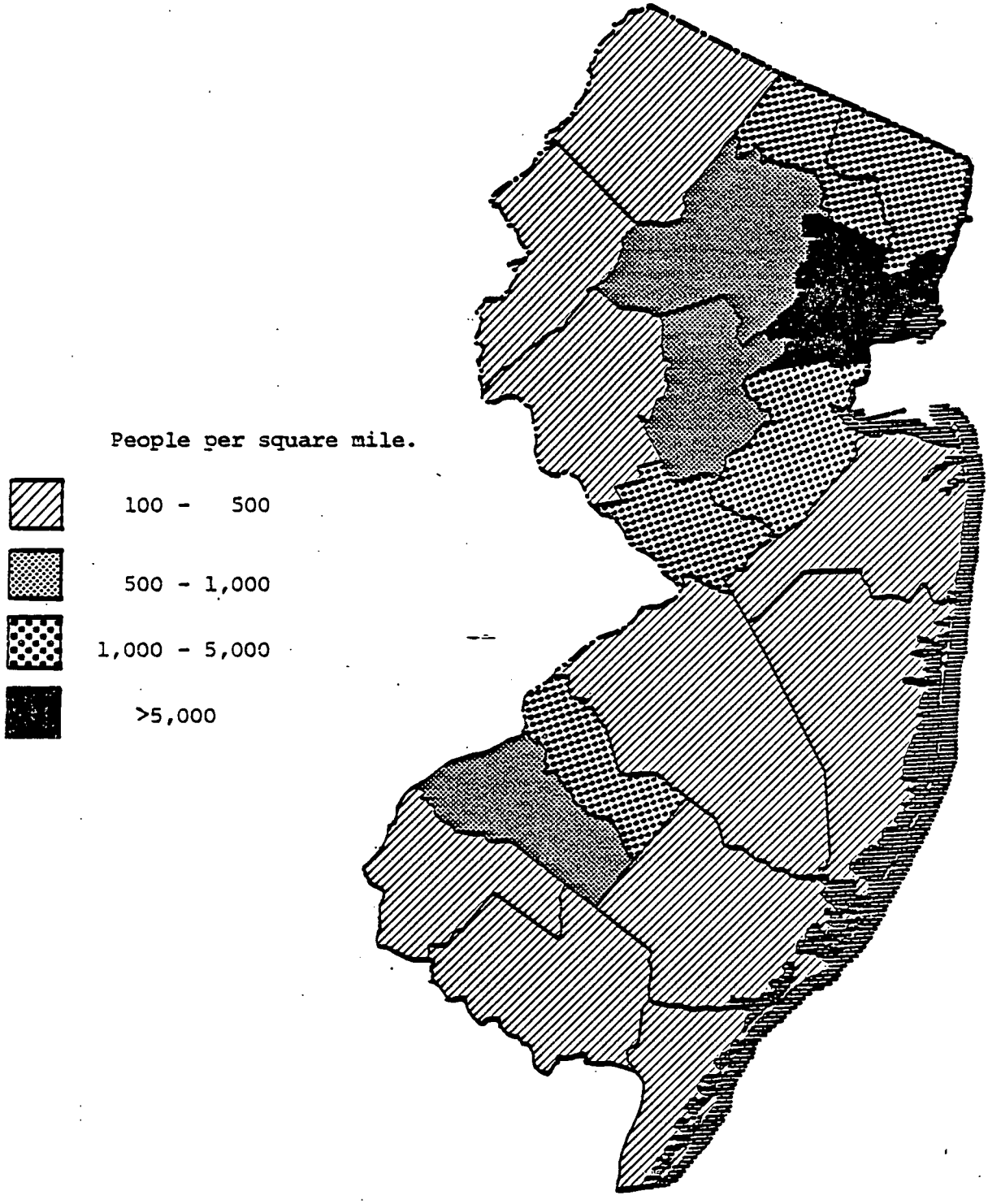

Figure 3-3. Population density map of New Jersey.

Source: Synergic Resources Corporation, primary data based on 1970 U. S. Census

Population projections prepared by the State estimate a population for the year 2000 of nine million. This would require a substantial increase in New Jersey's growth rate during a period when the Bureau of Economic Analysis (BEA) expects the national growth rate for the rest of the country to decline to 0.8 percent.[9] The BEA projection for New Jersey, when adjusted for the 1980 Census, would result in a year 2000 population of 8.2 million, with an annual growth rate of 0.58 percent. The growth rate experienced over the previous decade, if continued for the rest of the century, would result in a population of 7.7 million.

3.3 Economy

3.3.1 Economic Indicators

The economy of New Jersey has been severely buffeted by the economic shocks which have occurred during the last decade. As Table 3-3 demonstrates, New Jersey began the decade with an unemployment rate below the national average but averaged an unemployment rate almost two percentage points above the national rate for the second half of the decade.

Other indicators such as personal income (Table 3-4), per capita income (Table 3-5), and earnings (Table 3-6) reflect the States's economic difficulties. Total personal income held steady during the 1960's relative to the nation, despite a faster population growth, and grew more slowly during the 1970's than the nation. Per capita income has been declining relative to the nation at an accelerated pace during the previous decade.

3.3.2 Economic Composition

The dominant economic sectors in New Jersey are manufacturing, services, trade and government. There may be some shifts in the relative importance of these sectors over the next two decades. Manufacturing, which still accounts for 30 percent of earnings, has been growing slower

TABLE 3-3. UNEMPLOYMENT RATES: U. S. AND NEW JERSEY
(In Percent)

	1970	1975	1976	1977	1978	1979
United States	4.9	8.5	7.7	7.0	6.0	5.8
New Jersey	4.6	10.2	10.4	9.4	7.2	6.9

Source: New Jersey Department of Labor and Industry, Division of Planning and Research.

TABLE 3-4. TOTAL PERSONAL INCOME: U. S. AND NEW JERSEY
(Millions of 1980 Dollars)

	1960	1969	1978	1990	2000
United States	999,844	1,509,833	2,062,937	3,207,633	4,229, 798
New Jersey	41,630	63,258	77,586	114,718	145,363
New Jersey as a percentage of the U. S.	4.16	4.19	3.76	3.58	3.44

Source: New Jersey Department of Labor and Industry, Division of Planning and Research.

TABLE 3-5. NEW JERSEY PER CAPITA PERSONAL INCOME
(1980 Dollars)

	1960	1970	1978	1990	2000
United States	5,555	7,618	9,461	13,202	16,277
New Jersey	6,822	9,166	10,589	14,406	17,454
New Jersey/US	223	217	203	197	194

Source: U. S. Department of Commerce, Statistical Abstract of the United States, 1979.

TABLE 3-6. NEW JERSEY EARNINGS
(Millions of 1980 Dollars

				Annual Growth Rate	
	1960	1970	1978	1960-1978	1978-2000
United States	831,503	1,252,250	1,590,956	3.7	3.3
New Jersey	31,999	45,471	48,912	3.0	3.0
New Jersey/US	3.85	3.61	3.07	---	---

Source: U. S. Department of Commerce, Statistical Abstract of the United States, 1979.

(1.5 percent annually) for the last two decades and it is expected to grow more slowly over the next two decades, according to BEA projections. On the other hand, service industries have been growing rapidly and this growth is expected to continue. The growth of trade and government is expected to be slightly below the growth of the overall State economy and below their previous period growth (see Table 3-7).[10] Manufacturing, despite its slow growth, is still more important at the State level than the National, while trade, mining and agriculture are less important.

The most important manufacturing group in terms of value added is chemicals, which is also the only manufacturing group which has a significant share of the nation's output. Value added is a measure of industrial activity derived by subtracting the cost or materials, supplies, containers, fuel, electricity purchases, and contract work from the products produced or service rendered. Other manufacturing groups of importance to New Jersey are food, electric and electronic equipment, non-electrical equipment, and fabricated metals.[11] Table 3-8 provides data on the value added for major industrial groupings.

3.4 Agriculture

New Jersey is not a major producer of farm products; however, it is an important source of fresh market vegetables for both the Philadelphia and New York City areas. Table 3-9 gives the quantity and value of New Jersey agricultural products.

3.5. Energy

New Jersey accounts for 2.5 percent of the Nation's energy consumption. On a per capita basis, New Jersey residents use only 75 percent of the national average energy consumption. Energy consumption grew steadily in New Jersey until the oil embargo, at which time consumption dipped, followed by a gradual increase. Figure 3-4 presents the changing fuel mix in New Jersey. Petroleum is by far the most important fuel used (see Figure 3-5), accounting for almost two-thirds of all energy consumed. Natural gas and coal are of minor importance, accounting for only 15 percent of energy

TABLE 3-7. NEW JERSEY EARNINGS BY INDUSTRY SECTOR
(millions of 1980 dollars)

Sector	1960	1970	1978	Annual Growth Rate 1960-1978	Annual Growth Rate 1978-2000
Agriculture	346	208	159	-4.4	1.0
Mining	63	74	65	0.2	3.2
Construction	1,904	3,045	2,588	1.7	4.1
Manufacturing	12,514	16,243	16,261	1.5	1.9
T.C.U [a]	2,431	3,814	4,854	3.9	3.2
Trade	5,329	7,984	9,383	3.2	2.8
F.I.R.E [b]	1,517	2,156	2,820	3.5	3.5
Services	4,273	7,564	9,807	4.7	4.1
Federal Government	1,356	2,098	2,101	2.5	3.0
State and Local Government	2,181	4,413	6,167	5.9	2.5

a. Transportation, Communications and Utilities.
b. Finance, Insurance and Real Estate.

Source: New Jersey Department of Labor and Industry, Division of Planning and Research, Regional Income For United States, New Jersey Counties, 1929-1978

TABLE 3-8. VALUE ADDED FOR MAJOR INDUSTRY GROUPS
(millions of 1980 dollars)

Industry Group	SIC Code	New Jersey Industry 1977	New Jersey Industry 1972	New Jersey as a percentage of U.S. 1977	New Jersey as a percentage of U.S. 1972
All Manufacturing		29,198	29,700	3.9	4.6
Food	20	2,550	2,739	2.8	3.9
Apparel	23	1,102	1,262	4.4	5.2
Pulp and Paper	26	1,077	1,003	3.9	4.2
Printing and Publishing	27	1,490	1,367	3.7	3.7
Chemicals	28	7,908	7,258	11.0	12.4
Rubber and Plastics	30	1,267	1,115	5.0	5.4
Stone, Clay and Glass	32	1,213	1,263	5.1	5.6
Primary Metals	33	905	1,055	1.9	2.5
Fabricated Metals	34	2,185	2,062	3.8	4.2
Machinery, except Electrical	35	2,237	2,351	2.6	3.5
Electric and Electronic Equipment	36	2,465	2,878	3.9	5.2
Transportation Equipment	37	1,500	1,662	1.8	2.3
Instruments	38	1,131	914	4.7	4.8
Miscellaneous	39	746	758	5.9	6.2

Source: U. S. Department of Commerce, Bureau of Census, 1977 Census of Manufactures, Geographic Area Studies

TABLE 3-9. NEW JERSEY AGRICULTURAL PRODUCTION
(thousands)

Crop	Unit	1979 Production	1979 Farm Value	Rank	Percent of U.S. Production
Total Crops	Ton	1,984	239,676	36	0.41
Field Crops	N/A	N/A	119,139	N/A	N/A
Soybeans	Bushel	6,750	41,850	N/A	0.3
Corn for Grain	Bushel	7,380	22,140	N/A	0.1
Hay	Ton	339	21,018	N/A	0.2
Fruit Crops			48,203		
Peaches	lb.	90,000	15,210	4	3.0
Blueberries	Tray	2,127	13,806	2	N/A
Vegetables (Market)	Cwt.	3,899	60,545	N/A	1.5
Tomatoes	Cwt.	528	14,573	4	2.4
Vegetables (Processed)	Ton	129	11,789	N/A	1.0
Livestock and Poultry			115,000		
Milk		494,000	62,450	N/A	N/A
Cattle and Calves	lb.	39,900	23,007	N/A	N/A
Eggs	eggs.	341,000	17,903		

N/A = Not Available

Source: New Jersey Department of Agriculture, New Jersey Crop Reporting Service, New Jersey Agricultural Statistics, 1980

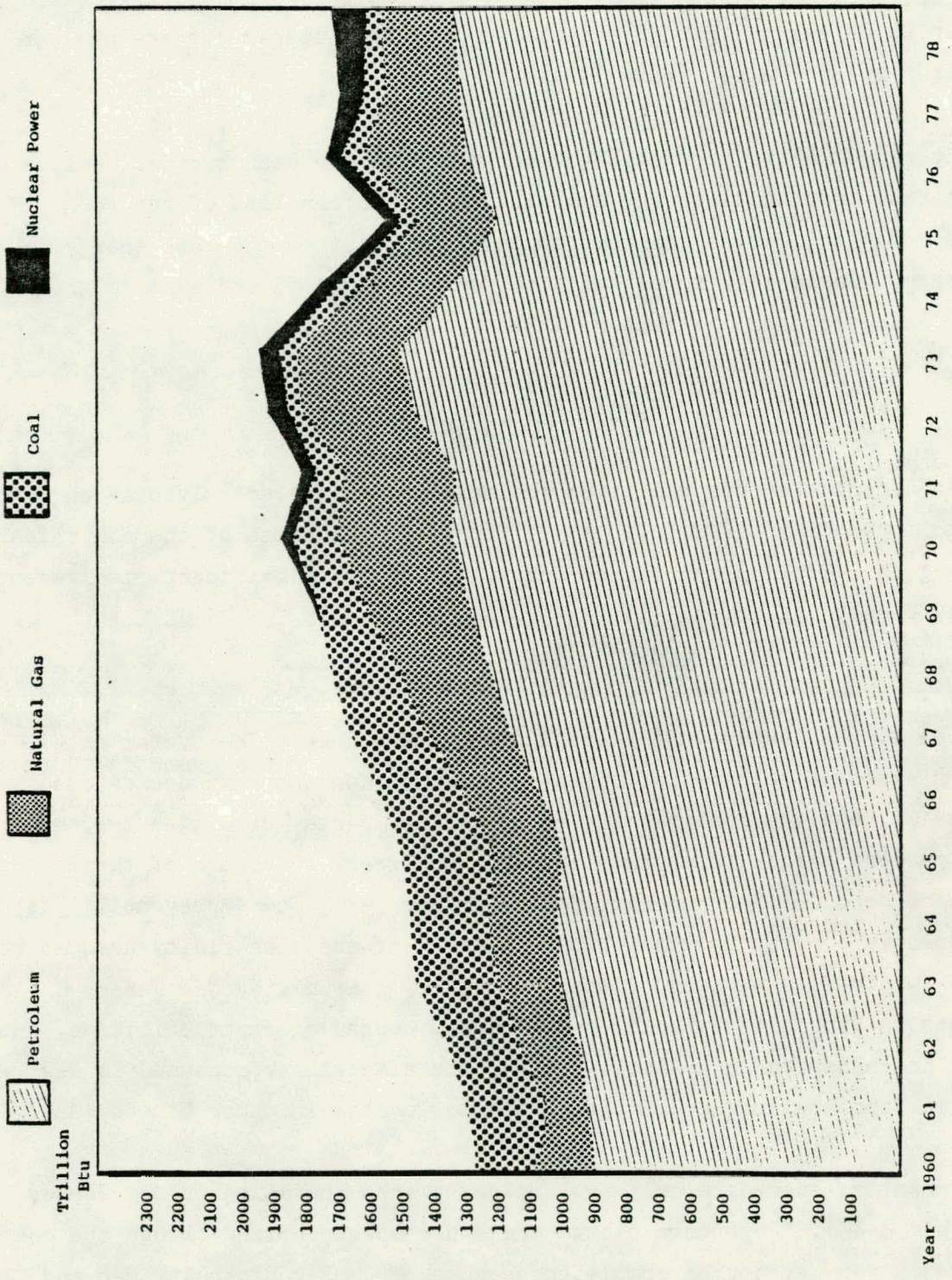

Figure 3-4. Consumption of energy by fuel type - New Jersey.

Source: Synergic Resources Corporation, Primary data from DOE State Energy Data Report, 1978

consumed. The consumption of both fuels has declined dramatically. The two sources of energy that have replaced coal and natural gas are nuclear power and imported electricity.[12]

Figure 3-6 shows the relative energy demand for each sector. Unlike many States, industrial energy consumption is the smallest of the four sectors. In fact, it is transportation which requires the most energy in New Jersey. Table 3-10 shows the total energy consumed and average growth rate of energy demand, by sector.

3.6. Electricity and Nuclear Power

New Jersey electric utilities are members of the Pennsylvania-New Jersey-Maryland Interchange (PJM). Table 3-11 provides the names of the companies belonging to PJM which are in New Jersey, or have a significant involvement with New Jersey utilities.[13]

As members of PJM, New Jersey utilities are able to use electricity generated at the lowest cost units in the interchange. The system as a whole is expected to have sufficient generation for the next decade (see Table 3-12), but the reserve margins of the New Jersey utilities are below the 20 percent margin which is considered necessary. Because of their dependence on oil-fired generation (see Figure 3-7), New Jersey utilities are presently purchasing more than 20 percent of the electricity used in the State. Twenty-five percent of the electricity consumed by New Jersey residents is generated by units owned by New Jersey electric utilities, but located in Pennsylvania. Almost half of the electricity consumed in New Jersey is from coal or nuclear power plants located in other States.[14]

Currently, there are only two nuclear plants operating in New Jersey (see Table 3-13). Four more plants are under construction, though the one at Forked River may not be completed because of Jersey Central Power and Light's precarious financial position due to its partial ownership (25 percent) of the Three Mile Island plants. New Jersey utilities also own half of the

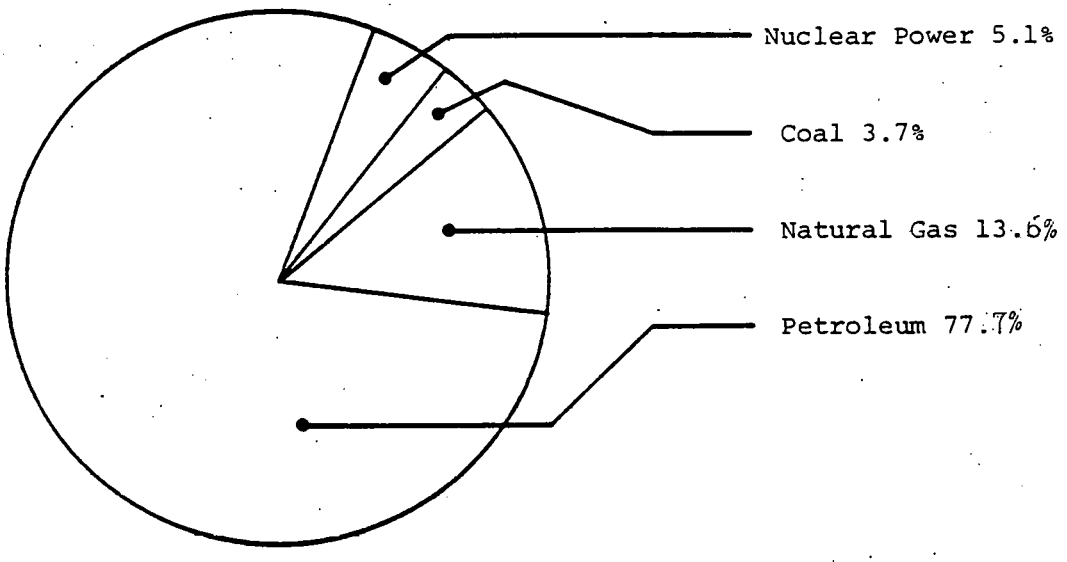

Figure 3-5. Consumption of energy by fuel.

Source: Synergic Resources Corporation, Primary data from DOE, State Energy Data Report, 1978

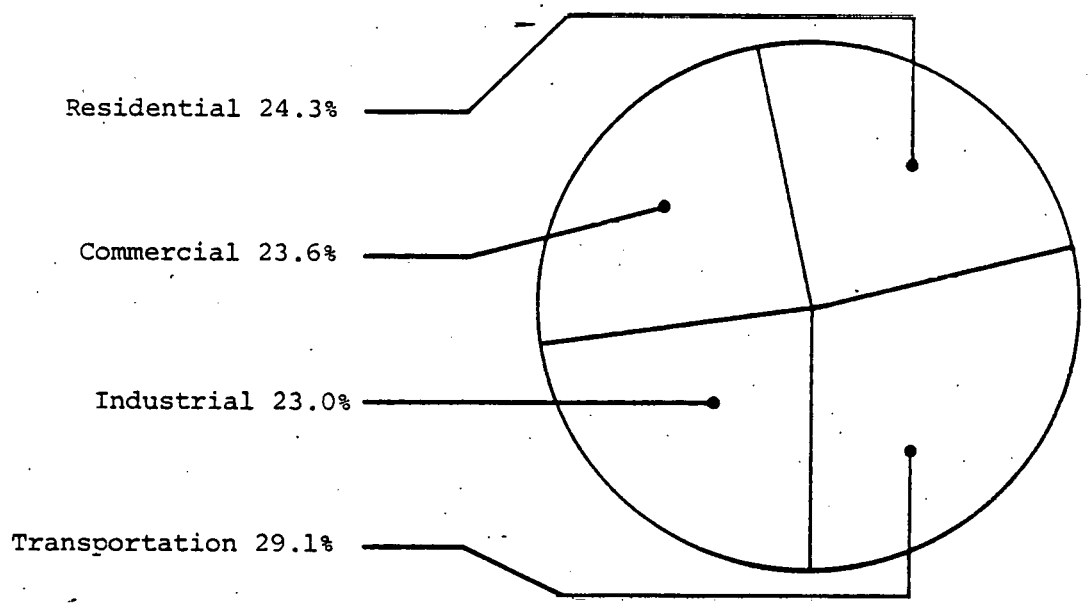

Figure 3-6. Consumption of energy by end-use.

Source: Synergic Resources Corporation, Primary data from DOE, State Energy Data Report, 1978

TABLE 3-10. NEW JERSEY ENERGY CONSUMPTION BY SECTOR
(trillion BTUs)

	Year	Residential	Commercial	Industrial	Transportation	Total
	1960	301.7	243.4	435.0	335.9	1316.0
	1965	372.5	313.8	429.7	396.7	1512.7
	1970	468.1	447.3	483.8	494.6	1893.8
	1975	462.0	433.2	399.5	519.9	1814.7
	1978	477.1	462.0	451.4	571.5	1962.0
Growth	1960-1973	3.94%	5.70%	0.54%	4.00%	3.37%
Rate	1973-1978	-0.89%	-1.61%	-0.67%	0.43%	-0.64%

Source: U. S. Department of Energy, State Energy Data Report, 1978

TABLE 3-11. MAJOR ELECTRIC UTILITIES IN THE PJM INTERCHANGE

New Jersey:

Atlantic City Electric Company
Deepwater Operating Company
Jersey Central Power and Light (GPU)*
Public Service Electric and Gas

Pennsylvania:

Metropolitan Edison Company (GPU)
Pennsylvania Electric Company (GPU)
Pennsylvania Power and Light
Philadelphia Electric Company
Safe Harbor Water Power Company

Delaware:

DELMARVA Power and Light Company

*GPU - General Public Utilities - a holding company which has partial ownership of these utilities.

Source: U. S. Department of Energy, Inventory of Power Plants In The United States.

TABLE 3-12. PROJECTED DEMAND FOR PJM

Year	Electrical Requirements (GWH)	Peak Demand (MW)	Reserve Margin (%)
1979	172,540	31,780	42.5
1989	236,938	42,370	33.5
Annual Growth Rate	3.22%	2.92%	--

Source: Synergic Resources Corporation, Primary data from New Jersey Department of Energy and DOE, Inventory of Power Plants in the United States

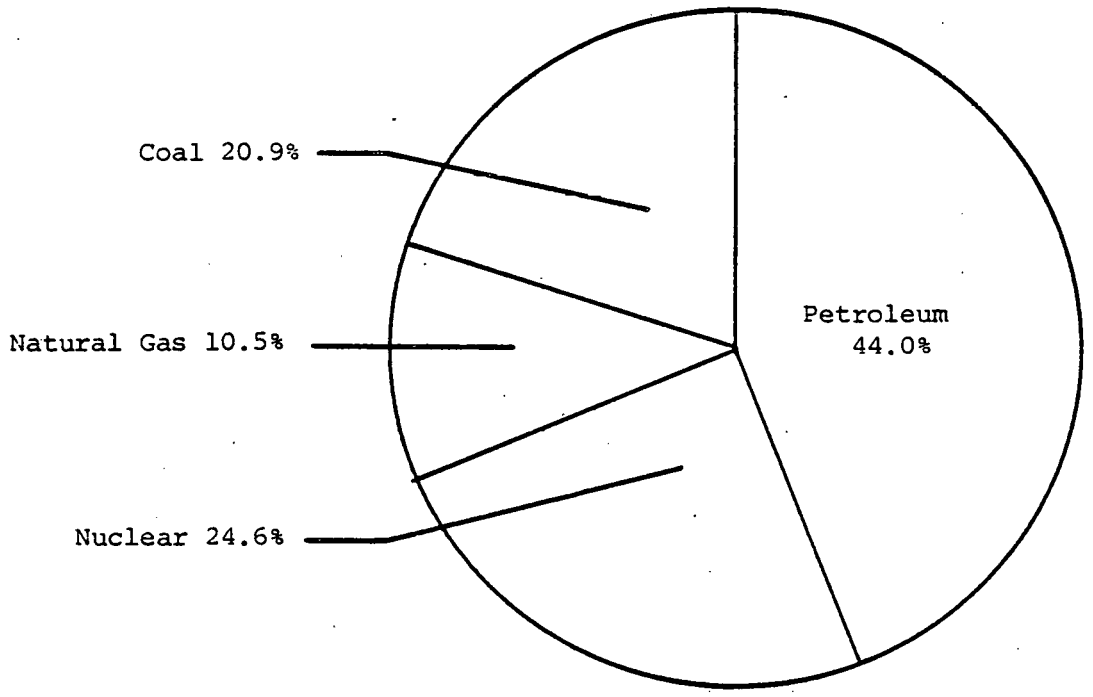

Figure 3-7. Generation fuel mix of power plants in New Jersey.

Source: Edison Electric Institute, Statistical Yearbook of the Electric Utility Industry, 1979

TABLE 3-13. OVERVIEW OF NUCLEAR PLANTS IN NEW JERSEY: EXISTING AND PROJECTED

Plant	Location	Capacity	Ownership		Year
Salem #1	Salem County	1170MW	Public Service	42.6%	1977
#2		1114MW	Electric and Gas		1983
			Philadelphia Electric	42.6%	
			Atlantic City Electric	7.4%	
			DELMARVA	7.4%	
Hope Creek #1	Salem County	1067MW	Public Service	95.0%	1985
#2		1067MW	Electric and Gas		1987
			Atlantic City Electric	5.0%	
Oyster Creek	Ocean County	550MW	Jersey Central Power and Light	100%	1969
Forked River	Ocean County	1251MW	Jersey Central Power and Light	97%	
			Allegheny Power Cooperative	3%	

Source: U. S. Department of Energy, Inventory of Power Plants in the United States, 1979

two Peach Bottom nuclear plants, with Public Service Electric and Gas accounting for 42.4 percent of ownership and Atlantic City Electric accounting for 7.6 percent.[15] Due to the political and economic climate additional expansion over the remainder of the century is unlikely.

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4. GOVERNMENTAL AND PUBLIC ASPECTS

4.1 Congressional Representation

New Jersey will be represented in the 97th Congress by two Democratic Senators along with eight Democratic and seven Republican Representatives. This represents a gain of two seats for the Republicans over their representation in the 96th Congress. Republican candidates defeated two incumbent Democrats in the fourth district, Christopher Smith defeated Frank Thompson; and in the seventh district, Marge Roukema defeated Andrew McGuire. Another newcomer, Bernard Dwyer (D-15th district) replaced the retiring Edward Patten (D).

The size of New Jersey's delegation to the House of Representatives has been relatively stable in comparison to the declines registered by neighboring New York and Pennsylvania. Following the 1940 Census, New Jersey had 14 seats. Since the 1950 Census, the State has had 15 seats, although it is expected to lose one seat following the reapportionment based on the 1980 Census. Current congressional districts are shown in Figure 4-1. Democrats have held a majority of the State's congressional seats since 1964. Before that Democratic landslide year, Republicans consistently held a majority of New Jersey's seats. The Democrats' greatest success occurred in the post-Watergate election of 1974, when they captured twelve of the State's fifteen seats. Since that election they have lost seats in each successive election.

New Jersey's two senators are Harrison Williams and William Bradley, both Democrats. Williams was first elected to the Senate in 1958 after one term in the House of Representatives. He has benefitted by running for election in the "Democratic years" of 1958, 1964, and 1970. In 1976, he had only token opposition. His alleged involvement in the "Abscam" affair is expected to endanger his chances for re-election in 1982. In the Senate, Williams has served as chairman of the Labor and Human Resources Committee and as second-ranking member of the Banking, Housing, and Urban Affairs

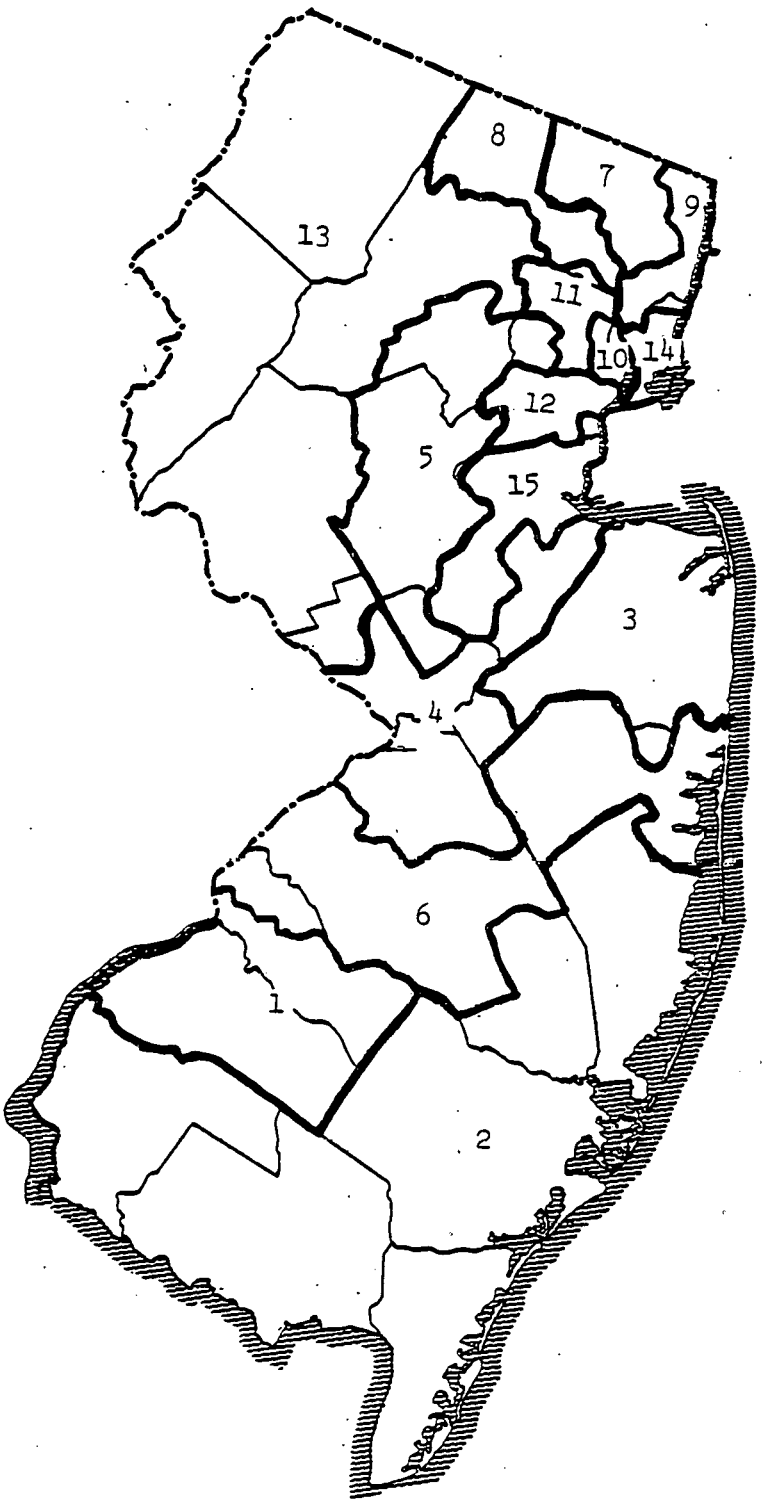

Figure 4-1. New Jersey Congressional Districts.*

*Numbers denote districts.

Committee. He has sponsored mass transit legislation and has been a consistent supporter of organized labor's position on "anti-labor" legislation. He has voted for recent legislation (H.R.7590, S.2332, and S.2189) dealing with nuclear waste control. Bradley became New Jersey's junior Senator in 1978. Bradley has served on both the Finance Committee and Energy and Natural Resources Committee, an important committee in the Senate for issues relating to radioactive wastes. Bradley has avoided publicity in the Senate, and has concentrated on learning the rules of legislative procedure.[1] He, too, has voted in favor of those recent bills dealing with nuclear waste control.

New Jersey's 15 members of the House of Representatives, along with the State's two Senators, are listed in Table 4-1. This table indicates each member's district, party affiliation, date of initial election, and committee assignments.

In the 96th Congress, several of New Jersey's congressmen served on committees relevant to issues of low-level radioactive waste. Serving on the Interior and Insular Affairs Committee were James Florio (D-1st district) and James Howard (D-3rd district). Serving on the Interstate and Foreign Commerce Committee were Florio, Andrew McGuire (D-7th district, defeated in 1980), and Matthew Rinaldo (R-12th district). Serving on the Science and Technology Committee were Edwin Forsythe (R-6th district) and Harold Hollenback (R-9th district). Serving on Government Operations was McGuire. Of all members of New Jersey's House delegation, the most active and outspoken proponent of environmental protection legislation was Andrew McGuire. First elected in 1974, McGuire lost to Marge Roukema in 1980. Votes of the New Jersey delegation on legislation relevant to low-level radioactive wastes are summarized on Table 4-2.[2]

TABLE 4-1. NEW JERSEY MEMBERS OF THE UNITED STATES CONGRESS

State Delegate	District	Political Affiliation	Beginning of Present Service	Congressional Committees
Harrison A. Williams	State	Democrat	1958	Banking, Housing and Urban Affairs Labor and Human Resources (Chairman)
Bill Bradley	State	Democrat	1978	Energy and Natural Resources Finance (Chairman)
James J. Florio	First	Democrat	1974	Interior and Insular Affairs Energy and Commerce
William J. Hughes	Second	Democrat	1974	Judiciary Merchant Marine and Fisheries
James H. Howard	Third	Democrat	1964	Public Works and Transportation
Christopher H. Smith[a]	Fourth	Republican	1980	Small Business Veterans Affairs
Millicent Fenwick	Fifth	Republican	1974	Foreign Affairs Education and Labor
Edwin B. Forsythe	Sixth	Republican	1970	Merchant Marine and Fisheries Science and Technology
Marge Roukema[b]	Seventh	Republican	1980	Banking, Financing and Urban Affairs Education and Labor

TABLE 4-1. (Continued)

State Delegate	District	Political Affiliation	Beginning of Present Service	Congressional Committees
Harold C. Hollenback	Ninth	Republican	1976	Public Works and Transportation Science and Technology
Peter W. Rodino, Jr.	Tenth	Democrat	1948	Judiciary (Chairman)
Joseph G. Minish	Eleventh	Democrat	1962	Banking, Finance and Urban Affairs House Administration
Matthew J. Rinaldo	Twelfth	Republican	1972	Energy and Commerce
James A. Courter	Thirteenth	Republican	1978	Armed Services (15th) Post Office and Civil Service
Frank J. Guarini	Fourteenth	Democrat	1978	Ways and Means (23rd)
Bernard J. Dwyer[c]	Fifteenth	Democrat	1980	Appropriations

a. Smith replaced Frank Thompson, a Democrat. Thompson was Chairman of the House Administration Committee and Chairman of the Labor-Management Subcommittee of the Education and Labor Committee.

b. Roukema replaced Andrew Maguire, a Democrat, who served on Government Operations and Interstate and Foreign Commerce. Maguire was an outspoken critic of the oil companies.

c. Dwyer replaces Edward Patten, a Democrat, who served on the Appropriations Committee.

d. Committee assignments are currently in the process of being made. They will not be finalized until after January 31, the deadline for requests for change of tentative assignments.

TABLE 4-2. VOTES OF NEW JERSEY CONGRESSMEN ON RECENT RELEVANT LEGISLATION[2]

I. Senate	HR7590	S2332	S2332(a)	S2189	S2189(a)	S2189(b)
Bradley (D)	Y	Y	Y	Y	Y	N
Williams (D)	Y	Y	Y	Y	Y	N

II. House	HR6865	HR7265	HR7590	HR7590(a)	HR7590(b)	HR8378(a)
1. Florio (D)	Y	Y	Y	N	Y	Y
2. Hughes (D)	?	Y	Y	N	N	Y
3. Howard (D)	Y	Y	Y	Y	Y	N
4. Thompson (D)	Y	?	Y	?	?	?
5. Fenwick (R)	Y	N	N	N	N	X
6. Forsythe (R)	Y	Y	Y	N	N	N
7. Maguire (D)	?	?	N	N	N	Y
8. Roe (D)	?	Y	Y	Y	Y	N
9. Hollenback (R)	?	Y	Y	Y	N	N
10. Rodino (D)	?	Y	N	Y	Y	#
11. Minish (D)	?	Y	Y	Y	N	Y
12. Rinaldo (R)	?	Y	Y	Y	Y	Y
13. Courter (R)	Y	Y	Y	N	N	N
14. Guarini (D)	Y	Y	Y	Y	Y	Y
15. Patten (D)	?	Y	Y	Y	Y	N

KEY: HR7590 -- A bill to appropriate $12 billion for energy and water projects in fiscal 1981, including $10 million for "away-from-reactor" storage of spent nuclear fuel from commercial power plants. Approved in House. Approved in Senate 83-9.

HR7590(a) -- Conference report on HR7590. Passed 273-117.

HR7590(b) -- Motion to agree to Senate amendment to authorize a $284 million flood control project in the Tug Fork River Valley along the Kentucky-West Virginia border. Motion agreed to 230-164.

S2332 -- A bill to authorize appropriations to the Department of Energy for civilian programs for fiscal 1981 and fiscal 1982. Passed 78-14.

S2332(a) -- An amendment to restrict the use of $300 million authorization for interim Federal storage of nuclear waste until an overall Federal nuclear waste disposal policy was legally in place. Passed 49-44.

TABLE 4-2. (Continued)

S2189 -- A bill to establish a program for Federal storage of spent fuel from civilian nuclear power plants, to set forth a Federal policy and initiate a program for the disposal of nuclear waste from civilian activities. Passed 88-7.

S2189(a) -- An amendment sponsored by Glenn (D-Ohio) to allow a state's objection to the storage of nuclear waste within its boundaries to be upheld if either house of Congress endorses the state's position. Adopted 83-0.

S2189(b) -- A motion made by Johnston (D-La.) to table the Hart (D-Colo.) amendment to restrict the use of Federal away-from-reactor storage of nuclear waste products to those utilities that no longer had storage space available at reactor sites. Motion agreed to 51-44.

HR6865 -- Demand for a second on the McCormack (D-Wash.) motion to suspend the rules and pass the bill to authorize $5 million for the Energy Department demonstration project at West Valley, New York, to solidify high-level liquid radioactive wastes. Second ordered 244-0. Bill subsequently passed by voice vote.

HR7265 -- A bill to authorize fiscal 1981 spending of $3.5 billion by the Department of Energy for research, development, and production of nuclear warheads and other items used by the Defense Department. Two amendments, one which added $10 million for design of a radioactive waste processing facility at Savannah River, South Carolina, were passed by voice vote. Passed on November 20, 1980, but later vacated for S3074.

HR8378(a) -- Amendment to HR8378 (passed by voice vote) to permit states to veto Federally selected nuclear waste sites within their borders unless both houses of Congress voted to override the veto. Rejected 161-218.

VOTE SYMBOLS

Y = For
N = Against
? = Did not vote or otherwise make position known
# = Paired for
X = Paired against.

4.2 State Government

4.2.1 Constitution

The structure and authority of New Jersey State government is given broad definition in the New Jersey Constitution. New Jersey's present Constitution was adopted in 1947 and is the State's third constitution. This Constitution was the consequence of growing dissatisfaction with provisions of the 1944 Constitution, such as a complex court system, cumbersome amendment procedures, and one-year terms and low pay for assembly service. The new Constitution included reforms such as a four-year term for Governor, extensive appointment power for the Governor, a simplified and unified court system, and broadened powers of legislative policymaking. The 1947 New Jersey Constitution has been considered a model of brevity, clarity and flexibility for efficient government, with relatively clear lines of responsibility for each branch. It is particularly notable for its creation of one of the strongest Governor's offices in the nation.[3]

4.2.2 Executive Branch

Article V of the State Constitution simply states that "the executive power shall be vested in a Governor." The Constitution also provides for no more than 20 executive departments whose heads are appointed by and responsible to the Governor. New Jersey has no other elected statewide public officials. The Governor's cabinet consists of the appointed heads of 19 State departments. The State is one of 11 having no lieutenant governor. The President of the Senate assumes the powers and duties of the Governor's office if a vacancy should occur. In addition to the Governor, his staff, and 19 cabinet departments, the executive branch in New Jersey also consists of a number of special purpose and continuing commissions. The members of these bodies are also appointed by the Governor in most cases.

4.2.2.1 Governor. The Governor of New Jersey is Brendan T. Byrne, Democrat, who was elected for a second four-year term in November, 1977.

Byrne received his law degree from Harvard in 1951 and had served in a variety of appointed State offices prior to becoming a candidate for Governor in 1973. Among the offices in which Byrne served were counsel to Governor Meyner, Essex County Prosecutor, President of the Board of Public Utilities Commissioners, and judge of the Superior Court. In 1973 he easily defeated Congressman Charles Sandman and in 1977 won re-election by defeating Raymond Bateman, despite having engineered the adoption of New Jersey's first State income tax. Although Byrne's popularity in the State was severely damaged by his support for the income tax, he managed to win on the strength of an accompanying tax rebate plan and his opponent's weakness as a campaigner and credible tax opponent.[4]

New Jersey's Governor under the Constitution of 1947 is one of the strongest in the Nation, with extensive powers of appointment, budget and veto.[5] According to one study, the Governor dominates the legislature regardless of the individual or party.[6] This is due to a number of factors, including: the concentration of executive authority under the 1947 Constitution; the lack of legislature specialization through committees, the high turnover of the legislative personnel; and the tradition of county blocs in the legislature. Overall, New Jersey's Governor has been rated as the seventh most powerful State Governor.[7]

Since World War II, elections for Governor have been closely contested between the parties, although Democrats have won six of the nine elections. During this time, the single largest margin of victory was Brendan Byrne's first-term victory of 66.7 percent. Generally, Democrats have fared better in gubernatorial contests than in other statewide races.

4.2.2.2 Departments. The New Jersey Constitution provides for a maximum of 20 departments in the executive branch. The creation of departments required legislative approval, and all department heads are appointed by the Governor with the advice and consent of the Senate. At the present time there are 19 departments:

- Agriculture Department.
- Banking Department.
- Civil Service Department.
- Community Affairs Department.
- Corrections Department.
- Defense Department.
- Education Department.
- Department of Energy.
- Department of Environmental Resources.
- Health Department.
- Department of Higher Education.
- Human Services Department.
- Insurance Department.
- Law and Public Safety Department.
- Labor and Industry Department.
- Public Advocate Department.
- State Department.

NEW JERSEY

ADJUTANT GENERAL
Wilfred C. Menard, Jr., Chief of Staff
Department of Defense
Eggert Crossing Rd.
P.O. Box 979
Trenton NJ 08625
(609) 292-3888

AERONAUTICS
Walter D. Kies, Director
Division of Aeronautics
Department of Transportation
Transportation Bldg.
1035 Parkway Ave.
Trenton NJ 08625
(609) 292-3020

AGING
James J. Pennestri, Director
Division on Aging
Department of Community Affairs
363 W. State St.
P.O. Box 2768
Trenton NJ 08625
(609) 292-3765

AGRICULTURE
Phillip Alampi, Secretary
Department of Agriculture
John Fitch Plz.
P.O. Box 1888
Trenton NJ 08625
(609) 292-3976

AIR POLLUTION CONTROL
Herbert Wortreich, Chief
Bureau of Air Pollution Control
Division of Environmental Quality
Department of Environmental Protection
1110 Labor and Industry Bldg.
John Fitch Plz.
C.N. 027
Trenton NJ 08625
(609) 292-5450

ALCOHOLISM
Riley W. Regan, Director
Division of Alcoholism
Alcohol, Narcotic, and Drug Abuse Unit
Department of Health
129 E. Hanover St.
Trenton NJ 08608
(609) 292-8947

ARCHIVES AND RECORDS
William C. Wright, Bureau Head
Bureau of Archives and History
Division of State Library, Archives, and History
Department of Education
185 W. State St.
Trenton NJ 08625
(609) 292-6260

ARTS AND HUMANITIES
Eileen K. Lawton, Executive Director
State Council on the Arts
Department of State
109 W. State St.
Trenton NJ 08608
(609) 292-6130

ATTORNEY GENERAL
John J. Degnan, Attorney General
Division of Law
Department of Law and Public Safety
State House Annex
Trenton NJ 08625
(609) 292-8740

AUDIT
George B. Harper, State Auditor
Division of State Auditing
Office of Legislative Services
329 W. State St.
Mail to: 232 State House
Trenton NJ 08625
(609) 292-3700

BANKING
Angelo R. Bianchi, Commissioner
Department of Banking
36 W. State St.
C.N. 040
Trenton NJ 08625
(609) 292-3420

BUDGET
Edward G. Hofgesang, Comptroller and Budget Director
Division of Budget and Accounting
Department of the Treasury
State House
P.O. Box 2447
Trenton NJ 08625
(609) 292-4882

Figure 4-2. New Jersey State Agencies, 1978.

Source: The National Directory of State Agencies.

CHILD WELFARE
Bernice L. Manshel, Director
Division of Youth and Family Services
Department of Human Services
1 S. Montgomery St.
Trenton NJ 08625
(609) 292-6920

CIVIL DEFENSE
Clinton L. Pagano, Sr., Director of Civil Defense and Superintendent
Division of State Police
Department of Law and Public Safety
P.O. Box 7068
West Trenton NJ 08625
(609) 882-2000

CLERK OF THE HOUSE
John J. Miller, Clerk of the General Assembly
General Assembly
State House
Trenton NJ 08625
(609) 292-5135

COMMERCE
Harry J. Callaghan, Director
Division of Economic Development
Department of Labor and Industry
John Fitch Plz.
P.O. Box 2766
Trenton NJ 08625
(609) 292-7757

COMMUNITY AFFAIRS
Joseph A. LeFante, Commissioner
Department of Community Affairs
363 W. State St.
Trenton NJ 08625
(609) 292-6420

COMPTROLLER
Edward G. Hofgesang, Comptroller and Budget Director
Division of Budget and Accounting
Department of the Treasury
State House
P.O. Box 2447
Trenton NJ 08625
(609) 292-4882

CONFLICT OF INTEREST
Richard B. Goldman, Director
Executive Commission on Ethical Standards
Department of Law and Public Safety
122 W. State St.
Trenton NJ 08625
(609) 292-1892

CONSUMER AFFAIRS
Adam K. Levin, Director
Division of Consumer Affairs
Department of Law and Public Safety
1100 Raymond Blvd.
Newark NJ 07102
(201) 648-4010

CORRECTIONS
William H. Fauver, Commissioner
Department of Corrections
Whittlesey Rd.
P.O. Box 7387
Trenton NJ 08628
(609) 292-9860

COURT ADMINISTRATION
Robert D. Lipscher, Director
Administrative Office of the Courts
State House Annex
C.N. 037
Trenton NJ 08625
(609) 292-4636

DATA PROCESSING
LeRoy E. Weber, Director
Division of Data Processing and Telecommunications
Department of the Treasury
28 W. State St.
Trenton NJ 08625
(609) 292-5357

DEVELOPMENTAL DISABILITIES
Maurice G. Kott, Director
Division of Mental Retardation
Department of Human Services
Capitol Place One
222 S. Warren St.
Trenton NJ 08625
(609) 292-3742

DRUG ABUSE
Richard J. Russo, Assistant Commissioner for Alcohol, Narcotic, and Drug Abuse
Department of Health
129 E. Hanover St.
Trenton NJ 08608
(609) 292-5760

ECONOMIC DEVELOPMENT
Harry J. Callaghan, Director
Division of Economic Development
Department of Labor and Industry
John Fitch Plz.
P.O. Box 2766
Trenton NJ 08625
(609) 292-7757

ECONOMIC OPPORTUNITY
Joseph Moore, Director
Division of Human Resources
Department of Community Affairs
363 W. State St.
Trenton NJ 08625
(609) 292-6212

EDUCATION (higher)
T. Edward Hollander, Chancellor
Department of Higher Education
225 W. State St.
Trenton NJ 08625
(609) 292-4310

Figure 4-2. (Continued)

NEW JERSEY

EDUCATION (primary, secondary, and vocational)
Fred G. Burke, Commissioner
Department of Education
225 W. State St.
P.O. Box 2019
Trenton NJ 08625
(609) 292-4450

ELECTIONS
George H. Bloom, Jr., Supervisor of Election Administration
Elections Section
Department of State
State House
Trenton NJ 08625
(609) 292-3760

EMPLOYMENT SECURITY
Arthur J. O'Neal, Jr., Assistant Commissioner, Income Security
Department of Labor and Industry
602 Labor and Industry Bldg.
John Fitch Plz.
Trenton NJ 08625
(609) 292-7275

ENERGY
Joel Jacobson, Commissioner
Department of Energy
101 Commerce St.
Newark NJ 07102
(201) 648-6290

ENVIRONMENTAL AFFAIRS
Jerry Fitzgerald English, Commissioner
Department of Environmental Protection
John Fitch Plz.
P.O. Box 1390
Trenton NJ 08625
(609) 292-2885

FEDERAL-STATE RELATIONS
Ann Schmitt, Federal Liaison
Office of Federal Relations
Department of Community Affairs
363 W. State St.
P.O. Box 2768
Trenton NJ 08625
(609) 292-7560

FINANCE
Clifford A. Goldman, State Treasurer
Department of the Treasury
State House, 1st Fl.
Trenton NJ 08625
(609) 292-5031

FISH AND GAME
Russell A. Cookingham, Director
Division of Fish, Game, and Wildlife
Department of Environmental Protection
363 Pennington Ave.
P.O. Box 1809
Trenton NJ 08625
(609) 292-2965

FOOD AND DRUGS
Warren Rednor, Director
Consumer Health Services
Division of Community Health Services
Department of Health
1911 Princeton Ave.
Trenton NJ 08648
(609) 292-6807

FORESTRY
Gordon T. Bamford, State Forester and Assistant Director
Forestry Services
Division of Parks and Forestry
Department of Environmental Protection
John Fitch Plz.
C.N. 028
Trenton NJ 08625
(609) 292-2520

GEOLOGY
Kemble Widmer, State Geologist
Bureau of Geology and Topography
Department of Environmental Protection
Wallach Bldg.
88 E. State St.
P.O. Box 1390
Trenton NJ 08625
(609) 292-2576

HANDICAPPED
George Chizmadia, Director
Office of Vocational Rehabilitation
Department of Labor and Industry
Labor and Industry Bldg.
John Fitch Plz.
P.O. Box 2098
Trenton NJ 08625
(609) 292-5987

HEALTH
Joanne E. Finley, Commissioner
Department of Health
Health Agriculture Bldg.
John Fitch Plz.
P.O. Box 1540
Trenton NJ 08625
(609) 292-7837

HIGHWAY SAFETY
Curtis A. Winston, Manager
Office of Highway Safety
Division of Motor Vehicles
Department of Law and Public Safety
Stuyvesant Ave.
C.N. 048
Trenton NJ 08625
(609) 292-3900

HIGHWAYS
Russell H. Mullen, Assistant Commissioner
Highways
Department of Transportation
Transportation Bldg.
1035 Parkway Ave.
Trenton NJ 08625
(609) 292-0091

Figure 4-2. (Continued)

HISTORIC PRESERVATION
Judith Winslow Blood, Chief
Office of Historic Preservation
Department of Environmental Protection
109 W. State St.
Trenton NJ 08625
(609) 292-2023

HOUSING
Philip B. Caton, Director
Division of Housing
Department of Community Affairs
363 W. State St.
Trenton NJ 08625
(609) 292-7898

HUMAN RIGHTS
Warren E. Smith, Director
Division on Civil Rights
Department of Law and Public Safety
1100 Raymond Blvd.
Newark NJ 07102
(201) 648-2700

INSURANCE
James J. Sheeran, Commissioner
Department of Insurance
201 E. State St.
Trenton NJ 08625
(609) 292-5360

JUVENILE DELINQUENCY
William H. Fauver, Commissioner
Department of Corrections
Whittlesey Rd.
P.O. Box 7387
Trenton NJ 08628
(609) 292-9860

LABOR
John J. Horn, Commissioner
Department of Labor and Industry
Labor and Industry Bldg.
John Fitch Plz.
P.O. Box V
Trenton NJ 08625
(609) 292-2323

LEGISLATIVE RESEARCH
Samuel A. Alito, Research Director
Division of Legislative Information and Research
Legislative Services Agency
128 State House
C.N. 042
Trenton NJ 08625
(609) 292-3565

LIBRARY SERVICES
Barbara F. Weaver, Assistant Commissioner of Education and State Librarian
Division of the State Library, Archives, and History
Department of Education
185 W. State St.
P.O. Box 1898
Trenton NJ 08625
(609) 292-6200

LICENSING (occupational and professional)
John E. Fredericks, Jr., Chief Administrative Officer
Division of Consumer Affairs
Department of Law and Public Safety
219 E. Hanover St.
Trenton NJ 08608
(609) 292-4676

LIQUOR CONTROL
Joseph H. Lerner, Director
Division of Alcoholic Beverage Control
Department of Law and Public Safety
N. International Plz.
U.S. Rte. 1-9
P.O. Box 2039
Newark NJ 07114
(201) 242-0768

LOTTERY
Gloria A. Decker, Executive Director
Division of the State Lottery
Department of the Treasury
Taxation Bldg.
W. State and Willow Sts.
C.N. 041
Trenton NJ 08625
(609) 292-5394

MENTAL HEALTH
Michail Rotov, Director
Division of Mental Health and Hospitals
Department of Human Services
Capitol Place One
222 S. Warren St.
P.O. Box 1237
Trenton NJ 08625
(609) 292-4242 and 4243

MOTOR VEHICLES
R. W. McMinn, Acting Director
Division of Motor Vehicles
Department of Law and Public Safety
25 S. Montgomery St.
Trenton NJ 08666
(609) 292-4570

NATURAL RESOURCES
Jerry Fitzgerald English, Commissioner
Department of Environmental Protection
John Fitch Plz.
P.O. Box 1390
Trenton NJ 08625
(609) 292-2885

NUCLEAR ENERGY
Joel Jacobson, Commissioner
Department of Energy
101 Commerce St.
Newark NJ 07102
(201) 648-6290

OCCUPATIONAL SAFETY AND HEALTH
William J. Clark, Assistant Commissioner, Labor Relations and Work Place Standards
Department of Labor and Industry
Labor and Industry Bldg.
John Fitch Plz.
Trenton NJ 08625
(609) 292-2313

Figure 4-2. (Continued)

NEW JERSEY

OMBUDSMAN
John W. Gleeson, Director
Division of Citizen Complaints and Dispute Settlement
Department of Public Advocate
428 E. State St.
P.O. Box 141
Trenton NJ 08625
(609) 292-1770
Citizen Hotline, (800) 792-8600

PARKS
Alfred T. Guido, Director
Division of Parks and Forestry
Department of Environmental Protection
John Fitch Plz.
P.O. Box 1420
Trenton NJ 08625
(609) 292-2733

PERSONNEL
Joseph M. Ryan, Acting Chief Examiner and Secretary
Department of Civil Service
Arnold Constable Bldg.
215 E. State St.
Trenton NJ 08625
(609) 292-4124

PLANNING
Richard Ginman, Director
Division of Planning
Department of Community Affairs
329 W. State St.
P.O. Box 2768
Trenton NJ 08625
(609) 292-2953

POLICE
Clinton L. Pagano, Sr., Superintendent
Division of State Police
Department of Law and Public Safety
P.O. Box 7068
West Trenton NJ 08625
(609) 882-2000

PRINTING AND PUBLISHING
Vedat Baykal, Supervisor
Publications Section
Governmental Division
Department of State
State House
Trenton NJ 08625
(609) 292-5554

PROBATION AND PAROLE
Fred B. Holley, Chief
Bureau of Parole
Division of Policy and Planning
Department of Corrections
Edge Bldg.
Whittlesey Rd.
P.O. Box 7387
Trenton NJ 08628
(609) 292-4256

PUBLIC DEFENDER
Stanley C. Van Ness, Public Advocate
Office of the Public Defender
Department of Public Advocate
520 E. State St.
Trenton NJ 08625
(609) 292-1887

PUBLIC UTILITIES
Gerald A. Calabrese, Secretary
Board of Public Utilities
Department of Energy
101 Commerce St.
Newark NJ 07102
(201) 648-2068

PUBLIC WORKS
S. Leonard DiDonato, Director
Division of Building and Construction
Department of the Treasury
Taxation Bldg.
W. State and Willow Sts.
C.N. 235
Trenton NJ 08625
(609) 292-2117

PURCHASING
Earl Josephson, Special Assistant in Charge
Division of Purchase and Property
Department of the Treasury
135 W. Hanover St.
Trenton NJ 08625
(609) 292-4886

RAILROADS
George Warrington, Acting Chief of Rail Operations
New Jersey Transit Corporation
1100 Raymond Blvd.
Newark NJ 07102
(201) 648-3360

RETIREMENT
William J. Joseph, Director
Division of Pensions
Department of the Treasury
20 W. Front St.
Trenton NJ 08625
(609) 292-3463

SECRETARY OF STATE
Donald Lan, Secretary of State
Department of State
State House
P.O. Box 1330
Trenton NJ 08625
(609) 292-3790

SECRETARY OF THE SENATE
Robert Gladden, Secretary
Senate
State House
Trenton NJ 08625
(609) 292-5377

Figure 4-2. (Continued)

SECURITIES
James M. Smith, Chief
Bureau of Securities
Division of Consumer Affairs
Department of Law and Public Safety
80 Mulberry St.
Newark NJ 07102
(201) 648-2040

SOCIAL SERVICES
Ann Klein, Commissioner
Department of Human Services
Capitol Place One
222 S. Warren St.
P.O. Box 1237
Trenton NJ 08625
(609) 292-3717

SOLID WASTE MANAGEMENT
Lee Pereira, Administrator
Solid Waste Administration
Department of Environmental Protection
32 E. Hanover St.
Trenton NJ 08625
(609) 292-9120

STATE-LOCAL RELATIONS
Barry Skokowski, Acting Director
Division of Local Government Services
Department of Community Affairs
363 W. State St.
Trenton NJ 08625
(609) 292-4806

SURPLUS PROPERTY
Patrick C. Sharpe, Director
Federal Surplus Property Program
Emergency Management Section
Division of State Police
Department of Law and Public Safety
P.O. Box 7068
West Trenton NJ 08625
(609) 292-3862

TAXATION AND REVENUE
Sidney Glaser, Director
Division of Taxation
Department of the Treasury
Taxation Bldg.
W. State and Willow Sts.
Trenton NJ 08646
(609) 292-5185

TOURISM
Steven B. Richard, Acting Director
Division of Travel and Tourism
Department of Labor and Industry
Labor and Industry Bldg.
John Fitch Plz.
P.O. Box 400
Trenton NJ 08625
(609) 292-2470

TRANSPORTATION
Louis J. Gambaccini, Commissioner
Department of Transportation
Transportation Bldg.
1035 Parkway Ave.
Trenton NJ 08625
(609) 292-3535

TREASURER
Clifford A. Goldman, State Treasurer
Department of the Treasury
State House, 1st Fl.
Trenton NJ 08625
(609) 292-5031

VETERANS' AFFAIRS
William C. Doyle, Director
Division of Veterans Programs and Special Services
Department of Human Services
143 E. State St.
Trenton NJ 08608
(609) 292-6663

VITAL RECORDS/STATISTICS
Charles A. Karkut, Registrar
Bureau of Vital Statistics
Administration Division
Department of Health
John Fitch Plz.
P.O. Box 1540
Trenton NJ 08625
(609) 292-4087

WATER POLLUTION CONTROL
Arnold Schiffman, Director
Division of Water Resources
Department of Environmental Protection
1474 Prospect St.
C.N. 029
Trenton NJ 08625
(609) 292-1637

WATER RESOURCES
Arnold Schiffman, Director
Division of Water Resources
Department of Environmental Protection
1474 Prospect St.
C.N. 029
Trenton NJ 08625
(609) 292-1637

WEIGHTS AND MEASURES
William J. Wolfe, Sr., State Superintendent
Office of Weights and Measures
Division of Consumer Affairs
Department of Law and Public Safety
187 W. Hanover St.
Trenton NJ 08625
(609) 292-4615

WELFARE
G. Thomas Riti, Director
Division of Public Welfare
Department of Human Services
3525 Quakerbridge Rd.
P.O. Box 1627
Trenton NJ 08625
(609) 890-9500

Figure 4-2. (Continued)

- Transportation Department.

- Treasury Department.[8]

In addition to these departments, there are six operational commissions, a large number of study and special purpose commissions, and 20 authorities. A listing of State agencies by area of policy responsibility is provided in Figure 4-2.

There are a number of executive bodies whose authority relates directly to nuclear energy and radioactive waste control. They are:

The Division of State and Regional Planning, within the Department of Community Affairs, is responsible for maintaining the State's comprehensive plan. The division serves in an advisory capacity by making policy recommendations, but has no authority to implement policy.

The Department of Energy is the State's newest department, having been created in 1977 in the wake of oil, gasoline, and natural gas shortages. Its major duties are to monitor the use and supply of fuel in the State and to maintain a master plan for energy use and conservation. As the successor of the Department of Public Utilities, it is responsible for all forms of energy supply, including nuclear. The department contains five major divisions: the Office of Alternative Technology; the Office of Conservation; the Office of Energy Operations; the Office of Planning and Policy Analysis; and the Office of Technical Assistance. Three advisory bodies are also attached to the department. They include: the Advisory Council on Energy Planning and Conservation, consisting of members appointed by the Governor and who serve without salary; the Cabinet Energy Committee, consisting of the Governor and various State officers and department heads; and the Board of Public Utilities, which regulates public utilities and garbage collection in the State.

The Department of Environmental Protection has the responsibilities of conserving the State's resources, including monitoring air and water

standards, and managing parks and recreation areas. It is responsible for water supply management, water quality control, flood plain and coastal zone management, park and forest management, and solid waste management. It is specifically charged with the responsibility of eliminating or reducing the hazards of garbage disposal and pollution from sewage, pesticides, noise, industrial processes, and radiation. An organizational chart for the department can be found in Appendix B.

The Bureau of Radiation Protection is the State's lead radiation control agency. Its responsibilities, which are outlined in the New Jersey Radiation Protection Act, are:

- To develop comprehensive policies for the evaluation and determination of hazards associated with the use of radiation.
- To maintain and distribute health education information pertaining to radiation protection.
- To inspect sources of radiation and maintain records concerning their operation for use in determining possible radiation hazards.
- To require, issue, renew, amend, suspend, and revoke licenses for the construction, operation, or maintenance of radiation sources.
- To encourage, participate in, and conduct studies, investigations, training, research, and demonstrations relating to the control of radiation hazards, measurement of radiation, and the health effects of radiation exposure.

The Commission on Radiation Protection is an autonomous group that oversees the activities of the Bureau of Radiation Protection. It consists of eight members: the Commissioner of Environmental Protection, the Commissioner of Health, the Commissioner of Labor and Industries, and five citizens with training in medicine, radiology, intrasonics, radiation

physics, atomic energy, biology, or engineering. Citizen members are appointed by the Governor with the advice and consent of the Senate.

The Commission's powers are defined by the New Jersey Radiation Protection Act. They include: the power to formulate, adopt, promulgate, amend, and repeal codes, rules and regulations designed to prohibit and prevent unnecessary radiation; the review of policies and programs of the Department of Environmental Protection and Bureau of Radiation Protection; and, the responsibility to provide technical advice and assistance as requested by the department.

The Advisory Council on Solid Waste Management is contained within the Department of Environmental Protection, and is responsible for studying and improving solid waste management programs and plans. The Council includes the Commissioner of Energy, the Commissioner of Community Affairs, the Secretary of Health, the Secretary of Agriculture, and seven unsalaried members appointed by the Governor.

The Hazardous Wastes Advisory Committee was established in 1979 and is responsible for reporting to the Governor concerning recommendations for administrative and legislative action concerning the development of an hazardous waste management program. It consists of 13 members appointed by the Governor.

The Department of Health is responsible for implementing programs designed to maintain and improve the health of all New Jersey citizens. It oversees all hospitals in the State and is the conduit for State and Federal financial assistance to hospitals, local health departments, and other community health agencies. There are nine boards and councils associated with the department. The most relevant of these to radioactive wastes is the Public Health Council.

The Public Health Council is given the sole power to adopt and amend regulations of the State Sanitary Code. This code has jurisdiction over all

matters affecting public health, including regulation of all local boards of health and their personnel. The Council is comprised of eight members appointed by the Governor with the advice and consent of the Senate.

The Environmental Protection Section within the Department of Law and Public Safety, provides legal support and assistance to the Bureau of Radiation Protection and all other sections of the Department of Environmental Protection.

The Department of Transportation was established in 1966 and is responsible for a balanced concern for highways and the preservation and improvement of rail and bus transportation. The department is headed by a Commissioner of Transportation, a Deputy Commissioner, an Assistant Commissioner for Highways, an Assistant Commissioner for Public Transportation, and a State Highway Engineer.

4.2.3 Legislative Branch

4.2.3.1 General Features. The New Jersey Constitution vests the legislative power in a Senate and General Assembly. The New Jersey Legislature is a bicameral body consisting of an 80 seat General Assembly and a 40 seat Senate. Members of the General Assembly are elected for two-year terms. Senate terms are on a 10-year cycle which is made up of a two-year term followed by two consecutive four-year terms. The election for the two-year term is in the odd-numbered year following the Census; the next such year will be 1981. Senators' terms are not staggered as in some States. Elections for members of the State Legislature are held in November of odd-numbered years.

The Legislature is constituted for a two-year period concurrent with the terms of members of the General Assembly. Membership in the Legislature is considered a part-time job, with relatively brief sessions and few meeting days.[9] Sometimes only the Senate is in session, in order to consider gubernatorial nominations. Special sessions may be called by

either petitions of a majority of each house or by the Governor when he deems it in the public interest to do so.

The State Constitution establishes the major responsibilities and functions of the Legislature. These include:

- The power to allocate the functions, powers and duties of all executive and administrative offices and departments.
- Appointment of the State Auditor, whose duty it is to see that State funds are spent in accordance with legislative intent.
- Investigative and subpoena powers.
- Origination of Constitutional amendments.
- The power to make appropriations for the support of State government in one general bill for the fiscal year.
- Initiation of fiscal bills or revenue bills by the General Assembly.
- The power to impeach and try judicial and executive officials.

The Legislature is expressly prohibited from passing private, special, or local laws in such categories as laws of inheritance, taxation, salaries and tenure of public officials, the management and control of public schools and the regulation of municipal and county internal affairs.

Generally, the Legislature of New Jersey has been considered relatively weak in comparison to the Governor. One study of the New Jersey Legislature describes the institution as relatively weak in areas such as capacity to perform business, membership, stability, power of leaders, and performance.[10] There is evidence to suggest, however, that the Legislature in New Jersey has been growing stronger and more assertive in recent years.[11]

4.2.3.2 Legislative Procedures. A number of requirements for the passsage of bills are provided in the State Constitution. These are:

- Bills must have three readings in each house before final passage, and a full calendar day must elapse between the second and third readings unless a three-fourths vote of the house declares the bill to be an emergency measure.

- A majority of the members must be present and approve bills, with each member's vote recorded in the Senate Journal or General Assembly Minutes.

- Each bill may concern one topic only.

- No extraneous amendments to a bill are allowed.

- General laws cannot include provisions of a private, special or local nature.

- Revenue bills must originate in the General Assembly.

Two forms of legislation may be enacted: bills and resolutions. Bills are the most common form of legislation. When approved by the Legislature and signed by the Governor, they become laws. Resolutions are formal expressions of the opinions and wishes of the Legislature, and do not require approval of the Governor.

4.2.3.3 Organization of the Senate. The membership of the Senate in the 199th legislature consists of 27 Democrats and 13 Republicans. The membership of the previously elected Senate (in 1973 for 1974-1977) was 29 Democrats, 10 Republicans, and one Independent. Senators are elected from 40 legislative districts which are required to be compact, contiguous, and nearly equal in population. Figure 4-3 shows the current legislative districts in New Jersey. Table 4-3 provides information concerning members of each district.

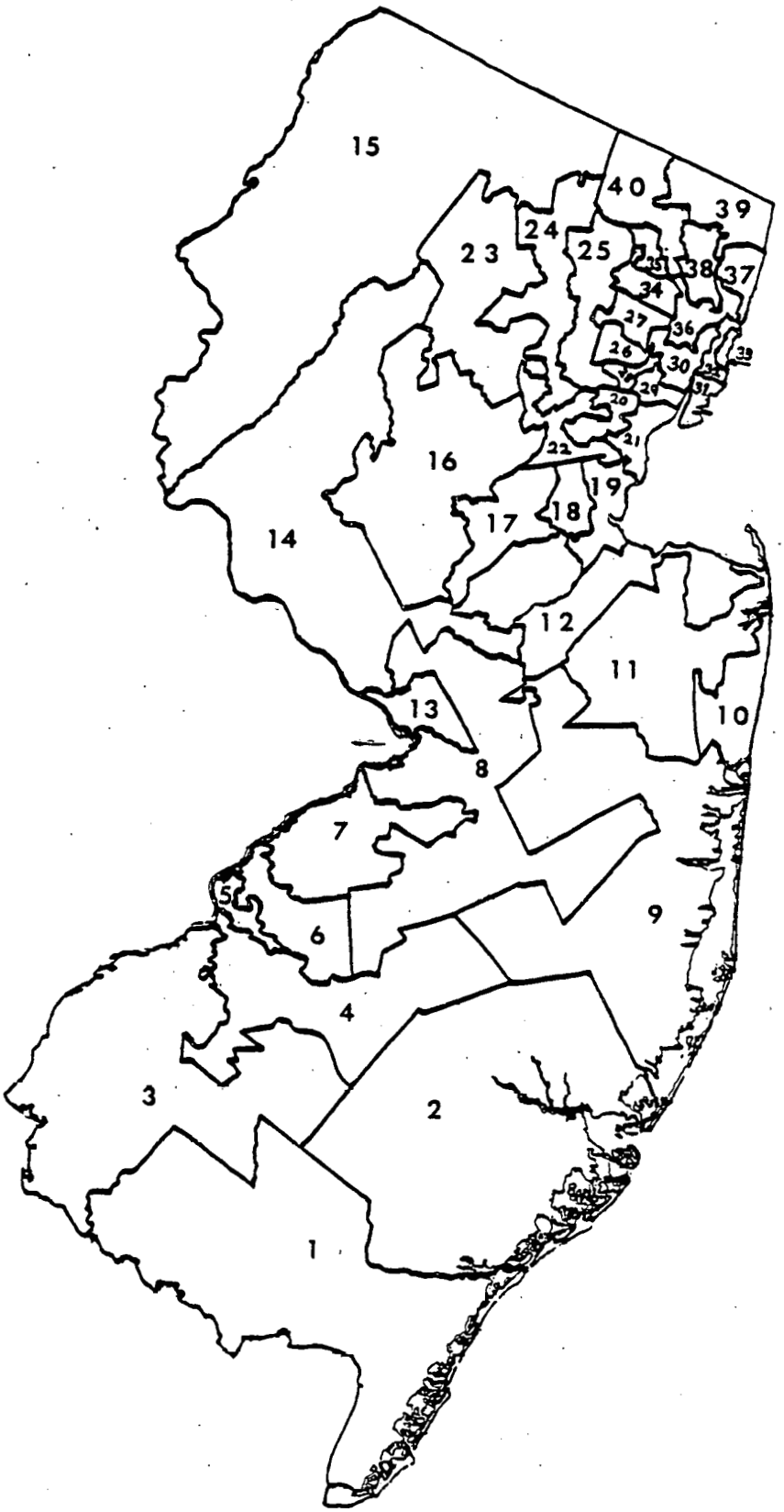

Figure 4- New Jersey Legislative Districts (1974-present).

TABLE 4-3. MEMBERS OF THE NEW JERSEY SENATE

District	Senator	Party	Hometown
1	James S. Cafiero	Republican	North Wildwood
2	Steven P. Perskie	Democrat	Margate
3	Raymond J. Zane	Democrat	Woodbury
4	Joseph A. Marsessa	Democrat	Waterford
5	Angelo J. Errichetti	Democrat	Camden
6	Lee B. Laskin	Republican	Cherry Hill
7	Charles B. Yates	Democrat	Edgewater Park
8	Barry T. Parker	Republican	Mount Holly
9	John F. Russo	Democrat	Toms River
10	Brian T. Kennedy	Republican	Sea Grit
11	S. Thomas Gagliano	Republican	Holmdel
12	Eugene J. Bedell	Democrat	Keansburg
13	Joseph P. Merlino	Democrat	Trenton
14	Walter E. Foran	Republican	Flemington
15	Wayne Dumont, Jr.	Republican	Phillipsburg
16	John H. Ewing	Republican	Peapack-Gladstone
17	William J. Hamilton, Jr.	Democrat	New Brunswick
18	Bernard J. Dwyer	Democrat	Edison
19	Lawrence S. Weiss	Democrat	Woodbridge
20	Anthony E. Russo	Democrat	Union
21	John T. Gregorio	Democrat	Linden
22	Donald T. DiFrancesco	Republican	Scotch Plains
23	John H. Dorsey	Republican	Boonton Township

TABLE 4-3. (Continued)

District	Senator	Party	Hometown
24	James P. Vreeland, Jr.	Republican	Montville
25	James H. Wallwork	Republican	Millburn
26	Frank J. Todd	Democrat	West Orange
27	Carmen A. Orechio	Democrat	Nutley
28	John P. Caufield	Democrat	Newark
29	Wynona M. Lipman	Democrat	Newark
30	Frank E. Rodgers	Democrat	Harrison
31	Walter N. Sheil	Democrat	Jersey City
32	David Friedland	Democrat	Jersey City
33	William V. Musto	Democrat	Union City
34	Joseph Hirkala	Democrat	Passaic
35	Frank X. Graves, Jr.	Democrat	Paterson
36	Anthony Scardino, Jr.	Democrat	Lyndhurst
37	Matthew Feldman	Democrat	Teaneck
38	John M. Skevin	Democrat	Oradell
39	Francis X. Herbert	Democrat	Waldwick
40	Garrett W. Hagedorn	Republican	Midland Park

The presiding officer of the Senate is the President of the Senate, who is elected by the membership. The President of the Senate in practice is also the leader of the majority party, and is nominated by the majority party caucus. In the absence of the President, the President Pro Tempore, also elected by the majority party, presides over the Senate. In addition to presiding, the President also appoints committee members and chairmen.[12] The majority party also selects a minority leader, assistant minority leader, minority whip, and assistant minority whip. The parties select their leaders in the party caucus prior to the beginning of a new Legislature. Both parties have followed a tradition of rotating the leadership in each session, from an established line of succession.[13] Partially because of this tradition, party leadership in the Legislature has been relatively weak.[14]

Presently, the officers of the Senate are:

- President: Joseph P. Merio<u>lo</u> (D-Trenton).
- President Pro Tempore: Matthew Feldman (D-Teaneck).
- Majority Leader: Bernard J. Dwyer (D-Edison).
- Assistant Majority Leaders:
  - Joseph Hirkala (D-Passaic).
  - Joseph A. Maressa (D-Berlin).
  - Carmen A. Orechio (D-Nutley).
- Minority Leader: Barry T. Parker (R-Mount Holly).
- Assistant Minority Leader: James H. Wallwork (R-Short Hills).
- Minority Whip: James P. Vreeland (R-Towaco).
- Assistant Minority Whip: John H. Ewing (R-Peapack).

There are three major types of legislative committees: standing reference committees, to which proposed legislation is referred for study; administrative or housekeeping committees; and joint committees.

Standing reference committees are most active in determining policy and analyzing specific bills. Among the standing reference committees relevant to low-level radioactive wastes are: Energy and Environment; Labor, Industry and Professions; Law, Public Safety and Defense; Revenue, Finance and Appropriations; State Government and Federal and Interstate Regulations and Veterans' Affairs; and Transportation and Communications.

4.2.3.4 Organization of the General Assembly. The membership of the General Assembly consists of 44 Democrats and 36 Republicans. In the 198th Legislature, there were 54 Democrats and 26 Republicans. Members of the General Assembly are elected from 40 legislative districts, which are the same as those from which Senators are elected. Two General Assembly members are elected from each district for two-year terms. Table 4-4 provides information about the members of each district.

The membership of the General Assembly elects by majority vote a Speaker, who is the leader of the majority party. The Speaker presides over the proceedings of the chamber and formally appoints committee members and chairmen. In the absence of the Speaker, the Speaker Pro Tempore serves as the presiding officer. The majority party also selects a majority leader, assistant majority leaders, and majority whips. The minority party selects a minority leader, assistant minority leader, deputy assistant minority leader, minority whip, assistant minority whip, and deputy assistant minority whip. As in the Senate, Assembly leadership has traditionally been rotated among an established line of succession.[15] Currently, the officers of the General Assembly are:

- Speaker: Christopher J. Jackson (D-West New York).
- Speaker Pro Tempore: Thomas A. Deverin (D-Carteret).

TABLE 4-4. MEMBERS OF THE NEW JERSEY GENERAL ASSEMBLY

District	Member	Party	Hometown
1	Joseph W. Chinnici	Republican	Bridgeton
1	James R. Hurley	Republican	Millville
2	William L. Gormley	Republican	Absecon
2	Michael J. Matthews	Democrat	Linwood
3	Martin A. Herman	Democrat	West Deptford
3	H. Donald Stewart	Democrat	Woodstown
4	Daniel J. Dalton	Democrat	Blackwood
4	Dennis M. Riley	Democrat	Blackwood
5	Walter Rand	Democrat	Camden
5	Ernest F. Schuck	Democrat	Barrington
6	John A. Rocco	Republican	Cherry Hill
6	Thomas J. Shusted	Republican	Haddonfield
7	Herman T. Costello	Democrat	Burlington
7	Barbara F. Kalik	Democrat	Willingboro
8	H. James Saxton	Republican	Bordentown
8	Clifford W. Snedeker	Republican	Lawrenceville
9	John Paul Doyle	Democrat	Brick
9	Hazel S. Gluck	Republican	Lakewood
10	William F. Dowd	Republican	Long Branch
10	Dr. Anthony M. Villane, Jr.	Republican	Long Branch
11	John O. Bennett	Republican	Little Silver
11	Marie S. Muhler	Republican	Marlboro
12	William E. Flynn	Democrat	Old Bridge
12	Richard Van Wagner	Democrat	Middletown
13	Francis J. McManimon	Democrat	Hamilton
13	Gerald R. Stockman	Democrat	Trenton
14	Barbara W. McConnell	Democrat	Flemington
14	Karl Weidel	Republican	Pennington
15	Donald J. Albanese	Republican	Phillipsburg
15	Robert E. Littell	Republican	Franklin
16	Walter J. Kavanaugh	Republican	Somerville
16	Elliot F. Smith	Republican	Belle Mead
17	Joseph D. Patero	Democrat	Manville
17	David C. Schwartz	Democrat	Highland Park
18	James W. Bornheimer	Democrat	East Brunswick
18	Dr. Thomas H. Paterniti	Democrat	Edison
19	Alan J. Karcher	Democrat	Sayreville
19	George J. Otlowski	Democrat	Perth Amboy
20	Charles L. Hardwick	Republican	Westfield
20	C. Louis Bassano	Republican	Union
21	Thomas J. Deverin	Democrat	Carteret
21	Raymond J. Lesniak	Democrat	Elizabeth
22	Robert D. Franks	Republican	Berkeley Heights
22	William J. Maguire	Republican	Clark

TABLE 4-4. (Continued)

District	Member	Party	Hometown
23	Arthur R. Albohn	Republican	Hanover
23	James J. Barry, Jr.	Republican	Morristown
24	Barbara A. Curran	Republican	Summit
24	Dean A. Gallo	Republican	Parsippany-Troy Hills
25	Jane Burgio	Republican	North Caldwell
25	Frederic Remington	Republican	North Caldwell
26	Richard J. Codey	Democrat	Orange
26	Mildred Barry Garvin	Democrat	East Orange
27	A. Joseph Fortunato	Democrat	Glen Ridge
27	Carl A. Orechio	Republican	Nutley
28	Harry A. McEnroe	Democrat	South Orange
28	James Zangari	Democrat	Irvington
29	Willie B. Brown	Democrat	Newark
29	Eugene H. Thompson	Democrat	Newark
30	Michael F. Adubato	Democrat	Newark
30	Anthony Imperiale	Republican	Newark
31	Joseph V. Doria, Jr.	Democrat	Bayonne
31	Charles Mays, Sr.	Democrat	Jersey City
32	Thomas F. Cowar, Sr.	Democrat	Jersey City
32	Robert C. Janiszewski	Democrat	Jersey City
33	Thomas A. Gallo	Democrat	Hoboken
33	Christopher J. Jackman	Democrat	West New York
34	William J. Bate	Democrat	Clifton
34	Emil Olszowy	Republican	Passaic
35	John A. Girgenti	Democrat	Hawthorne
35	Vincent O. Pellecchia	Democrat	Paterson
36	Robert P. Hollenbeck	Democrat	Carlstadt
36	Richard F. Visotcky	Democrat	Garfield
37	Byron M. Baer	Democrat	Englewood
37	Albert Burstein	Democrat	Tenafly
38	Louis F. Kosco	Republican	Paramus
38	John B. Paolella	Republican	Hackensack
39	Dr. Gerald Cardinale	Republican	Demarest
39	John W. Markert	Republican	Westwood
40	W. Cary Edwards	Republican	Oakland
40	Walter Kern, Jr., M.D.	Republican	Ridgewood

- Majority Leader: Alan J. Karcher (D-Sayerville).
- Assistant Majority Leaders:
  - Willie B. Brown (D-Newark).
  - John Paul Doyle (D-Brick Town).
  - Ernest F. Schuck (D-Barrington).
- Majority Whips:
  - Francis J. McManimon (D-Trenton).
  - Richard F. Visotcky (D-Garfield).
- Minority Leader: James R. Hurley (R-Milville).
- Assistant Minority Leader: Dean A. Gallo (R-Morris Plains).
- Deputy Assistant Minority Leader: Walter J. Kavanaugh (R-Somerville).
- Minority Whip: Marie S. Muhler (R-Freehold).
- Assistant Minority Whip: W. Cary Edwards (R-Oakland).
- Deputy Assistant Minority Whip: H. James Saxton (R-Bordentown).

As in the Senate, the committee structure in the General Assembly has been traditionally weak, but has apparently become more important in recent years.[16] The General Assembly is served by the same three types of committees -- standing reference, standing administrative, and joint -- that serve the Senate. Standing reference committees are most important, in that

bills are referred to them for study and recommendation. The majority party selects committee chairmen and determines the number of majority and minority members that will serve on each committee. There are currently 13 standing reference committees in the Assembly. Among the standing reference committees relevant to low-level radioactive wastes are: Revenue, Finance and Appropriations; Energy and Natural Resources; Agriculture and Environment; Judiciary, Law, Public Safety and Defense; State Government, Federal and Interstate Relations and Veterans Affairs; and Transportation and Communications.

4.2.3.5 Political Parties. Within both chambers of the New Jersey Legislature, the political parties have been the major agent for organizing, developing, and adopting legislative proposals. For many years, the party caucuses of the New Jersey Senate and Assembly were considered the classic examples of the strong caucus, particularly in the majority party.[17] In recent years, as committees have become more important and party leadership has become more stabilized, the caucuses have reduced their scope of activities. Generally, the caucus now limits its action to major bills designated by the party leaders as party measures.[18] The caucus is still a major determinant of legislative action in New Jersey, but it is now one of several major arenas of legislative action. This is illustrated by the increase in the number of bills defeated after open debate on the floor.[19]

4.2.4 Judicial Branch

The New Jersey Constitution provides for a unified court system consisting of the Supreme Court, the Superior Court, and county courts. It also permits the Legislature to establish, alter, or abolish lower courts created by the Legislature. These include the county district courts, the juvenile and domestic relations courts, and the municipal courts. However, as of December 7, 1978, the county courts were merged with the Superior Court, by amendment to the Constitution.

4.3 Local Government

The structure of local government in New Jersey consists of only two major divisions, counties and municipalities. There are 21 counties and 567 municipalities within the State. State legislation is the source of all local government authority; local units have no inherent or guaranteed powers. New Jersey has provided for more home rule than most States.[20] The 1947 Constitution also states that statutes conferring powers upon municipalities should be liberally construed in their favor. The State continues to exercise substantial supervision over local government through provisions for State aid and services.

The major geographical and administrative subdivisions of the State are its counties. Each of New Jersey's 21 counties are primarily agents of the State, performing those functions which the State has specifically delegated to them. The five mandatory areas of county responsibility are courts and law enforcement, welfare, education, roads, and the conduct of elections. Other areas of responsibility permitted include parks, libraries, planning, county colleges, health, and other similar services. County government structure includes an elected board of freeholders; elected county officials; independent boards and officials appointed by the State; and independent boards, agencies and officers appointed by freeholders. Recent studies of New Jersey county government have stressed its legal dependence on the State and its fragmented structure.[21] Unlike municipal government in New Jersey, counties are not the beneficiaries of the State's home rule provisions.

Municipalities in New Jersey are classified into 53 cities, 21 towns, 234 townships, 257 boroughs, and 2 villages. However, these classifications are not currently related in any way to size, population, or even the governmental structure. Cities are divided into four classes: three based on population and the fourth including seaside resort cities. The government structure of municipalities includes a large number of forms: borough council, commission, council-manager, mayor council, old city

charter act, small municipality, special charter, town, township committee and village. Local governments perform both legislative and administrative functions. The major functions performed by municipal governments are: police and fire protection; maintenance of health and sanitary standards; street cleaning, garbage collection, inspection and licensing; welfare; education; planning and zoning; streets and sidewalks; traffic and parking; and financial operations. Additional services, such as libraries, parks, recreation facilities, sewage and water utilities, and civil defense units, may be provided.[22]

New Jersey statutes also provide for three types of special units of government to provide specialized services. Special districts are independent units of government which provide a specific service and which have the power to tax, impose service charges, and incur debt. The financial obligations which they incur are not the responsibility of the rest of the municipality. Municipally operated public utilities provide a specific service, but are not independent of the municipality. An authority is a public corporation with the power to levy service charges, issue revenue bonds and operate independently of the municipality. It does not have the power to levy taxes, however.

The State of New Jersey exercises considerable supervision of the activities and operations of county and municipal governments. The Department of Community Affairs, created in 1966, provides assistance to and supervision of local governments. Its major functions pertain to local financial aid, local management and personnel training, local land use planning, and local financial regulations and technical assistance. Overall, local governments have been very active in providing direct services to their citizens. This was necessary until recently because of the lack of a stable source of revenue for State government. With the passage of a State income tax in 1976, some of the financial burdens traditionally placed on local governments may be relieved.

NOTES

1. Michael Barone, et. al., The Almanac of American Politics 1980 (New York: E.P. Dutton, 1979), p. 537.

2. The votes and summaries of bills and amendments are from the Congressional Quarterly Weekly.

3. See Helen M. Kushner, New Jersey: Spotlight on Government, 3rd edition. (New Brunswick, New Jersey: Rutgers University, 1978), pp. 44-51.

4. Barone, p. 537.

5. In a study by Joseph A. Schlesinger, "A Comparison of the Relative Positions of Governors," in The American Governor in Perspective, Thad Beyle and J. Oliver Williams, editors (New York: Harper and Row, 1972), pp. 141-150, the New Jersey Governor was rated the seventh most powerful Governor, using a combined measure of appointment, budgetary and veto powers.

6. See Alan Rosenthal, "The New Jersey Legislature: The Contemporary Shape of an Historical Institution; Not Yet Good But Better Than it Used to Be," in The Development of the New Jersey Legislature from Colonial Times to the Present, William C. Wright, editor. (Trenton: New Jersey Historical Commission, 1976), p. 104.

7. Schlesinger, pp. 141-150.

8. The National Directory of State Agencies 1978-1979 (Washington, D.C.: Information Resources Press 1978).

9. See Kushner, pp. 31-33; and Rosenthal, pp. 73-784.

10. Rosenthal, pp. 72-104.

11. Ibid.

12. However, appointments made by the presiding officer are generally agreed upon in practice by the party caucus.

13. Kushner, p. 27.

14. Rosenthal, pp. 86-90.

15. Rosenthal suggests, however, that party leadership has stabilized in recent years, so that the norm is now for leaders to hold their positions for two years.

16. Rosenthal, pp. 90-96.

17. Malcolm E. Jewell and Samuel C. Patterson, The Legislative Process in the United States, 3rd edition (New York: Random House, 1977), p. 155.

18. Ibid.

19. Kushner, p. 30.

20. Kushner, p. 26.

21. Ibid, p. 68.

22. Ibid, p. 76.

5. A REVIEW OF STATE LOW-LEVEL WASTE MANAGEMENT POLICY: PRESENT AND PROPOSED

5.1. Overview

New Jersey legislation has centralized the low-level radioactive waste management authority in the Department of Environmental Protection (DEP). Specific provisions establish the superiority of DEP over local political subdivisions.

What follows is a review of relevant New Jersey legislation, both present and proposed, which gives an indication of radioactive waste management policy in New Jersey. Some legislation not directly related to low-level waste has also been included in order to highlight the evolving nature of radiation protection policy in the State.

5.2 Existing Nuclear Waste Management Policy in New Jersey

5.2.1 Radiation Protection Act of 1958

The Radiation Protection Act of 1958 (as amended January 1972) consolidates radiation policies, programs, and regulatory powers within the New Jersey Department of Environmental Protection. Appendix B contains the entire text of the Radiation Protection Act. Highlights of the Act are summarized below.

- The Radiation Protection Act mandates appointment of a Commission on Radiation Protection consisting of three ex-officio members (the Commissioners of Environmental Protection, Health, and Labor and Industry) and five members appointed by the Governor with the advice and consent of the Senate. Present appointees are listed in Table 5-1.

TABLE 5-1. COMMISSION ON RADIATION PROTECTION

Commission Members	Date of Tenure	Residence
J. Powsner, M.D.	July 1, 1979	Princeton
S. Baron, Ph.D.	July 1, 1980	Oradell
Max M. Weiss, Ph.D., Chairman	July 1, 1981	Convent
Benjamin P. Sonnenblick, M.D.	July 1, 1982	Millburn
Fred Sterzer	July 1, 1983	Princeton
Commissioner of Labor and Industry	Ex-Officio	
Commissioner of Health	Ex-Officio	
Commissioner of Environmental Protection	Ex-Officio	
Staff Director - Eugene Fisher		

Source: Commission on Radiation Protection.

- The Commission on Radiation Protection is empowered to "formulate, adopt, promulgate, amend and repeal codes, rules and regulations as may be necessary to prohibit and prevent unnecessary radiation", subject to adequate notice and public hearings.

- The Commission on Radiation Protection is charged with three duties: 1) to review the policies and programs of DEP, as developed under

authority of the Act; 2) to make recommendations to the department; and 3) to provide technical advice and assistance to the department.

- DEP is required to staff the Commission on Radiation Protection and to administer the Radiation Protection Act and any codes, rules or regulations promulgated by the Commission. Additional duties include research, interagency cooperation, information dissemination, inspection and registration of radiation sources.

- DEP is empowered to issue, renew, amend, suspend and revoke licenses for the "construction, operation or maintenance of sources of radiation including byproduct materials, source materials and special nuclear materials in quantities not sufficient to form a critical mass." Authorization to adopt fee schedules for licensing and inspection services is provided.

- The Radiation Protection Act empowers the Governor of New Jersey to enter into an agreement with the Federal Government to assume authority "to regulate sources of radiation including byproduct materials, source materials and special nuclear materials in quantities not sufficient to form a critical mass." Furthermore, should New Jersey become an "agreement state", then regulatory authority assumed from the Federal Government will be exercised by DEP.

- DEP may enter into agreements with the Federal Government, other States or interstate agencies to perform inspections and other radiation protection functions on a cooperative basis, subject to the approval of the Governor.

- The Radiation Protection Act provides violation procedures, embargo authority, appeals procedures, and penalties to be invoked upon violation of the Act or regulations adopted by the Commission on Radiation Protection.

- As the precursor to regulations adopted by the Commission on Radiation Protection, the Act specifies that "all sources of radiation shall be shielded, transported, handled, used and kept in such manner as to prevent all users thereof and all persons within effective range thereof from being exposed to unnecessary radiation."

- DEP may invoke emergency powers in order to protect the public health, should a radiation threat exist.

- The Radiation Protection Act specifies that any ordinance, resolution or regulation concerning unnecessary radiation adopted by a New Jersey municipality, county, or local board of health is subject to approval by the Commissioner of the Department of Environmental Protection. Therefore, local restrictions may not supercede departmental regulations unless such restrictions are found by the Commissioner to be consistent with the intent of the Radiation Protection Act or regulations issued under the auspices of the Commission on Radiation Protection.

- Radiation protection, licensing and management procedures are delineated in Title 7, Chapter 28 of the New Jersey Administrative Code, pursuant to authority delegated by the Radiation Protection Act (see Appendix B).

Chapter 28, Bureau of Radiation Protection, governs all persons installing, using, handling, transporting or storing sources of radiation. Subchapters address the use of radiation sources, registration, licensing, standards, monitoring records, radioactive contamination control, notice, disposal, transportation, report procedures, therapeutic installations, medical diagnostic x-ray installations, dental radiographic installations, industrial and non-medical radiography, major nuclear facilities, exposure, analytical x-ray installations, nuclear medicine, and a radiation laboratory fee schedule.

Disposal of radioactive materials in New Jersey is permitted only under conditions specified in Section 11 of Chapter 28. Standards for discharge of radioactive material into sanitary sewage systems and into the air, ground, or surface waters are specified in Sections 7:28 -11.2 - 13. Written permission from DEP is required in order to carry out disposal by burial in the soil, by incineration, or into surface or ground waters (see Sections 78:28 - 11.3, .4, .6). Section 7:28 - 11.5 provides for disposal by transfer to a radioisotope disposal service, provided the service has been approved by DEP and that the receiver has been licensed by the department, a Federal agency, or any agreement State.

Subchapter 12. Transportation regulates the transport, intransit storage or detention pending transportation of high-level wastes only (see 7:18 -12.3).

5.3. Pending Nuclear Waste Management Policy In New Jersey

Summaries of pending legislation, carried over from the first half of the 1980-1981 session of the New Jersey State Legislature, are listed below. In addition to those bills which directly affect low-level radioactive waste management, related legislation has been included in order to provide a more comprehensive perspective on evolving State radioactive waste policies. The status of each bill, as of the termination of the first half of the 1980-1981 legislative session, is indicated. The following bills are reproduced in Appendix B.

5.3.1 Assembly Number 256

Purpose: This bill would create a New Jersey Hazardous Waste Disposal Authority. The Authority would consist of the Commissioner of Health, the Commissioner of Energy, the State Treasurer, and three persons appointed by the Governor with the consent and advice of the Senate. The Hazardous Waste Disposal Authority would be instructed to conduct a study of the most

efficient, sanitary and economical ways of collecting, storing, and disposing of hazardous wastes. After completion of this study, DEP will be responsible for the preparation of a statewide Hazardous Waste Management Plan. Radioactive wastes are included as hazardous wastes under the proposed definition (the definition does not differentiate between low- and high-level wastes).

Status: Referred to the Assembly Committee on Agriculture and Environment.

5.3.2 Assembly Number 626

Purpose: This bill would supplement the Radiation Protection Act in order to ban the transport or intransit storage of higher level radioactive and nuclear materials from New Jersey's most densely populated counties (e.g., those having an average density greater than 1,000 persons per square mile as measured in the most recent census). At the time this bill was drafted, eight New Jersey counties qualified for inclusion in the proposed ban: Bergen, Camden, Essex, Hudson, Passaic, Mercer, Middlesex, and Monmouth.

Status: Referred to the Assembly Committee on Agriculture and Environment.

Comments:* The impetus for this measure was a 1976 amendment to the New York City Code of Health, banning the transport of radioactive materials through its jurisdiction. Subsequently, the Nuclear Regulatory Commission sued the City of New York over the restriction; however, the preliminary injunction was denied. A 1978 administrative ruling by the Department of Transportation determined that Federal regulations do not preempt such local restrictions.

*A Comments section has been added where further explanation is necessary.

5.3.3 Assembly Number 966

Purpose: Known as the Radiation Accident Response Act, this bill would consolidate emergency response procedures which are currently dispersed among various State and local agencies, and private organizations and require the preparation and implementation of a State Radiation Emergency Response Plan, provide for funding assessment levied against certain electric utilities, and provide penalties for violations.

Status: Passed by the General Assembly and awaiting a Senate vote.

Comments: This bill would supplement the Radiation Protection Act. Its scope includes any accident encountered in the course of operation or maintenance of any nuclear facility or in the transit of radioactive material resulting in the release of "unnecessary radiation" (as defined by the Radiation Protection Act, 26:20-1).

The State Radiation Emergency Response Plan would be prepared by DEP and the Division of State Police in the Department of Law and Public Safety, after consultation with the Departments of Health, Energy and Transportation.

Implementation of the State Emergency Reponse Plan would result in the establishment of an emergency operations headquarters proximate to the site of each nuclear facility, affected counties, and every municipality within each county in which nuclear facilities are located. Local radiation emergency response plans are also mandated to be prepared in accordance with the State Radiation Emergency Response Plan, subject to approval of DEP and the Division of State Police.

5.3.4 Assembly Number 968

Purpose: This measure proposes to: 1) amend the Commission on Radiation Protection administrative procedures for adoption of regulations; 2) clarify DEP's duties regarding inspection of radiation sources and

imposition of the fee schedules; 3) expand the Department's ability to litigate violations of the Radiation Protection Act and Bureau of Radiation Protection standards; and 4) specify new procedures for embargoing or impounding any source of radiation.

Status: Passed by the General Assembly and awaiting a Senate vote.

5.3.5 Assembly Number 1345

Purpose: This act would prohibit the permanent disposal of radioactive waste materials in the State or in the territorial waters thereof.

Status: Passed by the General Assembly and awaiting a Senate vote.

Comments: If enacted, this ban could be overridden only through the passage of a concurrent resolution by the New Jersey State Legislature.

5.3.6 Assembly Number 1836

Purpose: This bill amends and supplements the Radiation Protection Act regarding procedures for the transportation of radioactive materials and relevant enforcement provisions.

Status: Referred to the Assembly Committee on Transportation and Communications.

5.3.7 Assembly Number 2165

Purpose: This bill supplements the Radiation Protection Act regarding the transportation of radioactive material in order to require that DEP provide advance notice of radioactive material shipments to New Jersey municipalities located along scheduled routes whenever the origin or destination of such materials is a nuclear fission power plant.

Status: Referred to the Assembly Committee on Agriculture and Environment.

5.3.8 Assembly Resolution Number 22

Purpose: This resolution would direct the General Assembly to establish a special committee to investigate and conduct public hearings on the use of New Jersey's roads and highways for the transportation of radioactive materials. Committee membership would include at least one member of the following standing committees: Transportation and Communications, Judiciary, Law, Public Safety and Defense, Energy and Natural Resources.

Initial public hearings would be concentrated in Northern New Jersey, especially the Bergen County area; however, the committee would be empowered to conduct hearings throughout the State. The purpose of the hearings would be to ascertain the need for further State and Federal legislation to control and regulate the transportation of "dangerous radioactive cargo" within New Jersey.

Status: Referred to the Assembly Committee on Transportation and Communications.

5.3.9 Assembly Joint Resolution Number 10

Purpose: This joint resolution would direct DEP to prepare, in consultation with Federal, county and local officials, "action plans for the cleanup of radioactive problem sites in Middlesex Borough and Piscataway Township."

Status: Referred to the Assembly Committee on Agriculture and Environment.

5.3.10 Senate Number 159

Purpose: This act would ban the transport into New Jersey of "any spent reactor fuel elements or mixed fission products associated with such spent fuel elements the activity of which exceeds 20 curies."

Status: Referred to the Senate Committee on Energy and Environment.

6. INTEREST GROUPS

6.1 Introduction

When considering policy options, it is advantageous for decision-makers to know the public's view of different options. As a technical issue, low-level radioactive waste disposal crosses the threshold of public awareness infrequently*, and therefore the public will probably have little understanding and no easily defined opinions on the issue. Certain interest groups, however, may consider low-level radioactive waste as a relevant policy issue due to its potential impacts upon the set of values or economic concerns which they represent.

A survey was designed to solicit information regarding the membership, contact individual, current telephone numbers, etc., for those groups which would possibly have an interest in low-level radioactive waste management. Listed below are those organizations that have both a defined constituency and a potential interest in any low-level radioactive waste activity affecting New Jersey. Unless otherwise noted, all groups have a statewide constituency.

Environmental organizations appear to be represented in larger numbers since these organizations are public interest in nature, often rely upon a voluntary staff and respond to a broad spectrum of value-oriented environmental questions. Professional organizations, on the other hand, tend to have a single legislative liaison organization. Medical organizations are an example of this; there are a number of topical professional organizations (internists, radiologists, etc.) which are primarily involved with internal information transfer. Actual legislative activity is usually left entirely to the American Medical Association affiliate, the Medical Society of New Jersey.

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*This assertion seems to be borne out by the media survey as discussed in Section 7.

6.2 Listing of Relevant Interest Groups

6.2.1 List of Environmental Groups*

Youth Environmental Society
P. O. Box 1127, New Brunswick, New Jersey 08903 (201-828-6880)
Executive Director: Maurice M. Sampson
This organization performs a clearinghouse function for students, teachers and local environmental organizations. Information and referral services are provided specifically to youth organizations. Membership approximately 100.

Center for Energy and Environmental Studies
Princeton University, Princeton, New Jersey 08544
Contact: Dr. Peter Montague
An academic research organization which has investigated nuclear related environmental issues at the national and State level.

Safe Energy Alternatives Alliance
324 Bloomfield Avenue, Montclair, New Jersey 07666 (201-744-3263)
Contact: Susan Sachs
An anti-nuclear power activist organization closely allied with New Jersey SANE.

League for Conservative Legislation
P. O. Box 605, Teaneck, New Jersey 07666 (609-393-7474)
President: Vivion Li
Advocacy regarding wide range of environmental issues. Supports New Jersey's only full time environmental lobbyist. Membership approximately 550.

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*Contact names and telephone numbers are listed where available.

New Jersey State Federation of Sportsmen's Clubs
Box 448, Freehold, New Jersey 07728
President: John J. Volb
An umbrella organization of local sportsmen's clubs affiliated with the National Wildlife Federation. The major activities of this organization involve the preservation and restoration of natural habitat and wildlife populations.

Association of New Jersey Environmental Commissions
Box 157, Mendham, New Jersey 07945 (201-539-7547)
Contact: Linda Sachs
An organization of environmental commissioners who serve in an advisory capacity to local governmental bodies. Policy orientation includes a broad range of environmental issues which are affected by local decision-makers. Membership approximately 2,000.

New Jersey Audubon Society
790 Erving Avenue, Franklin Lakes, New Jersey 07417 (201-891-1211)
Executive Director: William Baranyay, Jr.
Promotes conservation through a number of public education, information transfer and research activities. Membership approximately 4,000.

New Jersey Conservation Foundation
300 Mendhan Road, Morristown, New Jersey 07960 (201-539-7540)
President: Gordon A. Millspaugh, Jr.
Promotes conservation and land acquisition through the use of a revolving land fund. Membership approximately 2,700.

New Jersey SANE
324 Bloomfield Avenue, Montclair, New Jersey 07042 (201-744-3263)
Contact: Alan Swenson
An organization which formed in opposition to nuclear proliferation and weapons testing and has since become involved with opposition to nuclear power generation. Membership approximately 1,000.

Citizens Energy Council
P. O. Box 285, Allendale, New Jersey 07401 (201-327-3914)
Contact: Larry Bogart
Anti-nuclear power organization, publishes "Nuclear Opponents." Membership approximately 2,200

Citizen for Responsible Power Policies
P. O. Box 176, Blavenburg, New Jersey 08504 (609-924-3392)
Contact: Isabelle Sayer
Anti-nuclear power organization, operates speakers bureau.

Stop Nuclear Power
P. O. Box 3117, Margate, New Jersey 08402 (609-927-1275)
President: Esther Landau
Anti-nuclear power organization, membership approximately 800.

South Jersey Federation of Environmentalists
1942 Green Tree Road, Cherry Hill, New Jersey 08003
Contact: Dan Plotts
Regional organization active in air and water quality, land use and anti-nuclear power issues.

American Littoral Society
Highlands, New Jersey 07732
Contact: Terry Bennett
The organization deals with shoreline development and programs which affect ocean water quality.

6.2.2 Medical/Research Interest Groups

New Jersey Hospital Association
760 Alexander Road, Princeton, New Jersey 08540 (609-452-9280)
Contact: Alex Marlsovich
Trade organization representing hospitals and health care facilities. Involved with both information transfer and legislative activities. Membership of 136 institutions.

Medical Society of New Jersey
2 Princess Road, Lawrenceville, New Jersey 08648 (609-896-1766)
Ex. Director: Vincent A. Maressa
Professional organization of medical doctors involved with information transfer and legislative activities. Membership of approximately 8,500.

6.2.3 Public Interest Groups

League of Women Voters
460 Bloomfield Avenue, Montclair, New Jersey 07042 (609-394-3303)
President: Rita Cohen
An umbrella organization representing 88 local leagues and approximately 6,800 individual members throughout the State. Primary emphasis involves public education on current issues.

American Association of University Women, New Jersey Division
34 Farm Road, Trenton, New Jersey 08639
President: Mrs. Murial Gill
Takes an active interest in energy and environmental issues, membership approximately 5,000.

New Jersey Public Interest Research Group
32 West Lafayette Street, Trenton, New Jersey 08608 (609-393-7474)
Contact: Ed Lloyd
Engages in wide range of public interest and consumer oriented policy research with an active interest in nuclear power issues.

6.2.4 Labor Groups

New Jersey AFL-CIO
106 West State Street, Trenton, New Jersey 08608 (609-989-8730)
Contact: Charles Marciante
Labor union representing approximately 750,000 individual members. Represents local unions on State level issues; however, different unions will probably have different perspectives on low-level waste, in particular, the International Brotherhood of Electrical Workers and the Oil, Chemical and Atomic Workers International Union.

6.2.5 Other

New Jersey Conference of Mayors
240 West State Street, Suite 1514, Trenton, New Jersey 08608
(609-392-7600)
Ex. Director: Joseph Simonetta
Represents approximately 500 municipal memberships involved generally with urban problems facing elected officials.

New Jersey League of Municipalities
407 West State Street, Trenton, New Jersey 08618 (609-695-3481)
Ex. Director: John Trafford
Represents 551 municipalities with staff activities relevant to environmental and land-use issues.

New Jersey State Chamber of Commerce (Governmental Affairs)
240 West State Street, Suite 1520, Trenton, New Jersey 08608
(609-989-7888)
Ex. Director: Lewis Applegate
Represents approximately 3,600 member businesses with a periodic mailing list of approximately 12,000.

7. MASS MEDIA

7.1 Introduction

A review of media issue coverage provides information on the quantity and coverage of information that citizens and decision-makers are receiving. An analysis of media coverage can thus be highly instructive in determining government concerns and public views toward an issue. In order to characterize the New Jersey media coverage of the low-level radioactive waste issue, a review of articles and editorials published during 1979 and 1980 was conducted. This search was not intended to be exhaustive nor yield a representation of all radioactive issues of concern in New Jersey.

Generally, newspapers maintain more detailed records of coverage than either of the electronic media. Therefore, the primary focus of the media review was upon newspapers. New Jersey has 26 daily newspapers. To accomplish a valid characterization of New Jersey media coverage, the State was reduced to three "media centers" corresponding to the north, south and central areas of the State. The New Jersey media review is complicated by the fact that North Jersey is dominated by the New York media while South Jersey is dominated by the Philadelphia media. New Jersey is the only major State without a single network affiliated VHF television station. For this reason, both in-state media, as well as the neighboring media, have been examined. The specific newspapers are listed below with their respective "media centers":

North New Jersey
- New York Times
- Newark Star-Ledger

Central New Jersey
- Trenton Times
- Trenton Trentonian

South New Jersey
Philadelphia Inquirer
Philadelphia Bulletin
Camden Courier-Post

7.2 Media Coverage

7.2.1 Overview

The North Jersey area, being a satellite of New York City, is the most populous of the centers. The New York Times and the Newark Star-Ledger have similar circulation figures, although the Times is by far the more influentical and in fact markets extensively throughout New Jersey.

Trenton is the "media center" for central New Jersey. Though overshadowed by New York City in the north and Philadelphia to the south, Trenton as the State capital possesses influential newsprint media. The Trenton Times is the paper of record for State government activities and is influential among State decision-makers and other State media. The Trenton Times is the only paper which appears to make a conscientious attempt to cover statewide news.

The Philadelphia/Camden area is the "media center" for South New Jersey. Both the Philadelphia Inquirer and the Philadelphia Bulletin market New Jersey editions and a number of Philadelphia electronic media are required by license to serve the public interest in New Jersey. The Camden Courier-Post is the largest circulation newspaper in the South Jersey market and devotes its resources wholly to area news.

7.2.2 Volume of Coverage

The volume of coverage was highly variable and tended to reflect the financial resources of the individual papers. The New York Times and the Philadelphia Inquirer both ran stories on nuclear issues regularly prior to the Three Mile Island (TMI) accident and a larger volume thereafter. Among these were a number of articles concerning low-level radioactive waste (over a two year period the Times ran approximately 150 articles on nuclear waste, many of which dealt with low-level waste; the Inquirer ran approximately 100 articles).

The Trenton Times also ran a number of stories on low-level radioactive waste, particularly in relationship to the political debates over the banning of disposal within the State. The remainder of the media tended to use only wire stories and devoted little coverage to the issue except in situations of local impact.

7.2.3 Issues Raised

The New Jersey media generally gave a balanced account of the low-level radioactive waste issue. Differentiation between low-level and high-level radioactive wastes and hazardous wastes was generally good. In both stories and editorials, the media addressed issues of transportation, permanent disposal and the health effects of low-level radioactivity. The New York Times and the Trenton Times in particular were able to separate the low-level radioactive issue from that of nuclear power, attributing the negative impacts of disposal moratoriums on the medical profession.

In general, although the Philadelphia Inquirer displayed a singular concern with reactor safety, the Central and North Jersey coverage addressed the major waste disposal issues and their implications in an informed fashion.

7.3 Specific Media Coverage

7.3.1 North New Jersey

As noted earlier, the New York Times ran the largest number of articles on radioactive wastes. The Times tended to treat the issue from a national perspective and does not adequately represent indigenous New Jersey concerns. Editorially, the Times issued a number of statements addressing waste disposal in general and medical waste disposal in particular. The Times supports a regional approach to the low-level radioactive waste issue.

The Star-Ledger better represents local sentiments regarding low-level radioactive wastes. The Star-Ledger was most concerned with transportation and the possibility of a disposal site being located within the State. No editorial coverage of these issues occurred in the Star-Ledger and the perspective of the senior editor was represented by the statement, "Toxic-waste is the big issue, low-level is just a nuisance".

7.3.2 Central New Jersey

The Trenton Times is the dominant capital newspaper, both in terms of content and circulation, and tends to be the paper of record for State political events. While the Trentonian relies upon wire service coverage of most nuclear issues and has expressed no editorial opinion, the Trenton Times has provided perceptive and in-depth coverage of the low-level radioactive waste issue. Since New Jersey has been the perennial disposal site for various types of wastes, the Trenton Times has devoted much attention to the disposal question. Low-level radioactive wastes are accepted as another unpleasant and potentially dangerous result of modern technology which must be addressed by State and national government as well as industry. The Times was the only New Jersey paper surveyed to run an editorial

commenting on the difficulty faced by the medical community in the disposal of institutionally generated radioactive wastes. The editors do not expect, nor seek, a quick solution to the problem; however, they have accepted a journalistic responsibility to familiarize the public with the problem and thus maintain its presence on the State and Federal policy agenda.

7.3.3 South New Jersey

Although the Philadelphia Inquirer is dominant in the South Jersey market, the Bulletin aggressively markets its New Jersey edition and the two papers have similar circulation figures. The Inquirer paid much greater attention to nuclear and radiation issues and won a Pulitzer Prize for its coverage of the TMI incident. TMI was such a major issue that it tended to limit the focus of the Philadelphia media and, although the Inquirer devoted some space to low-level radioactive waste, in general the problem was highly associated with nuclear power operation and secondary to the coverage devoted to operational safety. The Courier-Post devoted little space and no apparent resources to the nuclear issue and provided no explicit coverage of any low-level waste issues.

7.4 Conclusions

The coverage of low-level radioactive waste issues in New Jersey is generally very thorough. Purely local issues are well explored by the Trenton Times while the New York Times provides adequate coverage of the national context. The Philadelphia papers were preoccupied with TMI. Most local papers did not devote resources to this issue, but interested New Jersey residents could turn to either the Trenton Times or the New York Times, both of which are marketed statewide.

Coverage, where it occurred, was usually marked by an implicit costs and benefits focus that detailed the numerous day-to-day functions of radioactive materials in the medical and industrial sectors as well as the utility industry.

8. SURVEY METHODOLOGY

A mail survey was conducted during December, 1980, of Nuclear Regulatory Commission (NRC) licensees in the State of New Jersey. The names of the license holders were obtained from a computerized listing provided by the NRC. Since the NRC listing did not contain the names of the Radiation Safety Officers (RSO), or an appropriate contact person, the State Radiation Safety Office was contacted in order to see if any registration was required of those licensed to handle radioactive materials. If such registration is required, it was believed that an appropriate contact person would be identified.

New Jersey does require the registration of radioactive material handling, and it was possible to obtain the names of the individuals in charge of radiation protection. Because some registration forms appeared to have been completed two or more years ago, the name of the contact person from recent NRC correspondence was used if such communication occurred recently. New Jersey did have copies of the NRC licenses issued within the State.

This survey was intended to classify license holders by type of licensed facility and to determine if they disposed of low-level radioactive waste by shipment to commercial disposal facilities and, if not, what other disposal methods were employed. The survey used and instruction sheet are presented in Figure 8-1. A letter of transmittal and return envelope were also provided (see Figure 8-2). The letter indicated that the State Radiation Safety Office endorsed the survey and that licensee responses were encouraged.

The survey instrument used may be primarily characterized as being "closed ended", thus forcing respondents to answer specific alternative responses. However, for those questions where there are a variety of possible responses, some of which may not be reflected in the survey question, "open ended" responses were provided. The questions used

SYNERGIC RESOURCES CORPORATION

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 Todd D. Davis or Steve Isser at:

   215-667-2160

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 use of 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 (e.g. Isotopes used in patient treatment residues decayed to background, disposed in trash, or shipped out in finished products).

THANK YOU VERY MUCH FOR YOUR CO-OPERATION

Figure 8-1

PART III - SOURCE OF RADIOACTIVE WASTE

(CHECK EACH SOURCE OF YOUR POTENTIAL RADIOACTIVE WASTE AND, IF YOU SHIP, INDICATE THE PERCENTAGE OF YOUR TOTAL SHIPPED WASTE VOLUME ORIGINATING FROM EACH SOURCE CATEGORY).

SOURCE OF RADIOACTIVITY	PERCENT OF WASTE VOLUME SHIPPED
☐ NUCLEAR REACTOR	
☐ NEUTRON GENERATOR	
☐ CYCLOTRON OR SYNCHROTRON	
☐ SEALED SOURCE	
☐ UNSEALED RADIOACTIVE MATERIAL	
☐ NATURAL ORES OR MILL TAILINGS	
☐ OTHER (SPECIFY)_____	
	100%

IF YOU DO NOT SHIP RADIOACTIVE WASTES, YOU HAVE COMPLETED THE QUESTIONNAIRE. THANK YOU. IF YOU DO SHIP, PLEASE CONTINUE WITH THE FOLLOWING QUESTIONS.

PART IV - PHYSICAL FORM OF SHIPPED WASTES

(CHECK EACH FORM OF WASTE WHICH YOU SHIP AND INDICATE THE PERCENTAGE OF YOUR TOTAL SHIPPED WASTE VOLUME REPRESENTING EACH FORM).

	PERCENT OF WASTE VOLUME SHIPPED
☐ DRY SOLIDS, TRASH, IRRADIATED COMPONENTS	
☐ SOLIDIFIED OR ABSORBED LIQUIDS, SOLID SLUDGES, SPENT RESINS, FILTER SLUDGES OR EVAPORATOR BOTTOMS	
☐ ANIMAL CARCASSES OR OTHER BIOLOGICAL WASTE	
☐ SEALED SOURCES	
☐ OTHER (SPECIFY)_____	
	100%

DOES WASTE CONTAIN ANY MATERIAL WHICH IS POTENTIALLY:

YES	NO	
☐	☐	COMBUSTIBLE
☐	☐	EXPLOSIVE
☐	☐	CHEMICALLY TOXIC

WHAT SHIPPING CONTAINERS DO YOU USE?

- ☐ 55 GALLON STEEL DRUMS
- ☐ 30 GALLON STEEL DRUMS
- ☐ OTHER (SPECIFY)_____

WHAT ON-SITE PROCESSING OF WASTE DO YOU EMPLOY?

- ☐ NONE
- ☐ MECHANICAL COMPACTION
- ☐ INCINERATION
- ☐ SOLIDIFICATION OR EVAPORATION OF LIQUIDS
- ☐ ABSORPTION OF LIQUIDS
- ☐ OTHER (SPECIFY)_____

Figure 8-1. (Continued)

TABULATION FORM

LICENSEE NAME _____

NAME OF FACILITY _____

STREET ADDRESS _____

CITY/STATE/ZIP _____

TELEPHONE NO. _____

PERSON SUPPLYING INFORMATION _____

TITLE _____

PART I - TYPE OF FACILITY

(CHECK THE ONE CATEGORY WHICH IS MOST APPLICABLE)

MEDICAL

- ☐ HOSPITAL
- ☐ PHARMACEUTICAL MANUFACTURER
- ☐ MEDICAL RESEARCH/EDUCATION
- ☐ OTHER (SPECIFY) _____

EDUCATIONAL

- ☐ UNIVERSITY
- ☐ HIGH SCHOOL
- ☐ OTHER (SPECIFY) _____

INDUSTRIAL

- ☐ INCORPORATES RADIOACTIVITY INTO PRODUCTS
- ☐ USES RADIOACTIVITY IN PROCESS CONTROL
- ☐ COMMERCIAL POWER REACTOR
- ☐ OTHER (SPECIFY) _____

GOVERNMENTAL (NON-MEDICAL OR EDUCATIONAL)

- ☐ FEDERAL
- ☐ MILITARY
- ☐ STATE
- ☐ LOCAL

PART II - DISPOSAL METHOD

CHECK EACH DISPOSAL METHOD WHICH YOU DO EMPLOY

- ☐ SHIP TO COMMERCIAL REPOSITORY
- ☐ RELEASE TO SEWER
- ☐ COMBINE WITH COMMON REFUSE
- ☐ VENT TO ATMOSPHERE
- ☐ BURN ON-SITE
- ☐ RETURN TO VENDOR
- ☐ DISTRIBUTE IN PRODUCT FORM
- ☐ NO WASTE GENERATED
- ☐ OTHER (SPECIFY) _____

Figure 8-1. (Continued)

PART V - WASTE QUANTITY

INDICATE TOTAL YEARLY VOLUME (IN CUBIC FEET) OF WASTE SHIPPED TO A COMMERCIAL DISPOSAL FACILITY.

	CUBIC FEET SHIPPED
ACTUAL SHIPPED IN 1978	
ACTUAL SHIPPED IN 1979	
ACTUAL SHIPPED IN 1980	

INDICATE TOTAL YEARLY VOLUME (IN CUBIC FEET) OF WASTE PROJECTED TO BE GENERATED WHICH WILL BE SHIPPED.

	CUBIC FEET GENERATED
ESTIMATED GENERATION IN 1981	
ESTIMATED GENERATION IN 1985	
ESTIMATED GENERATION IN 1990	

INDICATE THE QUANTITY OF RADIOACTIVITY (IN CURIES) SHIPPED TO A COMMERCIAL FACILITY IN THE YEARS 1978, 1979 AND 1980.

ISOTOPE	QUANTITY SHIPPED (CURIES) IN:		
	1978	1979	1980

Figure 8-1. (Continued)

SYNERGIC RESOURCES CORPORATION

December 17, 1980

Synergic Resources Corporation (SRC) is a subcontractor to EG&G Idaho, Inc., on a project for the U.S. Department of Energy to develop state briefing books on low level radioactive waste concerns. This project is being conducted with the cooperation and endorsement of New Jersey Bureau of Radiation Protection.

A major feature of these briefing books will be information on the volume, sources, physical forms, and projections of low level waste. Surveys are being conducted for all Nuclear Regulatory Commission (NRC) licensees. Since you are an NRC licensee, we would appreciate it if you would complete the attached questionnaire today.

Data obtained from these surveys will be kept confidential and will only be reported in aggregated form by type of low level waste generators (e.g., commercial power reactors, medical institutions, etc.). The information you provide will be used to obtain a profile of low-level waste generated in your state and assist in the consideration of alternative approaches in developing a low-level waste management program. We are sure that you are aware of public concerns, government interest, and the desire on the part of the private sector to properly manage low level waste in the United States.

Again, we would appreciate your completing the survey today and returning it in the enclosed self-addressed, stamped envelope. The information you provide will remain confidential. If you need additional time to provide more detailed and accurate information, please take no more than five days to complete this survey. The more detailed the information you provide, the more meaningful the results of the surveys.

Should you have any questions regarding the completion of this survey, please call SRC at 215-667-2160, and ask for Steve Isser, or myself.

Sincerely,

Todd D Davis

Todd D. Davis, Director
State/Regional Energy Studies

TDD:lc

ONE BALA-CYNWYD PLAZA, SUITE 630 • BALA-CYNWYD, PA. 19004 • 215-667-2160

Figure 8-2

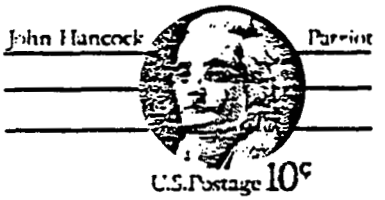
in the survey were limited to those which have a direct bearing on the characterization of low-level radioactive waste management practices in the State. Respondents were assured that the data obtained would only be reported in aggregate form.

Two weeks after surveys were mailed, an assessment was made as to the response rate and the type of licensees returning surveys. Based on contacts with the NRC regional offices in Chicago, Illinois, and King of Prussia, Pennsylvania, a listing of NRC licensees was obtained by category and priority of licensed activity. Those licensees identified in categories that are known to generate a significant volume of low-level radioactive waste were then contacted by phone in order to encourage their response. Of those licensees contacted, all agreed to return the survey. Not all returned the surveys, however.

It is believed that these categories account for over 75 percent of the low-level radioactive waste generated. For the remaining non-respondents, a follow-up letter and postcard were sent in order to notify licensees that a survey had been sent and that their response was requested (see Figure 8-3). A postcard was provided in order to determine if the licensee: received the survey and did or did not intend to respond; did not receive the survey and would respond if another was sent; or, received the survey, but only utilized sealed sources of radiation. If the licensees indicated that they only used sealed sources, no further contact was made. Postcard responses were counted as a specific type of response if this latter response was given.

Response rates in the medical category IV-G, containing 157 hospitals and other medical licenses in New Jersey, were felt to be significantly low, as many in this group were believed to be potential shippers. Thus, a selective telephone survey was made by first analyzing the American Hospital Association's 1979 Annual Guide to the Health Care Field to determine which hospitals had significant nuclear medicine or radiation therapy programs. These facilities were then contacted. Of the 24 hospitals called, only five actually turned out to be shippers of low-level radioactive waste. Data

FROM



MR. TODD D. DAVIS
SYNERGIC RESOURCES CORPORATION
1 BALA CYNWYD PLAZA, SUITE 514
BALA CYNWYD, PA 19004

PLEASE CHECK THE APPROPRIATE BOX:

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

THANK YOU

Figure 8-3.

were gathered on disposal method, the source of radioactive waste, the shipping container used, and actual shipped volumes for 1978, 1979 and 1980.

It was discovered during survey analysis that nuclear power plants had not been included in the original NRC licensee listings, since they are licensed under a different category of license. Title X of the Code of Federal Regulations was referenced for a more detailed breakdown of licensing categories. The list of licensees surveyed contained all licenses issued under Part 30 and Part 70 of the above mentioned Code, while nuclear plants are licensed under Part 50. Contact names were then obtained for the active nuclear power reactors in the State by calling the owner companies and surveys were mailed to complete the scope of the survey.

The information received from the licensees was then tabulated. The results appear in Sections 2.0 and 9.0 of this report.

TABLE 9-1. USE OF COMMERCIAL WASTE FACILITIES

PRIORITY CATEGORY	Number of Licensees	Number of Respondents	Percent of Response	Respondents Using a Commercial Facility		
				Number	Percent of all Respondents	Percent of Respondents in Priority/Facility
1. Top Priorities	19	13	62.42	11	5.94	84.62
2. Middle Priorities	242	117	48.35	36	19.46	30.77
3. All Others	228	55	24.12	5	2.70	9.09
TYPE OF FACILITY (All Priorities)						
Medical	157	76	48.41	23	12.43	30.26
Educational	32	14	43.75	4	2.16	28.57
Industrial	275	85	30.91	23	12.43	27.05
Governmental	23	9	39.13	2	1.08	22.22
Power Reactor	2	1	50.00	1	0.54	100.00
TOTAL	489	185	37.83	53	28.65	28.65

9. A PROFILE OF LOW-LEVEL RADIOACTIVE WASTE GENERATION AND DISPOSAL

In the State of New Jersey, a total of 489 potential shippers of low-level radioactive waste was identified. These potential shippers were initially contacted by mail and some received a follow-up telephone call. The respondents were identified as either a medical, educational, industrial, power reactor, or governmental type facility. Section 2.0 presents data on the number of respondents using various disposal methods and the source of radioactivity used at facilities. Table 9-1 indicates that 28.65 percent (53 facilities) of the respondents use commercial low-level waste facilities. What follows is a summary of the characteristics and quantity of waste disposed by these facilities.

9.1 Survey Response

Table 9-1 presents, by facility type, the number of potential shippers of low-level radioactive waste surveyed, the total number and percentage of responses obtained, and a breakdown of responses by type of response. If a facility provided at least the facility type and method of disposal, the answer to the survey was considered a response. If no information was obtained, the type of facility was determined by the NRC license category to which the licensee was assigned. The responses were classified into four groups by the type of response. Group One responses were responses in which all appropriate information was provided except estimated generation (see Figure 8-1). Group Two consists of partial responses that missed one or two questions but answered the type of facility and disposal method. Group Three contains responses obtained by the follow-up telephone survey and Group Four are responses obtained by postcard. Table 9-2 summarizes the type of responses received by priority categories and facility type.

TABLE 9-2. ANALYSIS OF OVER-ALL SURVEY RESPONSE

PRIORITY CATEGORY	Degree of Response															
	Non-Shippers								Shippers							
	Group I		Group II		Group III		Group IV		Group I		Group II		Group III		Group IV	
	No. of Resp.	% of Resp.	No. of Resp.	% of Resp.	No. of Resp.	% of Resp.	No. of Resp.	% of Resp.	No. of Resp.	% of Resp.	No. of Resp.	% of Resp.	No. of Resp.	% of Resp.	No. of Resp.	% of Resp.
1. Top Priorities	2	15.38	0	0.00	0	0.00	0	0.00	9	69.23	2	15.38	0	0.00	0	0.00
2. Middle Priorities	36	30.77	10	8.55	20	17.09	14	11.97	27	23.08	5	4.27	5	4.27	0	0.00
3. All Others	45	81.82	5	9.09	0	0.00	0	0.00	3	5.45	2	3.64	0	0.00	0	0.00
TYPE OF FACILITY (All Priorities)																
Medical	22	28.95	4	5.26	19	25.00	8	10.53	16	21.05	2	2.63	5	6.58	0	0.00
Educational	5	35.71	2	14.29	1	7.14	2	14.29	3	21.43	1	7.14	0	0.00	0	0.00
Industrial	51	60.00	7	8.24	0	0.00	4	4.71	18	21.18	5	5.88	0	0.00	0	0.00
Governmental	5	55.56	2	22.22	0	0.00	0	0.00	1	11.11	1	11.11	0	0.00	0	0.00
Power Reactors	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00
TOTAL	83	44.86	15	8.11	20	10.81	14	7.57	39	21.08	9	4.86	5	2.70	0	0.00

Of the 489 potential shippers identified, 37.8 percent provided some degree of response. The range of responses by type of facility was 31 percent for industrial and 48 percent for medical. Of all respondents approximately 25 percent provided all requested information.

9.2 Sources of Shipped Wastes

9.2.1 Distribution by Type of Facilities Shipping Wastes

Table 9-3 provides data on the number and type of facilities shipping wastes. The type of facility is also broken into subgroupings.

All facilities checking both "medical research/education" and also "university" are reported in the medical category and not in the educational. It should also be noted that pharmaceutical manufacturers were classified as "industrial." The "other" category in the "medical" group includes doctors offices, clinics, out-patient centers, blood centers, and medical laboratories.

In the industrial category those who checked the "other" response specified R & D, analytical testing lab, calibration, gas chromatography, geiger counter, soils, alloys, scrap metals, gamma sterilization, diagnostic reagents, moisture density testing, industrial radiography, import, construction engineering, water treatment, etc. The governmental category was relatively unambiguous. Over 80 percent of the hospitals surveyed reported using commercial disposal facilities. Pharmaceutical manufacturers also reported significant use of such facilities (39 percent). Power reactors and military installations also reported extensive use of such facilities.

TABLE 9-3. TYPE OF FACILITIES SHIPPING LOW-LEVEL WASTE

Type of Facility	Number Of Facilities Shipping	Percent Of All Shippers	Percent Of Facilities Type
Medical			
Hospital	19	35.8	82.6
Research/Education	2	3.8	8.7
Other	2	3.8	8.7
Total	23	43.4	100.0
Educational			
University	4	7.5	100.0
High School	0	0.0	0.0
Other	0	0.0	0.0
Total	4	7.5	100.0
Industrial			
Pharm. Mfg.*	9	17.0	39.1
Product Use	2	3.8	8.7
Process Control	4	7.5	17.4
Other	8	15.1	34.8
Total	23	43.4	100.0
Power Reactor Total	1	1.9	100.0
Government			
Federal	1	1.9	50.0
Military	1	1.9	50.0
State	0	0.0	0.0
Local	0	0.0	0.0
Total	2	3.8	100.0
TOTAL	53	100.0	100.0

*Pharmaceutical Manufacturing

9.2.2 Origin of Radioactivity Resulting in Shipped Wastes

Three major categories were used to define the origin of radioactivity resulting in shipped wastes: nuclear reactor operation, purchases of sealed sources, and purchases of unsealed radioactivity. Table 9-4 presents the distribution of the number of facilities to the type of facility and origin of radioactivity. It should be noted that more than one origin may be appropriate for a given facility. Over 82 percent of the industrial licensees reporting the shipping of low-level waste obtain the radioactivity as unsealed radioactive material. Twenty-three percent of all respondents that ship radioactive waste obtain the radioactivity from sealed sources. In addition 79 percent of the respondents also obtain radioactivity from unsealed sources.

9.3 Volume of Shipped Waste

Table 9-5 provides data on the volumes of shipped wastes for the years 1978, 1979 and 1980 for each type of facility and for subgroups of each facility type. Volumes of low-level radioactive wastes shipped to commercial disposal facilities were reported by 47 of the 53 facilities reporting that they shipped wastes.

In New Jersey, a special case existed where building decontamination projects and other special uses (manufacture of catalyst, for example) that generate very large volumes of extremely low-level radioactive wastes. In order to maintain the integrity of the statistical analysis these cases were separated from the rest of the survey results. One major oil refinery ships over 55,000 cubic feet each year of catalyst fines containing 18 millicuries distributed throughout. This material is disposed of at a land-fill site approved by the New Jersey Department of Environmental Protection.

The data in the table show that in 1980, 51.5 percent of the total reported low-level radioactive waste shipped is by medical institutions. Only 15.23 percent of the 1980 volumes reported came from commercial power

TABLE 9-4. ORIGIN OF RADIOACTIVITY RESULTING IN SHIPPED WASTE

Type Of Facility	Number Of Respondents	Nuclear Reactor		Sealed Sources		Unsealed Radioactive Material	
		Number	Percent	Number	Percent	Number	Percent
Medical	23	0	0.0	5	21.7	18	78.3
Educational	4	0	0.0	1	25.0	4	100.0
Industrial	23	1	4.3	5	21.7	19	82.6
Power Reactor	1	1	100.0	0	0.0	0	0.0
Government	2	1	50.0	1	50.0	1	50.0
TOTAL	53	3	7.6	12	22.6	42	79.2

TABLE 9-5. VOLUME OF WASTE SHIPPED

Type of Facility	Number of Respondents	1978 Cu. Ft.	1978 Percent	1979 Cu. Ft.	1979 Percent	1980 Cu. Ft.	1980 Percent
Medical							
Hospital	18	9477.80	31.52	9608.20	20.97	9867.10	35.47
Research/Education	2	1461.20	4.86	1844.90	4.03	2253.20	8.10
Other	2	2390.00	7.95	2740.00	5.98	2203.00	7.92
Total	22	13329.00	44.33	14193.10	30.97	14323.30 405	51.49
Educational							
University	3	1450.90	4.83	1161.60	2.53	1560.50	5.61
High School	0	0.00	0.00	0.00	0.00	0.00	0.00
Other	0	0.00	0.00	0.00	0.00	0.00	0.00
Total	3	1450.90	4.83	1161.60	2.53	1560.50 44	5.61
Industrial							
Pharm. Mfg.*	7	6735.00	22.40	5838.00	12.74	7033.00	25.28
Product Use	2	120.00	0.40	113.00	0.25	150.00	0.54
Process Control	3	75.20	0.25	38.70	0.08	100.50	0.36
Other	8	329.00	1.09	149.10	0.33	411.50	1.48
Total	20	7259.20	24.14	6138.80	13.40	7695.00 218	27.66
Power Reactor Total	1	8029.50	26.70	24333.30	53.10	4237.20 667	15.23
Government							
Federal	0	0.00	0.00	0.00	0.00	0.00	0.00
Military	1	0.00	0.00	0.00	0.00	0.00	0.00
State	0	0.00	0.00	0.00	0.00	0.00	0.00
Local	0	0.00	0.00	0.00	0.00	0.00	0.00
Total	1	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	47	30068.59	100.00	45826.78	100.00	27815.99	100.00

*Pharmaceutical Manufacturing

reactors. Industry sources were ranked second in the total volumes reported showing 27.67 percent, of which 92 percent is from pharmaceutical manufacturing.

The total volume of low-level radioactive waste generated in New Jersey was 30,069 cubic feet in 1978. In 1980, the total volume of low-level radioactive waste generated was 27,816 cubic feet.

Table 9-6 shows the volumes in cubic feet of estimated future waste generation, as provided by the 35 respondents who gave these projections. Of the 53 respondents indicating actual volumes of shipped waste, 18 did not attempt to estimate their future generation at all. Moreover, based on telephone interviews, on-site visits, and comments written by respondents in the margin of the survey questionnaire, the projected volumes listed should be considered at best as only crude estimates. Therefore, any interpretation of projected waste volumes should be done cautiously. Another factor is the definition of low-level radioactive waste and NRC rulemaking regarding disposal practices. An increasing number of institutions have reported holding such waste on site until it decays to background levels, when it is disposed with common refuse. The projected volume of low-level radioactive waste in New Jersey is expected to be 60,073 cubic feet in 1981, 42,390 cubic feet in 1985 and 49,538 cubic feet in 1990.

9.4 Activity of Shipped Wastes

Table 9-7 shows the amount of activity in shipped waste for the years 1978, 1979 and 1980. The total number of respondents answering this question (N=38) is lower than the total number of shippers (N=53) because 15 respondents provided no information on activity. Of those who did respond most appeared to carefully and methodically present the data. Still, many of these numbers may be approximations. It should also be noted that, while zeros appear for many isotopes actual data were provided but the coding scheme used does not report data for the lower activity levels.

Power reactors accounted for the largest proportion of activity of shipped radioactive waste in 1978 and 1979. The data show that activity levels of waste produced by commercial power reactors are declining, while

TABLE 9-6. ESTIMATED GENERATION (CU. FT.)

Type of Facility	1981 Respondents	1981 Volume	1985 Respondents	1985 Volume	1990 Respondents	1990 Volume
Medical						
Hospital	11	1253.6	10	1133.6	9	937.6
Research/Education	2	2700.0	2	3500.0	2	4400.0
Other	2	2600.0	2	3900.0	2	5200.0
Total	15	6553.6	14	8533.6	13	10537.6
Educational						
University	3	1780.2	3	2280.2	3	2900.3
High School	0	0.0	0	0.0	0	0.0
Other	0	0.0	0	0.0	0	0.0
Total	3	1780.2	3	2280.2	3	2900.3
Industrial						
Pharm. Mfg.*	7	4317.0	6	2781.0	6	3121.0
Product Use	2	158.0	2	179.0	2	204.0
Process Control	1	7.4	2	44.8	0	0.0
Other	5	7212.2	5	8511.2	5	2684.8
Total	15	11694.6	15	11516.0	13	6009.8
Power Reactor Total	1	40000.0	1	20000.0	1	30000.0
Government						
Federal	0	0.0	0	0.0	0	0.0
Military	1	45.0	1	60.0	1	90.0
State	0	0.0	0	0.0	0	0.0
Local	0	0.0	0	0.0	0	0.0
Total	1	45.0	1	60.0	1	90.0
TOTAL	35	60073.4	34	42389.8	31	49537.7

*Pharmaceutical Manufacturing

TABLE 9-7. ACTIVITY OF SHIPPED WASTE

Type of Facility	Number Of Respondents	1978 Curies	1978 Percent	1979 Curies	1979 Percent	1980 Curies	1980 Percent
Medical							
Hospital	12	22.7975	4.08	27.8996	4.61	15.1381	3.58
Research/Education	2	4.1910	0.75	4.2633	0.70	3.7666	0.89
Other	2	0.1780	0.03	0.2145	0.04	0.2519	0.06
Total	16	27.1665	4.86	32.3774	5.35	19.1566	4.53
Education							
University	3	2.5549	0.46	1.9910	0.33	1.3523	0.32
High School	0	0.0000	0.00	0.0000	0.00	0.0000	0.00
Other	0	0.0000	0.00	0.0000	0.00	0.0000	0.00
Total	3	2.5549	0.46	1.9910	0.33	1.3523	0.32
Industrial							
Pharm. Mfg.*	7	129.1903	23.11	169.2330	27.95	193.8430	45.83
Product Use	1	0.0003	0.00	0.0003	0.00	0.0130	0.00
Process Control	3	0.0007	0.00	0.4010	0.07	1.8008	0.43
Other	7	0.2126	0.04	1.5729	0.26	6.7604	1.60
Total	18	129.4039	23.14	171.2071	28.27	202.4171	47.86
Power Reactor Total	1	399.9999	71.54	400.0000	66.05	200.0000	47.29
Government							
Federal	0	0.0000	0.00	0.0000	0.00	0.0000	0.00
Military	0	0.0000	0.00	0.0000	0.00	0.0000	0.00
State	0	0.0000	0.00	0.0000	0.00	0.0000	0.00
Local	0	0.0000	0.00	0.0000	0.00	0.0000	0.00
Total	0	0.0000	0.00	0.0000	0.00	0.0000	0.00
TOTAL	38	559.1250	100.00	605.5753	100.00	422.9260	100.00

*Pharmaceutical Manufacturing

activity levels of industrial shipped wastes have been steadily increasing. Overall, the activity levels of shipped waste in New Jersey in 1980 are below the level indicated for 1978, but a significant increase was reported in 1979. In 1980, a significant decrease in the activity levels of power reactor shipped waste was indicated.

Tables 9-8 to 9-13 present the distribution of activity by shipped radionuclide and facility type. This listing represents isotopes provided by respondents; presumably other isotopes may be in use by non-respondents.

Power reactors accounted for the largest activity levels of shipped wastes. The year-to-year activity levels of the largest shippers vary significantly.

9.5 Physical Characteristics of Shipped Wastes

Low-level radioactive waste may be processed on-site by either reducing the volume of the waste (e.g., compaction, incineration) or by removing free liquid (e.g., solidification, absorption). Table 9-14 shows the number of facilities using these methods. The most common type of on-site processing of shipped wastes is absorption, followed by compaction. Thirty-four percent of the respondents reported not using any on-site processing methods. Seven respondents indicated that they used mechanical compaction and only two respondents listed incineration as the on-site method of processing.

Table 9-15 provides data on the type of shipping container used to package waste for transport to disposal facilities. Most facilities indicated that they used either 30 gallon or 55 gallon steel drums. However, 27 percent of the facilities mentioned "Other" shipping containers which are likely to include cardboard boxes, or special containers provided by vendors.

In the survey, shipped waste was categorized as either dry, moist, biological, sealed, or other. Table 9-16 presents the number of facilities

TABLE 9-8. RADIONUCLIDES IN SHIPPED WASTE - MEDICAL

ISOTOPE	1978	1979	1980	ISOTOPE	1978	1979	1980
H 3	1.0450	0.9600	0.6481	IN 111	0.0090	0.0311	0.0030
C 14	0.1950	0.3185	0.1698	SN 119	0.0000	0.0000	0.0000
NA 22	0.0000	0.0005	0.0003	SB 125	0.0000	0.0000	0.0000
P 32	0.6700	0.5220	0.6555	TE 123	0.3800	0.7100	0.0300
P 33	0.0000	0.0000	0.0000	TE 125	0.0000	0.0000	0.0000
S 35	0.0480	0.1090	0.0960	TE 129	0.0000	0.0000	0.0000
CL 36	0.0000	0.0000	0.0000	I 123	0.0733	0.8631	0.5671
K 40	0.0000	0.0000	0.0000	I 124	0.2100	0.4800	0.5600
CA 45	0.0115	0.0413	0.0253	I 125	1.4910	1.4961	1.3830
SC 46	0.0000	0.0000	0.0100	I 131	1.0286	1.0845	1.1363
CR 51	0.1345	0.0683	0.0976	I 133	0.0000	0.0000	0.0000
MN 54	0.0000	0.0000	0.0000	XE 131	0.1114	0.0619	0.0081
FE 55	0.0000	0.0000	0.0000	CS 134	0.0000	0.0000	0.0000
FE 59	0.0060	0.0010	0.0003	CS 137	0.1000	0.0000	0.0000
CO 57	0.0713	0.0215	0.0111	BA 133	0.0000	0.0000	0.0000
CO 58	0.0000	0.0000	0.0000	BA 140	0.0000	0.0000	0.0000
CO 60	0.0010	0.0010	0.0010	LA 140	0.0000	0.0000	0.0000
NI 63	0.0000	0.0000	0.0000	CE 141	0.0200	0.0210	0.0180
CU 64	0.0000	0.0000	0.0000	PM 147	0.0000	0.0000	0.0000
ZN 65	4.2000	0.3920	0.5200	EU 152	0.0000	0.0000	0.0000
GA 67	0.9842	1.3004	1.8461	HF 181	0.0000	0.0000	0.0000
AS 73	0.0000	0.0000	0.0000	IR 192	1.0000	1.0000	1.0000
SE 75	0.0307	0.0656	0.0020	HG 203	0.0000	0.0000	0.0000
KR 81	0.0000	0.0000	0.0000	TL 201	0.0080	0.0131	0.0320
KR 85	0.0000	0.0000	0.0000	TL 204	0.0000	0.0000	0.0000
RB 81	0.0000	0.0000	0.0000	PB 210	0.0000	0.0000	0.0000
RB 83	0.0500	0.1500	0.1900	RA 226	0.0000	0.0000	0.0000
RB 86	0.0000	0.0000	0.0000	TH 232	0.0000	0.0000	0.0000
SR 85	0.0060	0.0083	0.0130	U 235	0.0000	0.0000	0.0000
SR 90	0.0000	0.0000	0.0000	U 238	0.0000	0.0000	0.0000
MO 99 M	5.9320	7.7120	3.6120	AM 241	0.0000	0.0000	0.0000
TC 99 M	7.3500	12.9452	4.5210	TH MIX	0.0000	0.0000	0.0000
RH 100	0.0000	0.0000	0.0000	U MIX	0.0000	0.0000	0.0000
RH 107	0.0000	0.0000	0.0000	PU MIX	0.0000	0.0000	0.0000
CD 109	0.0000	0.0000	0.0000	MISC.MIX	2.0000	2.0000	2.0000
				TOTAL	27.1665	32.3774	19.1566

TABLE 9-9. RADIONUCLIDES IN SHIPPED WASTE - EDUCATIONAL

ISOTOPE	1978	1979	1980	ISOTOPE	1978	1979	1980
H 3	1.3660	1.0020	0.5370	IN 111	0.0000	0.0000	0.0000
C 14	0.0900	0.0960	0.0818	SN 119	0.0000	0.0000	0.0000
NA 22	0.0000	0.0100	0.0030	SB 125	0.0000	0.0000	0.0000
P 32	0.1930	0.2170	0.2680	TE 123	0.0000	0.0000	0.0000
P 33	0.0000	0.0000	0.0000	TE 125	0.0000	0.0000	0.0000
S 35	0.7500	0.5240	0.3370	TE 129	0.0000	0.0000	0.0000
CL 36	0.0000	0.0000	0.0000	I 123	0.0000	0.0000	0.0000
K 40	0.0000	0.0000	0.0000	I 124	0.0000	0.0000	0.0000
CA 45	0.0100	0.0103	0.0106	I 125	0.1180	0.0930	0.1000
SC 46	0.0000	0.0001	0.0021	I 131	0.0000	0.0000	0.0000
CR 51	0.0003	0.0001	0.0006	I 133	0.0000	0.0000	0.0000
MN 54	0.0006	0.0000	0.0000	XE 131	0.0000	0.0000	0.0000
FE 55	0.0000	0.0007	0.0000	CS 134	0.0000	0.0000	0.0000
FE 59	0.0006	0.0016	0.0000	CS 137	0.0000	0.0010	0.0000
CO 57	0.0001	0.0000	0.0000	BA 133	0.0000	0.0000	0.0000
CO 58	0.0000	0.0000	0.0000	BA 140	0.0000	0.0000	0.0000
CO 60	0.0010	0.0000	0.0000	LA 140	0.0000	0.0000	0.0000
NI 63	0.0000	0.0000	0.0000	CE 141	0.0000	0.0000	0.0020
CU 64	0.0003	0.0260	0.0045	PM 147	0.0000	0.0000	0.0000
ZN 65	0.0042	0.0070	0.0057	EU 152	0.0000	0.0000	0.0000
GA 67	0.0000	0.0000	0.0000	HF 181	0.0000	0.0000	0.0000
AS 73	0.0000	0.0000	0.0000	IR 192	0.0000	0.0000	0.0000
SE 75	0.0000	0.0000	0.0000	HG 203	0.0000	0.0009	0.0000
KR 81	0.0000	0.0000	0.0000	TL 201	0.0000	0.0000	0.0000
KR 85	0.0000	0.0000	0.0000	TL 204	0.0000	0.0000	0.0000
RB 81	0.0000	0.0000	0.0000	PB 210	0.0000	0.0000	0.0000
RB 83	0.0000	0.0000	0.0000	RA 226	0.0000	0.0000	0.0000
RB 86	0.0000	0.0000	0.0000	TH 232	0.0000	0.0000	0.0000
SR 85	0.0000	0.0000	0.0000	U 235	0.0000	0.0000	0.0000
SR 90	0.0200	0.0000	0.0000	U 238	0.0000	0.0000	0.0000
MO 99 M	0.0000	0.0000	0.0000	AM 241	0.0000	0.0000	0.0000
TC 99 M	0.0000	0.0000	0.0000	TH MIX	0.0000	0.0000	0.0000
RH 100	0.0000	0.0005	0.0000	U MIX	0.0000	0.0000	0.0000
RH 107	0.0000	0.0005	0.0000	PU MIX	0.0000	0.0000	0.0000
CD 109	0.0008	0.0003	0.0000	MISC.MIX	0.0000	0.0000	0.0000
				TOTAL	2.5549	1.9910	1.3523

TABLE 9-10. RADIONUCLIDES IN SHIPPED WASTE - INDUSTRIAL

ISOTOPE	1978	1979	1980	ISOTOPE	1978	1979	1980
H 3	127.5804	166.7549	194.6169	IN 111	0.0000	0.0000	0.0300
C 14	1.4671	3.6411	4.9120	SN 119	0.0000	0.0000	0.0000
NA 22	0.0001	0.0002	0.0000	SB 125	0.0000	0.0000	0.0000
P 32	0.0820	0.0320	0.0419	TE 123	0.0000	0.0000	0.0000
P 33	0.0000	0.0000	0.0000	TE 125	0.0000	0.0000	0.0000
S 35	0.0000	0.0500	0.1800	TE 129	0.0000	0.0000	0.0000
CL 36	0.0000	0.0000	0.0000	I 123	0.0000	0.0000	0.0000
K 40	0.0000	0.0000	0.0000	I 124	0.0000	0.0000	0.0000
CA 45	0.0020	0.0010	0.0000	I 125	0.2069	0.3112	0.3791
SC 46	0.0000	0.0000	0.0000	I 131	0.0000	0.0000	0.0070
CR 51	0.0454	0.0035	0.0426	I 133	0.0000	0.0000	0.0000
MN 54	0.0000	0.0000	0.0000	XE 131	0.0000	0.0000	0.0180
FE 55	0.0000	0.0000	0.0100	CS 134	0.0000	0.0000	0.0000
FE 59	0.0000	0.0000	0.0000	CS 137	0.0000	0.3820	2.0500
CO 57	0.0001	0.0000	0.0000	BA 133	0.0000	0.0000	0.0000
CO 58	0.0000	0.0000	0.0000	BA 140	0.0000	0.0000	0.0000
CO 60	0.0000	0.0010	0.0000	LA 140	0.0000	0.0000	0.0000
NI 63	0.0000	0.0220	0.0000	CE 141	0.0050	0.0010	0.0000
CU 64	0.0000	0.0000	0.0000	PM 147	0.0000	0.0000	0.0000
ZN 65	0.0000	0.0000	0.0000	EU 152	0.0000	0.0003	0.0000
GA 67	0.0000	0.0000	0.0120	HF 181	0.0000	0.0000	0.0000
AS 73	0.0000	0.0000	0.0002	IR 192	0.0000	0.0000	0.0000
SE 75	0.0000	0.0000	0.1070	HG 203	0.0000	0.0000	0.0000
KR 81	0.0000	0.0000	0.0000	TL 201	0.0000	0.0000	0.0100
KR 85	0.0000	0.0000	0.0000	TL 204	0.0010	0.0000	0.0000
RB 81	0.0000	0.0000	0.0000	PB 210	0.0000	0.0000	0.0000
RB 83	0.0000	0.0000	0.0000	RA 226	0.0060	0.0060	0.0006
RB 86	0.0000	0.0000	0.0000	TH 232	0.0000	0.0000	0.0000
SR 85	0.0080	0.0010	0.0000	U 235	0.0000	0.0000	0.0000
SR 90	0.0000	0.0000	0.0000	U 238	0.0000	0.0000	0.0000
MO 99 M	0.0000	0.0000	0.0000	AM 241	0.0000	0.0000	0.0000
TC 99 M	0.0000	0.0000	0.0000	TH MIX	0.0000	0.0000	0.0000
RH 100	0.0000	0.0000	0.0000	U MIX	0.0000	0.0000	0.0000
RH 107	0.0000	0.0000	0.0000	PU MIX	0.0000	0.0000	0.0000
CD 109	0.0000	0.0000	0.0000	MISC.MIX	0.0000	0.0000	0.0000
				TOTAL	129.4039	171.2071	202.4171

TABLE 9-11. RADIONUCLIDES IN SHIPPED WASTE - POWER REACTOR

ISOTOPE	1978	1979	1980	ISOTOPE	1978	1979	1980
H 3	0.0000	0.0000	0.0000	IN 111	0.0000	0.0000	0.0000
C 14	0.0000	0.0000	0.0000	SN 119	0.0000	0.0000	0.0000
NA 22	0.0000	0.0000	0.0000	SB 125	0.0000	0.0000	0.0000
P 32	0.0000	0.0000	0.0000	TE 123	0.0000	0.0000	0.0000
P 33	0.0000	0.0000	0.0000	TE 125	0.0000	0.0000	0.0000
S 35	0.0000	0.0000	0.0000	TE 129	0.0000	0.0000	0.0000
CL 36	0.0000	0.0000	0.0000	I 123	0.0000	0.0000	0.0000
K 40	0.0000	0.0000	0.0000	I 124	0.0000	0.0000	0.0000
CA 45	0.0000	0.0000	0.0000	I 125	0.0000	0.0000	0.0000
SC 46	0.0000	0.0000	0.0000	I 131	16.0000	0.0000	0.0000
CR 51	0.0000	0.0000	0.0000	I 133	15.0000	0.0000	0.0000
MN 54	19.9000	40.0000	34.0000	XE 131	0.0000	0.0000	0.0000
FE 55	0.0000	0.0000	0.0000	CS 134	0.0000	0.0000	0.0000
FE 59	0.0000	0.0000	0.0000	CS 137	0.0000	0.0000	0.0000
CO 57	0.0000	0.0000	0.0000	BA 133	0.0000	0.0000	0.0000
CO 58	223.7000	232.0000	18.0000	BA 140	0.0000	0.0000	0.0000
CO 60	70.4000	108.0000	148.0000	LA 140	0.0000	0.0000	0.0000
NI 63	0.0000	0.0000	0.0000	CE 141	0.0000	0.0000	0.0000
CU 64	0.0000	0.0000	0.0000	PM 147	0.0000	0.0000	0.0000
ZN 65	0.0000	0.0000	0.0000	EU 152	0.0000	0.0000	0.0000
GA 67	0.0000	0.0000	0.0000	HF 181	0.0000	0.0000	0.0000
AS 73	0.0000	0.0000	0.0000	IR 192	0.0000	0.0000	0.0000
SE 75	0.0000	0.0000	0.0000	HG 203	0.0000	0.0000	0.0000
KR 81	0.0000	0.0000	0.0000	TL 201	0.0000	0.0000	0.0000
KR 85	0.0000	0.0000	0.0000	TL 204	0.0000	0.0000	0.0000
RB 81	0.0000	0.0000	0.0000	PB 210	0.0000	0.0000	0.0000
RB 83	0.0000	0.0000	0.0000	RA 226	0.0000	0.0000	0.0000
RB 86	0.0000	0.0000	0.0000	TH 232	0.0000	0.0000	0.0000
SR 85	0.0000	0.0000	0.0000	U 235	0.0000	0.0000	0.0000
SR 90	0.0000	0.0000	0.0000	U 238	0.0000	0.0000	0.0000
MO 99 M	0.0000	0.0000	0.0000	AM 241	0.0000	0.0000	0.0000
TC 99 M	0.0000	0.0000	0.0000	TH MIX	0.0000	0.0000	0.0000
RH 100	0.0000	0.0000	0.0000	U MIX	0.0000	0.0000	0.0000
RH 107	0.0000	0.0000	0.0000	PU MIX	0.0000	0.0000	0.0000
CD 109	0.0000	0.0000	0.0000	MISC.MIX	55.0000	20.0000	0.0000
				TOTAL	399.9999	400.0000	200.0000

TABLE 9-12. RADIONUCLIDES IN SHIPPED WASTE - GOVERNMENTAL

ISOTOPE	1978	1979	1980	ISOTOPE	1978	1979	1980
H 3	0.0000	0.0000	0.0000	IN 111	0.0000	0.0000	0.0000
C 14	0.0000	0.0000	0.0000	SN 119	0.0000	0.0000	0.0000
NA 22	0.0000	0.0000	0.0000	SB 125	0.0000	0.0000	0.0000
P 32	0.0000	0.0000	0.0000	TE 123	0.0000	0.0000	0.0000
P 33	0.0000	0.0000	0.0000	TE 125	0.0000	0.0000	0.0000
S 35	0.0000	0.0000	0.0000	TE 129	0.0000	0.0000	0.0000
CL 36	0.0000	0.0000	0.0000	I 123	0.0000	0.0000	0.0000
K 40	0.0000	0.0000	0.0000	I 124	0.0000	0.0000	0.0000
CA 45	0.0000	0.0000	0.0000	I 125	0.0000	0.0000	0.0000
SC 46	0.0000	0.0000	0.0000	I 131	0.0000	0.0000	0.0000
CR 51	0.0000	0.0000	0.0000	I 133	0.0000	0.0000	0.0000
MN 54	0.0000	0.0000	0.0000	XE 131	0.0000	0.0000	0.0000
FE 55	0.0000	0.0000	0.0000	CS 134	0.0000	0.0000	0.0000
FE 59	0.0000	0.0000	0.0000	CS 137	0.0000	0.0000	0.0000
CO 57	0.0000	0.0000	0.0000	BA 133	0.0000	0.0000	0.0000
CO 58	0.0000	0.0000	0.0000	BA 140	0.0000	0.0000	0.0000
CO 60	0.0000	0.0000	0.0000	LA 140	0.0000	0.0000	0.0000
NI 63	0.0000	0.0000	0.0000	CE 141	0.0000	0.0000	0.0000
CU 64	0.0000	0.0000	0.0000	PM 147	0.0000	0.0000	0.0000
ZN 65	0.0000	0.0000	0.0000	EU 152	0.0000	0.0000	0.0000
GA 67	0.0000	0.0000	0.0000	HF 181	0.0000	0.0000	0.0000
AS 73	0.0000	0.0000	0.0000	IR 192	0.0000	0.0000	0.0000
SE 75	0.0000	0.0000	0.0000	HG 203	0.0000	0.0000	0.0000
KR 81	0.0000	0.0000	0.0000	TL 201	0.0000	0.0000	0.0000
KR 85	0.0000	0.0000	0.0000	TL 204	0.0000	0.0000	0.0000
RB 81	0.0000	0.0000	0.0000	PB 210	0.0000	0.0000	0.0000
RB 83	0.0000	0.0000	0.0000	RA 226	0.0000	0.0000	0.0000
RB 86	0.0000	0.0000	0.0000	TH 232	0.0000	0.0000	0.0000
SR 85	0.0000	0.0000	0.0000	U 235	0.0000	0.0000	0.0000
SR 90	0.0000	0.0000	0.0000	U 238	0.0000	0.0000	0.0000
MO 99 M	0.0000	0.0000	0.0000	AM 241	0.0000	0.0000	0.0000
TC 99 M	0.0000	0.0000	0.0000	TH MIX	0.0000	0.0000	0.0000
RH 100	0.0000	0.0000	0.0000	U MIX	0.0000	0.0000	0.0000
RH 107	0.0000	0.0000	0.0000	PU MIX	0.0000	0.0000	0.0000
CD 109	0.0000	0.0000	0.0000	MISC.MIX	0.0000	0.0000	0.0000
				TOTAL	0.0000	0.0000	0.0000

TABLE 9-13. RADIONUCLIDES IN SHIPPED WASTE - TOTAL

ISOTOPE	1978	1979	1980	ISOTOPE	1978	1979	1980
H 3	129.9914	168.7169	195.8020	IN 111	0.0090	0.0311	0.0330
C 14	1.7521	4.0556	5.1636	SN 119	0.0000	0.0000	0.0000
NA 22	0.0001	0.0107	0.0033	SB 125	0.0000	0.0000	0.0000
P 32	0.9450	0.7710	0.9654	TE 123	0.3800	0.7100	0.0300
P 33	0.0000	0.0000	0.0000	TE 125	0.0000	0.0000	0.0000
S 35	0.7980	0.6830	0.6130	TE 129	0.0000	0.0000	0.0000
CL 36	0.0000	0.0000	0.0000	I 123	0.0733	0.8631	0.5671
K 40	0.0000	0.0000	0.0000	I 124	0.2100	0.4800	0.5600
CA 45	0.0235	0.0526	0.0359	I 125	1.8159	1.9003	1.8621
SC 46	0.0000	0.0001	0.0121	I 131	17.0286	1.0845	1.1433
CR 51	0.1802	0.0719	0.1408	I 133	15.0000	0.0000	0.0000
MN 54	19.9006	40.0000	34.0000	XE 131	0.1114	0.0619	0.0261
FE 55	0.0000	0.0007	0.0100	CS 134	0.0000	0.0000	0.0000
FE 59	0.0066	0.0026	0.0003	CS 137	0.1000	0.3830	2.0500
CO 57	0.0715	0.0215	0.0111	BA 133	0.0000	0.0000	0.0000
CO 58	223.7000	232.0000	18.0000	BA 140	0.0000	0.0000	0.0000
CO 60	70.4020	108.0020	148.0010	LA 140	0.0000	0.0000	0.0000
NI 63	0.0000	0.0220	0.0000	CE 141	0.0250	0.0220	0.0200
CU 64	0.0003	0.0260	0.0045	PM 147	0.0000	0.0000	0.0000
ZN 65	4.2042	0.3990	0.5257	EU 152	0.0000	0.0003	0.0000
GA 67	0.9842	1.3004	1.8581	HF 181	0.0000	0.0000	0.0000
AS 73	0.0000	0.0000	0.0002	IR 192	1.0000	1.0000	1.0000
SE 75	0.0307	0.0656	0.1090	HG 203	0.0000	0.0009	0.0000
KR 81	0.0000	0.0000	0.0000	TL 201	0.0080	0.0131	0.0420
KR 85	0.0000	0.0000	0.0000	TL 204	0.0010	0.0000	0.0000
RB 81	0.0000	0.0000	0.0000	PB 210	0.0000	0.0000	0.0000
RB 83	0.0500	0.1500	0.1900	RA 226	0.0060	0.0060	0.0006
RB 86	0.0000	0.0000	0.0000	TH 232	0.0000	0.0000	0.0000
SR 85	0.0140	0.0093	0.0130	U 235	0.0000	0.0000	0.0000
SR 90	0.0200	0.0000	0.0000	U 238	0.0000	0.0000	0.0000
MO 99 M	5.9320	7.7120	3.6120	AM 241	0.0000	0.0000	0.0000
TC 99 M	7.3500	12.9452	4.5210	TH MIX	0.0000	0.0000	0.0000
RH 100	0.0000	0.0005	0.0000	U MIX	0.0000	0.0000	0.0000
RH 107	0.0000	0.0005	0.0000	PU MIX	0.0000	0.0000	0.0000
CD 109	0.0008	0.0003	0.0000	MISC.MIX	57.0000	22.0000	2.0000
				TOTAL	559.1250	605.5753	422.9260

TABLE 9-14. ONSITE PROCESSING OF WASTE

Type of Facility	Number Of Respondents	None		Mechanical Compaction		Incineration		Solidification/ Evaporation		Absorption		Other	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Medical	17	4	23.53	3	17.65	1	5.88	0	0.00	9	52.94	2	11.76
Education	4	1	25.00	1	25.00	0	0.00	0	0.00	3	75.00	1	25.00
Industrial	21	9	42.86	2	9.52	1	4.76	4	19.05	8	38.10	1	4.76
Power Reactor	1	0	0.00	1	100.00	0	0.00	1	100.00	0	0.00	1	100.00
Government	1	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	44	15	34.09	7	15.91	2	4.55	5	11.36	20	45.45	5	11.36

TABLE 9-15. SHIPPING CONTAINER USED

Type Of Facility	Number Of Respondents	55 Gallon Drum		30 Gallon Drum		Other	
		Number	Percent	Number	Percent	Number	Percent
Medical	21	11	52.38	11	52.38	7	33.33
Education	4	2	50.00	4	100.00	1	25.00
Industrial	21	14	66.67	10	47.62	4	19.05
Power Reactor	1	0	0.00	0	0.00	1	100.00
Government	1	1	100.00	1	100.00	0	0.00
TOTAL	48	28	58.33	26	54.17	13	27.08

TABLE 9-16. PHYSICAL FORM OF SHIPPED WASTE

Type Of Facility	Number Of Respondents	Dry		Moist/Potential Free Liquid		Biological Waste		Sealed Sources		Other	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Medical	18	14	77.78	4	22.22	4	22.22	1	5.56	6	33.33
Educational	4	4	100.00	1	25.00	3	75.00	1	25.00	2	50.00
Industrial	22	18	81.82	8	36.36	7	31.82	5	22.73	5	22.73
Power Reactor	1	1	100.00	1	100.00	0	0.00	0	0.00	0	0.00
Government	1	1	100.00	1	100.00	0	0.00	1	100.00	0	0.00
TOTAL	46	38	82.61	15	32.61	14	30.43	8	17.39	13	28.26

reporting the shipping of waste in any of these categories. Eighty-three percent of the respondents shipping waste indicated that the physical form was "dry". The next most frequent reported type of shipped waste was "moist/potential free liquid" (33 percent), followed by biological waste (30 percent).

APPENDIX A

LIST OF NRC LICENSEES

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
International Flavors & Fragrances 800 Rose Lane Union Beach, NJ 07735			I		
International Hydronics Corporation P.O. Box 243 Rocky Hill, NJ 08552			I		
J. P. Stevens & Co. Inc. 141 Lanza Avenue Garfield, NJ 07026			I		
J. T. Baker Company North Broad Street Phillipsburg, NJ 08965			I		
Jersey Analytical Services Inc. 3 Maple Avenue Andover, NJ 07821			I		
John G. Reutter Associates 9th & Cooper Streets Camden, NJ 08101			I		
Johns-Manville Sales Corporation 200 North Main Street Manville, NJ 08835			I		
Johnson & Johnson Baby Products Company Grandview Road Skillman, NJ 08558			I		
Johnson Soils Engineering Laboratory 225 Grantwood Boulevard Palisades Park, NJ 07650			I		
Joint Meeting of Union of Essex County 500 South First Street Elizabeth, NJ 07202	Y	1	I	N	Sealed source.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Harwin Associates Inc. 38 Hibernia Road Rockaway, NJ 07866	Y	1	I	N	Sealed source.
Hercules Incorporated Minnisink Avenue Parlin, NJ 08859	Y	1	I	N	Sealed source.
Hess Brothers Inc. P.O. Box A Parlin, NJ 08859			I		
Hoeganaes Corporation River Road and Taylors Lane Riverton, NJ 08077	Y	1	I	N	Sealed source.
Hooker Chemical Corporation P.O. Box 456 River Road Burlington, NJ 08016			I		
Howmet Corporation P.O. Box 371 Roy Street Dover, NJ 07801	Y	1	I	N	Sealed source.
Howmet Turbine Components Corporation P.O. Box 625 Roy Street Dover, NJ 07801	Y		I		
Hydroscience Inc. 363 Old Hook Road Westwood, NJ 07675			I		
IBM Corporation P.O. Box 10 Princeton, NJ 08540			I		
Inmont Corporation 150 Wagaraw Road Hawthorne, NJ 07506			I		
Insul-Coustic Corporation Jernee Mill Road Sayreville, NJ 08872			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Keegan Technology & Testing Association 119-123 Paris Street Newark, NJ 07105	Y	1	I	2	Sealed source.
Kentile Floors Inc. Kentile Road South Plainfield, NJ 07080			I		
Kimberly-Clark Corporation Main Street Spotswood, NJ 08884			I		
Langan Engineering Associates Inc. 970 Clifton Avenue Clifton, NJ 07013			I		
Linden Roselle Sewerage Authority P.O. Box 124 Linden, NJ 07036			G		
Liquid Carbonic Corporation 603 Bergen Street Harrison, NJ 07029			I		
Lummus Company (The) 1515 Broad Street Bloomfield, NJ 07003			I		
Lummus Company (The) 755 Jersey Avenue New Brunswick, NJ 08903			I		
Mannington Mills Inc. P.O. Box 30 Salem, NJ 08079			I		
Mars Inc. High Street Hackettstown, NJ 07840			I		
Materials Engineering Testing Service State Highway 73 Kresson, NJ 08053			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Mennen Company (The) East Hanover Avenue Morristown, NJ 07960	Y	2	I	N	No waste generated.
Merrick Scale Manufacturing Company 180 Autumn Street Passaic, NJ 07055			I		
Metz Metallurgical Corporation 3900 South Clinton Avenue South Plainfield, NJ 07080			I		
Middlesex County Sewerage Authority Box 461 Sayreville, NJ 08872	Y	1	G	N	Sealed source.
Mountainside Hospital (The) Bay Street & Highland Avenue Montclair, NJ 07042			M		
National Biscuit Company 2111 Route 208 Fair Lawn, NJ 07410			I		
National Starch and Chemical Corporation 10 Finderne Avenue Bridgewater, NJ 08876			I		
Nestle Company 61 Jerseyville Avenue Freehold, NJ 07738			I		
New Jersey Department of Transportation 1035 Parkway Avenue Trenton, NJ 08625			G		
New Jersey Feed Laboratory Inc. P.O. Box 357 Trenton, NJ 08603			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
New Jersey Steel & Structural Corporation North Crossman Road, P.O. Box 11 Sayreville, NJ 08872			I		
New Jersey, State of 150 Cabinet Street Newark, NJ 07107	Y	1	G	N	Sealed source.
New Jersey, State Police Energy Management Section P.O. Box 5088, Eggerts Crossing Road Trenton, NJ 08626	Y		G		
Pandullo Quirk Associates 613 Salem Quinton Road Salem, NJ 08079			I		
Passaic Crushed Stone Company, Inc. Foot of Broad Street Pompton Lakes, NJ 07442			I		
Passaic Valley Sewerage Commissioner 600 Wilson Avenue Newark, NJ 07105	Y	1	G	N	Sealed source.
Passaic Valley Water Commission 1525 Main Avenue Clifton, NJ 07015			G		
Paterson Clinical Laboratories 205 Livingston Avenue New Brunswick, NJ 08901			I		
Perkin-Elmer Corporation 511 Boulevard Elmwood Park, NJ 07407	Y	1	I	N	Sealed source.
Permacel U.S. Highway #1 New Brunswick, NJ 08903	Y	1	I	N	Sealed source.
Permutit Company Inc. (The) 567 Ridge Road Monmouth Junction, NJ 08852	Y	1	I	N	Sealed source.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Pitman-Moore Inc. Route 579 and Postley Drive Washington Cross, NJ 08560			I		
Plainfield Iron & Metal Company P.O. Box 3133 Plainfield, NJ 07063			I		
Porter and Ripa Associates Inc. P.O. Box 6785 Bridgewater, NJ 08807			I		
Prolerized Schiabo Neu Company Foot of Linden Avenue Jersey City, NJ 07303			I		
Public Service Electric & Gas Company 200 Boyden Avenue Maplewood, NJ 07040	Y	I	G	Y	Nuclear generating unit.
PVO International Inc. 416 Division Street Boonton, NJ 07005			I		
Quality Control Laboratory 243 White Horse Pike Audubon, NJ 08106			I		
Rahway, City of 1045 Westfield Avenue Rahway, NJ 07065			G		
Raritan River Steel Company P.O. Box 309 Perth Amboy, NJ 08862			I		
Recon Systems Inc. 51 Fifth Street P.O. Box 842 Somerville, NJ 08876	Y	1	I	N	Sealed source.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Reed & Carnrick 30 Boright Avenue Kenilworth, NJ 07033			I		
Riegel Products Corporation Milford, NJ 08848	Y	1	I	N	Sealed source.
Rollins Environmental Services P.O. Box 221 Bridgeport, NJ 08104			I		
Sangamo Weston Inc. 614 Frelinghuysen Avenue Newark, NJ 07114			I		
Scher Chemicals Inc. One Styertowne Road Allwood Clifton, NJ 07012	Y	1	I	N	Sealed source.
Schiavone-Bonomo Corporation Foot of Jersey Avenue Jersey City, NJ 07302	Y	1	I	N	Sealed source.
Sharlin Radiological Associates P.A. 35 Pangborn Place Hackensack, NJ 07601			I		
Shaw Jr., Robert 240 Regents Avenue Maple Shade, NJ 08052			I		
Soils Engineering Services Inc. 1479 Route 23 Wayne, NJ 07470	Y	1	I	N	Sealed source.
St. Mary High School Stevens and Augusta Streets South Amboy, NJ 08879			E		
Stephan Chemical Company 100 West Hunter Avenue Maywood. NJ 07607	Y	NA	I		License for storage only.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Sunshine Biscuits Inc. Bordentown Avenue at Jernee Mill Sayreville, NJ 08872			I		
Tenneco Chemicals Inc. P.O. Box 365 Piscataway, NJ 08854			I		
Testwell Laboratories Inc. 218 Little Falls Road Cedar Grove, NJ 07009			I		
Toms River Chemical Corporation P.O. Box 71, Route 37 Toms River, NJ 08753			I		
Transporation, Department of National Aviation Facilities Experimental Atlantic City, NJ 08405	Y	1	G	N	Sealed source.
Tri County Asphalt Corporation Eisenhower Parkway Roseland, NJ 07068	Y	1	I	N	Sealed source.
Union Camp Corporation Princeton Parkway & Interstate 295 Lawrenceville, NJ 08648	Y	1	I	N	Sealed source.
Union Carbide Corporation River Road Bound Brook, NJ 08805			I		
Union Carbide Corporation Industrial Highway Keasbey, NJ 08832			I		
Union Steel Corporation P.O. Box 156, 2150 Stanley Terrace Union, NJ 07083			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
United States Testing Company Inc. 1415 Park Avenue Hoboken, NJ 07030	Y	1	I	N	Sealed source.
Var Lac Oid Chemical Company 666 South Front Street Elizabeth, NJ 07202			I		
Wayne, Township of 475 Valley Road Wayne, NJ 07470	Y	NA	G		
Western Electric Company P.O. Box 900 Princeton, NJ 08540			I		
Wheaton Glass Company 3rd and G Streets Millville, NJ 08332			I		
Wheaton Tubing Products 1200 N. Tenth Street Millville, NJ 08332			I		
White Chemical Corporation Foot of East 22nd Street Bayonne, NJ 07002			I		
William Paterson College of New Jersey 300 Pompton Road Wayne, NJ 07470			E		
Witco Chemical Corporation 1000 Convery Boulevard Perth Amboy, NJ 08862			I		
Xoel Corporation 290 Ferry Street Newark, NJ 07105			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Havens and Emerson Inc. 299 Market Street Saddle Brook, NJ 07662			I		
Marisol, Inc. 125 Factory Lane Middlesex, NJ 08846			I		
Medi-Physics Inc. 900 Durham Avenue South Plainfield, NJ 07080	Y	1	I	Y	Expect volumes to decrease.
Montclair State College Upper Montclair, NJ 07043	Y	1	E	N	No wastes generated.
Shimel and SOR Testing Laboratories 2A Merry Lane East Hanover, NJ 07936			I		
E. R. Squibb and Sons Inc. Georges Road New Brunswick, NJ 08903	Y		I		
Allied Chemical Corporation P.O. Box 8075 R Morristown, NJ 07906	Y		I		
Teledyne Isotopes Inc. 50 Van Buren Avenue Westwood, NJ 07675			I		
Abex Corporation - RPG Route 202 65 Valley Road Mahwah, NJ 07430			I		
Department of the Army Dover, NJ 07801			G		
Curtiss-Wright Corporation Wood-Ridge, NJ 07075			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Ebasco Services Inc. Building 100A Port Kearny South Kearny, NJ 07032	Y	1	I	N	Sealed source.
International Testing Labs. Inc. 580 N. Market Street Newark, NJ 17105			I		
Radiography Inspection Inc. 358 Berry Street P.O. Box 284 Woodbridge, NJ 07095			I		
Spectrum Laboratories Inc. 524 Pelham Avenue Piscataway, NJ 08854	Y		I		
W.R. Johnson Associates, Inc. P.O. Box 928 266 Lake Avenue Metuchen, NJ 08840			I		
Merck & Company, Inc. P.O. Box 2000 Rahway, NJ 07065	Y	1	I	Y	Expect substantial reduction in volumes.
Rutgers The State University New Brunswick, NJ 08902	Y	1	E	Y	
College of Medicine and Dentistry 100 Bergen Street Newark, NJ 07103	Y	1	E	Y	Volumes expected to increase.
Rutgers Medical School New Brunswick, NJ 08903	Y	1	E	Y	Volumes expected to increase.
Veterans Administration Medical Center Ctr. Street and Tremont Avenue East Orange, NJ 07019	Y	2	M	Y	Incomplete data.
Department of the Air Force Newark Air Force Station Newark AFS, NJ 43055			G		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Department of the Air Force McGuire AFB, NJ 08641			G		
Airco Incorporated Union Landing Road Riverton, NJ 08077			I		
Allied Chemical Corporation P.O. Box 1057 R Morristown, NJ 07950	Y	1	I	Y	Volumes expected to increase.
American Biological Control Laboratory 65 Hudson Avenue Tenafly, NJ 07670	Y	C	I	N	Sealed sources.
American Cyanamid Company P.O. Box W400 Princeton, NJ 08540	Y		I		
American Cyanamid Company P.O. Box 31 Linden, NJ 07036			I		
American Biological Research Inc. P.O. Box 5700 Princeton, NJ 08540			I		
Department of the Army DELSD-SF Fourt Monmouth, NJ 07703			G		
Department of the Army Picatinny Arsenal Dover, NJ 07801			G		
Baker Industries, Inc. 8 Ridgedale Avenue Cedar Knolls, NJ 07927			I		
Beckman Instruments, Inc. 45 Belmont Street Somerset Valley R. Somerset, NJ 08873	Y		I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Bell Telephone Laboratories, Inc. 600 Mountain Avenue Murray Hill, NJ 07974	Y	1	I	Y	
Bio/Dynamics, Inc. P.O. Box 43 Mettler's Road East Millstone, NJ 08873	Y	1	I	Y	Chemical metabolism studies volumes expected to increase.
Bionucleonics, Inc. 753 Boulevard Kenilworth, NJ 07033	T	1	I	N	Sealed source.
Bionucleonics, Inc. 40 South Avenue Fanwood, NJ 07023			I		
Blake Equipment Corporation 110 Route 4 Englewood, NJ 07631	Y	2	I	N	No wastes generated.
Bristol-Myers Company 225 Long Avenue Hillside, NJ 07207	Y	1	I	Y	
Burroughs Corporation P.O. Box 1226 Plainsfield, NJ 07061			I		
Burroughs Corporation Mount Bethel Road Mount Bethel, NJ 07061			I		
Burroughs Corporation 330 South Randolphville Road Piscataway, NJ 08854			I		
Campbell Soup Company Campbell Place Camden, NJ 08101			I		
Carter-Wallace, Inc. Half Acre Road Cranbury, NJ 08512	Y	2	I	Y	Incomplete data.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Celanese Corporation Morris Court Summit, NJ 07901	Y	1	I	N	
Chevron U.S.A. Inc. 1200 State Street Perth Amboy, NJ 08861	Y	1	I	Y	Process control.
Ciba-Geigy Pharmaceutical Company 536 Morris Avenue Summit, NJ 07901	Y	1	I	Y	Volumes expected to increase.
Department of Commerce Middle Atlantic Coastal Fisher Highlands, NJ 07732			G		
Conrac Corporation 32 Fairfield Place West Caldwell, NJ 07006			I		
Cryogenic Rare Gas Laboratories, Inc. 46 Liberty Street Metuchen, NJ 08840			I		
Diagnostic Isotopes, Inc. 225 Belleville Avenue Bloomfield, NJ 07003	Y	1	I	Y	
DRG International Inc. 217 Elmer Street Westfield, NJ 07090	Y	1	I	N	Exports radio-pharmaceuticals.
E.I. Du Pont De Nemours & Company Deepwater, NJ 08023	Y	1	I	N	Used in Process control.
Esso Research & Engineering Company Park Avenue and Linden Avenue Linden, NJ 07036			I		
Ethicon Incorporated Route 22 Somerville, NJ 08876	Y	1	I	N	Sealed sources.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Firetek Corporation 53 Thomas Road Hawthorne, NJ 07506			I		
Fisher Scientific Company 1 Reagent Lane Fair Lawn, NJ 07410			I		
Flinchbaugh Products Inc. 315 Richard Mine Road R.D. 1 Wharton, NJ 07885			I		
FMC Corporation P.O. Box 8 Princeton, NJ 08540			I		
Gollob Analytical Service Corp. 47 Industrial Road Berkeley Heights, NJ 07922			I		
Halcon Research & Development Corp. 33 Industrial Avenue Little Ferry, NJ 07643			I		
Heat Pipe Corporation of America 1224 New Market Avenue S. Plainsfield, NJ 07080			I		
Hoechst-Roussel Pharmaceuticals Inc. Rts. 202 - 206 North Somerville, NJ 08876	Y	1	I	Y	Volume expected to increase.
Hydrocarbon Research Inc. New York & Puritan Avenues Lawrenceville, NJ 08648	Y	1	I	N	Sealed source.
International Flavors & Fragrances 1515 Highway 36 Union Beach, NJ 07735	Y	1	I	N	Sealed source.
Isomedix Inc. 80 South Jefferson Road Whippany, NJ 07981	Y	2	I	N	No wastes generated.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Isomedix Incorporated 25 Eastmans Road P.O. Box 177 Parsippany, NJ 07054	Y		I		
J. T. Baker Chemical Company 600 N. Broad Street Phillipsburg, NJ 08865			I		
J. T. Baker Chemical Company 222 Red School Lane Phillipsburg, NJ 08865			I		
John E. Hand & Sons Company Beechwood Avenue & Birch Street Cherry Hill, NJ 08034	Y	1	I	Y	Incorporates materials into products.
John Potter Associates Star Route Box 47 (Rt. 515) Vernon, NJ 07462			I		
Johnson & Johnson 501 George Street New Brunswick, NJ 08903	Y	C	I	N	Sealed sources.
Kulite Tungsten Corporation 1040 Hoyt Avenue Ridgefield, NJ 07657			I		
Ledoux & Company 359 Alfred Avenue Teaneck, NJ 07666			I		
Lever Brothers Company 45 River Road Edgewater, NJ 07020	Y	1	I	Y	Research and development usage.
Jack G. Makari, MD 223 South Dean Street Englewood, NJ 07631	Y	1	M	N	Decay.
Mary Help of Christians Academy 659 Belmont Avenue North Haledon, NJ 07508	Y	1	E	N	No wastes generated.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Matheson Division, Searle Medical 932 Paterson Plank Road East Rutherford, NJ 07073			M		
Merck & Company Inc. P.O. Box 2000 Rahway, NJ 07065	Y		I		
Metpath Incorporated One Malcomb Avenue Teterboro, NJ 07608			I		
Millipore Corporation Halls Hill Road Freehold, NJ 07728	Y	1	I	Y	Expect volumes to increase.
Mobil Chemical Company P.O. Box 240 Edison, NJ 08817			I		
Mobil Oil Corporation P.O. Box 1027 Princeton, NJ 08540	Y	C	I	N	Sealed sources.
Mobil Research & Development Corporation P.O. Box 1025 Princeton, NJ 08540	Y	NA	I		Presently use no materials.
Mobile Research & Development Corporation Paulsboro, NJ 08066	Y	1	I	Y	R & D usage.
Monitor Systems Inc. Salem Industrial Park Route 2 Whitehouse, NJ 08833			I		
Monitor Systems Inc. P.O. Box 306 256 Belvidere Avenue Washington, NJ 07882			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
NL Chemicals/NL Industries, Inc. P.O. Box 700 Highstown, NJ 08520	Y	1	I	N	Sealed source.
Nuclear Medex Inc. 330 Stephen Drive Toms River, NJ 08753	Y	1	I	N	Distribute in product form.
Nuclear Research Corporation 2 Richwood Place Denville, NJ 07834	Y	1	I	Y	
Pharmacia Inc. 800 Centennial Avenue Piscataway, NJ 08854			I		
Pitman-Moore Inc. Rt. 579 and Postley Drive Washington Cros, NJ 08560			I		
Princeton Gamma-Tech. Inc. Route 518 Rocky Hill, NJ 08553	Y	1	I	N	Incorporates material into products.
Princeton Gamma-Tech. Inc. P.O. Box 641 Princeton, NJ 08540	Y	1	I	N	Incorporates material into products.
Pulsar Time Inc. 2 Pearl Court Allendale Park Allendale, NJ 07401			I		
Radio Corporation of America P.O. Box 800 Princeton, NJ 08540	Y	1	I	N	Sealed source.
RCA Corporation P.O. Box 432 Princeton, NJ 08540	Y	1	I	Y	
RCA Corporation Route 202 - Dept. 642 Somerville, NJ 08876			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
RCA Corporation Bldg. 10-8 Del. & Cooper Streets Camden, NJ 08102			I		
Research-Cottrell Inc. P.O. Box 750 Bound Brook, NJ 08805	Y	1	I	N	Sealed source.
Robert H. Wager Company, Inc. Passaic Avenue Chatham, NJ 07928	Y	NA	I		No longer use materials.
Roche Clinical Laboratories 5 Johnson Drive Raritan, NJ 08869	Y	1	I	Y	Volumes expected to increase. a) 100%
RSA Corporation U.S. Highway and Schley Street Dover, NJ 07801			I		
SANDOX Inc. Route 10 East Hanover, NJ 07936			I		
Schering Corporation 60 Orange Street Bloomfield, NJ 07003	Y	1	I	Y	Volumes expected to increase.
Sears Roebuck and Company 64 Brunswick Avenue Edison, NJ 08817			I		
Shieldalloy Corporation West Boulevard Newfield, NJ 08344	Y	1	I	N	On-site disposal.
Shulton Incorporated 697 Route 46 Clifton, NJ 07015			I		
Siemens Corporation 186 Wood Avenue S. Iselin, NJ 08830	Y	1	I	N	Distribute in product form.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Siemens Medical of America Inc. 685 Liberty Avenue Union, NJ 07083			M		
Spectro Chemical Laboratories Inc. 545 Commerce Street Franklin Lakes, NJ 07417		1	I	N	Return to vendor.
SSE Incorporated 5801 Magnolia Avenue Pennsauken, NJ 08109			I		
St. Augustine Preparatory School N. Cedar Avenue Richland, NJ 08350	Y	C	E	N	Sealed sources.
Sybron Corporation 72 Eyland Avenue Succasunna, NJ 07876			I		
Tenneco Chemicals Inc. Nixon Lane Nixon, NJ 08817	Y	C	I	N	Sealed sources.
Thomas J. Lipton, Inc. 800 Sylvan Avenue Englewood Cliffs, NJ 07632			I		
Warner Lambert Research Institute 170 Tabor Road Morris Plains, NJ 07950			I		
Warner Lambert Company 182 Tabor Road Morris Plains, NJ 07950	Y	1	I	Y	Used in process control.
Westinghouse Electric Corporation 1 Westinghouse Plaza Bloomfield, NJ 07003	Y	1	I	Y	Volumes expected to increase.
Wien Laboratories Pleasant Hill Road Flanders, NJ 07836	Y	1	I	Y	Volumes expected to increase.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Wing Corporation 215 Highland Avenue Westmont, NJ 08108			I		
Wm. B. Johnson & Associates, Inc. Research Park Montville, NJ 07045			I		
X-ray Industrial Distributors 338 Delawanna Avenue Clifton, NJ 07014	Y	1	I	N	Sealed sources.
Colgate Palmolive Research Center 909 River Road Piscataway, NJ 08854	Y		I		
Exxon Research and Engineering Company P.O. Box 51 Linden, NJ 07036			I		
Hoffmann-La Roche Inc. 340 Kingsland Street Nutley, NJ 07110			I		
Ortho Diagnostics Incorporated Route 202 Raritan, NJ 08869			I		
Ortho Pharmaceutical Corporation U.S. Highway 202 Raritan, NJ 08869	Y	1	I	Y	Expect decrease in volumes.
Alexian Brothers Hospital 655 Rast Jersey Street Elizabeth, NJ 07206	Y	1	M	N	Decay and incinerate.
Department of the Army Fort Dix, NJ 08640			G		
Atlantic City Medical Center 1925 Pacific Avenue Atlantic City, NJ 08401	Y	1 T	M	Y	Expects volume to decrease by 50% in future.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Barnert Memorial Hospital Broadway and 31st Streets Paterson, NJ 07504	Y	T	M	N	Decay.
Bayonne Hospital and Dispensary East 29th Street Bayonne, NJ 07002			M		
Bayshore Community Hospital 727 North Beers Street Holmdel, NJ 07733			M		
Becker MD., Stanley M. 530 New Brunswick Avenue Long Branch, NJ 07740			M		
Beran MD., Irving 2169 White Horse Pike Lindenwold, NJ 08021			M		
Bergen Pines County Hospital East Ridgewood Avenue Paramus, NJ 07652			M		
Beth Israel Hospital 70 Parker Avenue Passaic, NJ 07055	Y	1	M	Y	
Bodian MD., Jerome G. 245 Engle Street Englewood, NJ 07631	Y	C	M	N	Sealed sources.
Bridgeton Hospital Irving and Magnolia Avenue Bridgeton, NJ 08302	Y	1	M	N	Decay and incinerate.
Brown MD., James M. 109 South Munn Avenue East Orange, NJ 07018			M		
Bucholtz MD., Harvey K. 34 Center Street Springfield, NJ 07081	Y	C	M	N	Sealed sources.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Burlington County Memorial Hospital 175 Madison Avenue Mounty Holly, NJ 08060	Y	1	M	Y	Expects volume to decrease by 90% within 5 years.
Cherry Hill Medical Center Chapel Avenue and Cooper Landing Cherry Hill, NJ 08002	Y	1	M	N	Decay.
Chilton Memorial Hospital 97 West Parkway Pompton Plains, NJ 07444			M		
Christ Hospital 176 Palisade Avenue Jersey City, NJ 07306	Y	T	M	N	Decay.
Clara Maass Memorial Hospital 1-A Franklin Avenue Belleville, NJ 07109			M		
Columbus Hospital 495 North 13th Street Newark, NJ 07107			M		
Community Memorial Hospital Highway 37 West Toms River, NJ 08753			M		
Cooper Medical Center 1 Cooper Plaza Camden, NJ 08103	Y	1	M	Y	
Deborah Heart and Lung Center Old Trenton Road Browns Mills, NJ 08015			M		
Denville Radiological Group 282 Route 46 Denville, NJ 07834	Y	C	M	N	Sealed sources.
Doehner MD., G.A. 303 West Main Street Freehold, NJ 07728			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Dover General Hospital Jardine Street Dover, NJ 07801	Y	T	M	Y	
East Orange General Hospital 300 Central Avenue East Orange, NJ 07019			M		
Elizabeth General Hospital 925 East Jersey Street Elizabeth, NJ 07201			M		
Elmer Community Hospital W. Front Street Elmer, NJ 08318			M		
Englewood Hospital Association Englewood, NJ 07631	Y	T	M		Decay.
Foster D.O., Howard R. 109 E. Laurel Road Straford, NJ 08084			M		
Freehold Area Hospital Route 537 Freehold, NJ 07728	Y	1	M	N	Decay and incinerate.
Garden State Community Hospital Route 73 and Brick Road Marlton, NJ 08053			M		
Gewirtz MD., George Paul 349 East Northfield Avenue Livingston, NJ 07039			M		
Girolamo MD., Rita 418 Park Avenue Paterson, NJ 07504			M		
Greater Paterson General Hospital 224 Hamburg Turnpike Wayne, NJ 07470	Y	T	M	Y	

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Greenville Hospital 1825 Kennedy Boulevard Jersey City, NJ 07305			M		
Greiss MD., Kamal 198 Stevens Avenue Jersey City, NJ 07305			M		
Hackensack Hospital Hospital Place Hackensack, NJ 07601	Y	T	M	Y	
Hackettstown Community Hospital 601 Willow Grove Street Hackettstown, NJ 07840			M		
Hamilton Hospital Whitehorse-Hamilton Square Road Trenton, NJ 08690	Y	1	M	N	Sealed source.
Helene Fuld Hospital 750 Brunswick Avenue Trenton, NJ 08607			M		
Hollander MD., Bentley A. Browning Road and Route 38 Pennsauken, NJ 08109	Y	1	M	N	Decay.
Holy Name Hospital 718 Teaneck Road Teaneck, NJ 07666			M		
Hunterdon Medical Center Flemington, NJ 08822	Y	T	M	Y	
Irvington General Hospital 832 Chancellor Avenue Irvington, NJ 07111			M		
Jersey City Medical Center Baldwin Avenue Jersey City, NJ 07304			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Jersey Shore Medical Center 1945 Corlies Avenue Neptune, NJ 07753	Y	T	M	N	Decay.
Jewish Hospital & Rehabilitation Center 198 Stevens Avenue Jersey City, NJ 07305		C	M	N	Sealed sources.
John F. Kennedy Community Hospital James Street Edison, NJ 08817	Y	T	M	N	Decay.
John F. Kennedy Memorial Hospital Laurel Road Stratford, NJ 08084	Y	T	M	N	Decay.
Kessler Memorial Hospital Hammonton, NJ 08037			M		
Marsh Radiology Professional Association 1170 Karin Street Vineland, NJ 08360			M		
Medical Center at Princeton (The) 253 Witherspoon Street Princeton, NJ 08540	Y	T	M	N	Decay.
Melnick Locurcio & Silverberg Radiology 349 East Northfield Road Livingston, NJ 07039			M		
Memorial General Hospital 1000 Galloping Hill Road Union, NJ 07083			M		
Mercer Medical Center 446 Bellevue Avenue Trenton, NJ 08607	Y	T	M		Decay.
Middlesex General Hospital 180 Somerset Street New Brunswick, NJ 08901	Y	1	M	N	Decay.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Millville Hospital High Street and Harrison Avenue Millville, NJ 08332	Y	C	M	N	No longer use nuclear material.
Monmouth Medical Center 300 Second Avenue Long Branch, NJ 07740	Y	1	M	Y	
Montclair Community Hospital 120 Harrison Avenue Montclair, NJ 07042	Y	2	M	Y	Incomplete data.
Morristown Memorial Hospital 100 Madison Avenue Morristown, NJ 07960	Y	2	M	Y	
Mountainside Hospital Bay and Highland Avenues Montclair, NJ 07042	Y	T	M	N	Decay.
Mufson MD., Monroe H. 6 Hinchman Avenue Denville, NJ 07834			M		
Muhlenberg Hospital Randolph Road Plainfield, NJ 07061	Y	1	M	N	Decay.
Newark Beth Israel Medical Center 201 Lyons Avenue Newark, NJ 07112	Y	T	M	N	Decay.
Newcomb Hospital 66 South State Street Vineland, NJ 08360			M		
Newton Memorial Hospital 175 High Street Newton, NJ 07360	Y	2	M	N	Decay.
Northern Community Hospital 576 Kinderkamack Road Oradell, NJ 07649			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Our Lady of Lourdes Hospital 1600 Haddon Avenue Camden, NJ 08103	Y	1	M	Y	Ship and decay.
Overlook Hospital 193 Morris Avenue Summit, NJ 07901	Y	1	M	N	Decay.
Palazzo MD., William L. 757 Teaneck Road Teaneck, NJ 07666	Y	1	M	N	Decay.
Palisades General Hospital 7600 River Road North Bergen, NJ 07047			M		
Pascack Valley Hospital Old Hook Road Westwood, NJ 07675			M		
Passaic General Hospital 350 Boulevard Passaic, NJ 07055			M		
Paul Kimball Hospital 600 River Avenue Lakewood, NJ 08701	Y	1	M	Y	
Perth Amboy General Hospital 530 New Brunswick Avenue Perth Amboy, NJ 08861	Y	2	M	N	Decay.
Point Pleasant Hospital Point Pleasant, NJ 07042			M		
Radiological Diagnostic Center 77 N. Dean Drive Englewood, NJ 07631			M		
Radiology Affiliates of Central NJ 838 West State Street Trenton, NJ 08618			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Radiology Group of New Brunswick 303 George Street New Brunswick, NJ 08901			M		
Radiology Professional Association P.O. Box 7100 Jersey City, NJ 07307			M		
Rahway Hospital 865 Stone Street Rahway, NJ 07065			M		
Riverside General Hospital Meadowland Parkway Secaucus, NJ 07094			M		
Riverside Hospital Powerville Road Boonton, NJ 07005			M		
Riverview Hospital 35 Union Street Red Bank, NJ 07701	Y	T	M		
Saddle Brook General Hospital 300 Market Street Saddle Brook, NJ 07662			M		
Salem County Memorial Hospital Salem, NJ 08079			M		
Schletter MD., Felix E. 101 Madison Avenue Morristown, NJ 07960	Y	C	M	N	Sealed sources.
Sharlin Radiological Associates 35 Pangborn Place Hackensack, NJ 07601			M		
Shore Memorial Hospital New York and Sunny Avenues Somers Point, NJ 08244			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Siegler MD., Stanley Walter 9 Hospital Drive Toms River, NJ 08753			M		
Somerset Medical Center Somerville, NJ 08876	Y	T	M	N	Decay.
South Amboy Hospital 540 Bordentown Avenue South Amboy, NJ 08879			M		
South Bergen Hospital 214 Terrace Avenue Hasbrouck Heights, NJ 07604	Y	1	M	Y	Decays and incinerates.
Southern Ocean County Hospital 1140 West Bay Avenue Manahawkin, NJ 08050	Y	1	M	Y	Expect significant decrease in volumes.
St. Barnabas Medical Center Old Short Hills Road Livingston, NJ 07039	Y	1	M	Y	Expect significant decrease in volumes.
St. Clare's Hospital Pocono Road Denville, NJ 07834	Y	1	M	N	Decay.
St. Elizabeth Hospital 225 Williamson Street Elizabeth, NJ 07202			M		
St. Francis Community Health Center 25 McWilliams Place Jersey City, NJ 07302	Y	1	M	N	Decay.
St. Francis Hospital 601 Hamilton Avenue Trenton, NJ 08629			M		
St. James Hospital 155 Jefferson Street Newark, NJ 07105			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
St. Joseph's Hospital and Medical Center 703 Main Street Paterson, NJ 07503			M		
St. Mary's Hospital Hoboken, NJ 07030			M		
St. Mary's Hospital 211 Pennington Avenue Passaic, NJ 07055	Y	1	M	Y	Expect do discontinue shipping.
St. Michael's Medical Center 306 High Street Newark, NJ 07102	Y	T	M	Y	
St. Peter's General Hospital 254 Easton Avenue New Brunswick, NJ 08903	Y	T	M		
St. Vincent's Hospital 45 Elm Street Montclair, NJ 07042			M		
Summit Medical Group P.A. 120 Summit Avenue Summit, NJ 07901			M		
Swyer MD., Alfred J. 307 Sixtieth Street West New York, NJ 07093	Y	2	M	N	Decay.
Underwood Memorial Hospital North Broad & Red Bank Avenue Woodbury, NJ 08096			M		
United Hospitals of Newark 15 South Ninth Street Newark, NJ 07107	Y	T	M	N	Decay.
Valley Hospital Linwood and N. Van Dien Avenue Ridgewood, NJ 07450			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Veterans Administration Medical Center Lyons, NJ 07939	Y	T	M	Y	
Vitale MD., Salvatore F. Highway 70 and Green Grove Road Bricktown, NJ 08723			M		
Warren Hospital 185 Roseberry Street Phillipsburg, NJ 08865			M		
Washington Memorial Hospital Hurffville Crosskeys Road Turnersville, NJ 08012			M		
West Essex General Hospital 204 Hillside Avenue Livingston, NJ 07039			M		
West Jersey Hospital Mt. Ephraim and Atlantic Avenue Camden, NJ 08104	Y	1	M	N	Decay.
X-ray Group P.A. (The) 23 Duke Street New Brunswick, NJ 08902			M		
Zimmerman MD., Charles 591 E. 27th Street Paterson, NJ 07504	Y	1	M	N	Decay.
Zurbrugg Memorial Hospital Taylor Street Riverside, NJ 08075			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Associated Radiologists 315 E. Main Street Somerville, NJ 08876			M		
Atlantic City Medical Center 1925 Pacific Avenue Atlantic City, NJ 08401			M		
Bergen Pines County Hospital East Ridgewood Avenue Paramus, NJ 07652	Y	T	M	N	Decay.
Berman MD., Carroll Z. 925 East Jersey Street Elizabeth, NJ 07201			M		
Bluestein MD. S. G. 591 East 27th Street Paterson, NJ 07504			M		
Doehner MD., G. A. 252 Broad Street West Long Branch, NJ 07764			M		
Doehner MD., Gunther Anthony 252 Broad Street Red Bank, NJ 07701			M		
Englewood Hospital Association 350 Engle Street Englewood, NJ 07631			M		
Hackensack Hospital 22 Hospital Place Hackensack, NJ 07601			M		
Horowitz MD., Leo 47 Kensington Avenue Jersey City, NJ 07304	Y	1	M	N	Sealed sources.
Hospital Center at Orange 286 Henry Street Orange, NJ 07050	Y	T	M	N	Decay.

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Jersey Shore Radiology Associates Shore Medical Building Neptune, NJ 07753			M		
Jersey Shore Radiology Associates 3822 River Road Point Pleasant, NJ 08742	Y	2	M	N	Sealed source.
Leone MD., Armando 220 Hamburg Turnpike Wayne, NJ 07470			M		
Raritan Radiologic Associates, P.A. 466 New Brunswick Avenue Perth Amboy, NJ 08861			M		
Riverview Hospital 35 Union Street Red Bank, NJ 07701	Y	T	M	N	Decay.
Sharlin Radiological Associates 35 Pangborn Place Hackensack, NJ 07601			M		
Veterans Administration Medical Center Tremont Avenue East Orange, NJ 07019			M		
Wuester Tumor Clinic, P.A. 815 Salem Avenue Elizabeth, NJ 07208			M		
Schering Corporation 60 Orange Street Bloomfield, NJ 07003			M		
Singer Company (The) 1150 McBride Avenue Little Falls, NJ 07424	Y	1	M	Y	Research processes.
American Cyanamid Company Bound Brook, NJ 08805			M		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Department of the Army Fort Monmouth, NJ 07703			G		
Asarco Incorporated 901 Oak Tree Road South Plainfield, NJ 07080			I		
Bird & Son Inc. Amboy Avenue Perth Amboy, NJ 08862			I		
Booz Allen & Hamilton Inc. 66 Hanover Road Florham Park, NJ 07932			I		
E. R. Squibb & Sons Inc. P.O. Box 4000 Princeton, NJ 08540			I		
Emergency Products Corporation 25 Eastmans Road Parsippany, NJ 07054			I		
Gibraltar Plastics & Chemicals Inc. 199 Garibaldi Avenue Lodi, NJ 07644			I		
Hydro Med Sciences 783 Jersey Avenue New Brunswick, NJ 08902			I		
Institute for Medical Research Copewood Street Camden, NJ 08103			I		
Itt Corporation 500 Washington Avenue Nutley, NJ 07110			I		
Kaulson Laboratories Inc. 949 Broad Street, Suite 1H Newark, NJ 07102			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
New Jersey Department of Environment P.O. Box 2807 Trenton, NJ 08625			G		
New Jersey, State of P.O. Box 7068 Trenton, NJ 08625			G		
New Jersey, State of P.O. Box 1540 Trenton, NJ 08625			G		
NMC Clinical Laboratory AKA 1 Erika Plaza Rockleigh, NJ 07647			I		
Pennwalt Corporation Box 100 - South Street Holmdel, NJ 07733	Y	1	I	N	Sealed source.
Philips Electronic Instruments Inc. 85 McKee Drive Mahwah, NJ 07430			I		
Platina Refining Laboratories 4301 South Clinton Avenue South Plainfield, NJ 07080	Y	1	I	N	Sealed source.
Princeton Resources Inc. North Harrison Street Princeton, NJ 08540			I		
Rhone-Poulenc Inc. P.O. Box 125 Monmouth Junction, NJ 08852	Y	1	I	Y	Volumes expected to increase.
Textile Research Institute 601 Prospect Avenue Princeton, NJ 08540			I		
Wheaton Glass Company 3rd and "G" Streets Millville, NJ 08332			I		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Burlington Township High School Fountain Avenue Burlington, NJ 08016	Y	1	E	N	Sealed source.
Corporation of St. Peter's College 2641 Kennedy Blvd. Jersey City, NJ 07306	Y	1	E	N	No wastes generated.
County College of Morris Route 10 & Center Grove Road Dover, NJ 07801			E		
Drew University Madison, NJ 07940			E		
Fairleigh Dickinson University 110 Fuller Place Hackensack, NJ 07601	Y	1	E	Y	Volumes expected to increase.
Fairleigh Dickinson University 1000 River Road Teaneck, NJ 07666	Y	1	E	N	Sealed sources.
Kean College of New Jersey Morris Avenue Union, NJ 07083			E		
New Jersey Institute of Technology 323 High Street Newark, NJ 07102			E		
Parsippany High School 20 Rita Drive Parsippany, NJ 07054	Y	C	E	N	Sealed sources.
Princeton University James Forrestal Campus Princeton, NJ 08544	Y	1	E	Y	Ship and decay.
Ramapo College of New Jersey Ramapo Valley Road Mahwah, NJ 07430			E		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
Ridgefield Memorial High School 555 Chestnut Street Ridgefield, NJ 07657	Y	1	E	N	No wastes generated.
Seton Hall University South Orange, NJ 07079	Y	T	E		
Shore Regional High School West Long Branch, NJ 07764	Y	2	E	N	Incomplete data.
St. Elizabeth, College of Convent Station, NJ 07961			E		
Stevens Institute of Technology Castle Point Station Hoboken, NJ 07030	Y	1	E	Y	
Stockton State College Pomona, NJ 08240			E		
Sussex County Vocational-Technical 105 North Church Road Sparta, NJ 07871			E		
Trenton State College Trenton, NJ 08625	Y	T	E		
William Paterson College 300 Pompton Road Wayne, NJ 07470			E		
New Jersey College of Medicine 100 Bergen Street Newark, NJ 07107			E		

LICENSEE NAME AND ADDRESS	SURVEY		TYPE OF FACILITY	SHIPS WASTE	COMMENTS
	RECEIVED	RESPONSE			
American Red Cross 850 No. Franklin Avenue Pleasantville, NJ 08232	Y	1	M	N	Decay.
Biophasics/DSI 520 Speedwell Avenue Morris Plains, NJ 07950			M		
Burdette Tomlin Memorial Hospital Stone Harbor Boulevard Cape May Court House, NJ 08210	Y	1	M	N	Decay and incinerate.
Chase DD., Paul J. 40 East Laurel Road, Suite 202 Stratford, NJ 08084			M		
Clara Maass Memorial Hospital Belleville, NJ 07109			M		
Cobin MD., Rhoda H. 750 Broadway Paterson, NJ 07514			M		
Dooley MD., Charles E. (Jr.) 261 Orchard Street Westfield, NJ 07090	Y	1	M	N	Decay.
John F. Kennedy Medical Center Edison, NJ 08817	Y	1	M	N	Decay.
Lawner MD., Ethel G. 1905 Kennedy Boulevard Jersey City, NJ 07305			M		
Marquis MD., John W. 92 Old Northfield Avenue West Orange, NJ 07052			M		
Masley MD., Peter M. 1050 Clifton Avenue Clifton, NJ 07013			M		

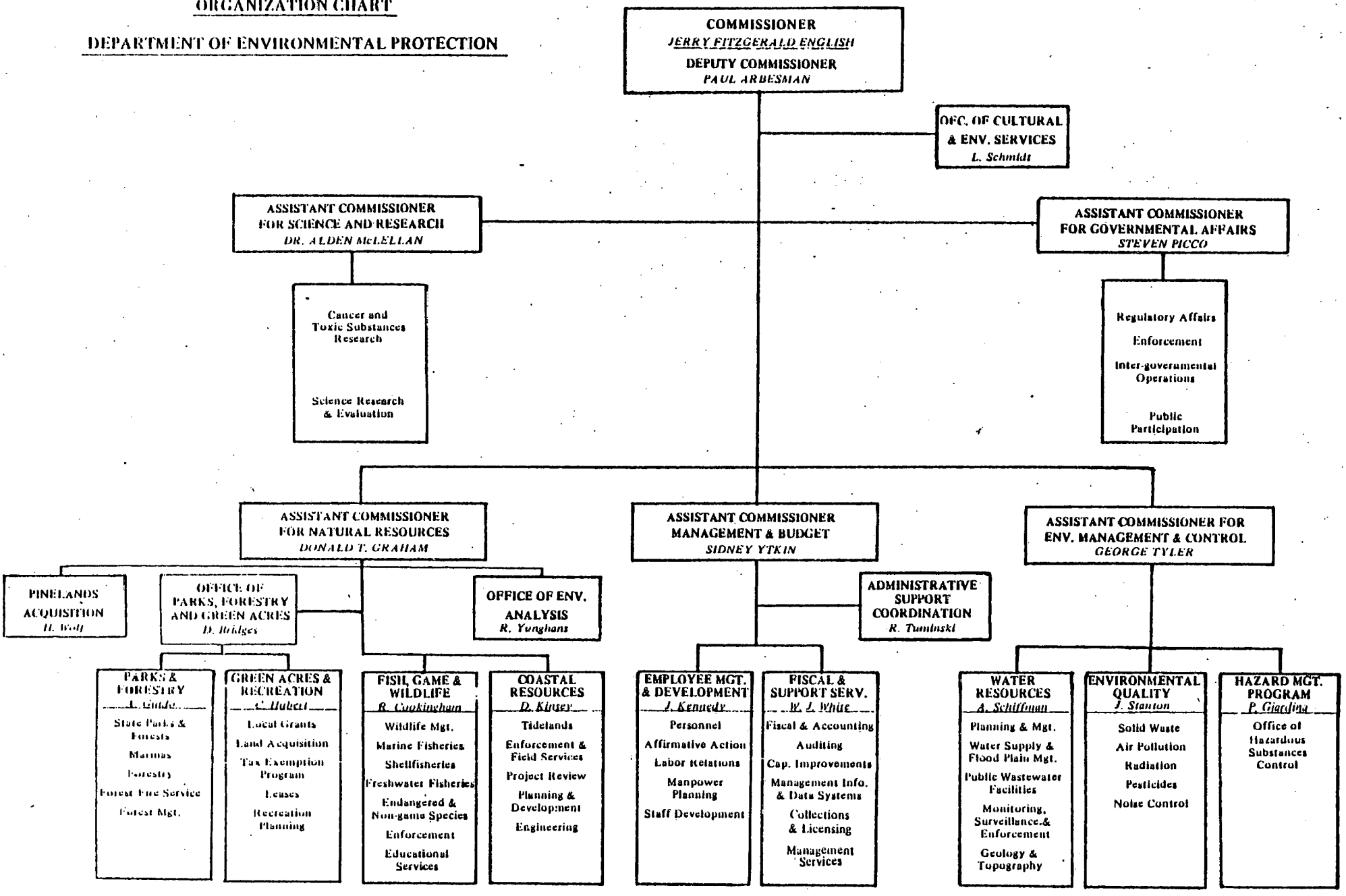
APPENDIX B

NEW JERSEY LEGISLATION AND REGULATION

7/80

ORGANIZATION CHART

DEPARTMENT OF ENVIRONMENTAL PROTECTION



NEW JERSEY RADIATION PROTECTION

COMMISSION: DESCRIPTION OF DUTIES

[redacted]

(N.J.S.A. 26:2D-3; Eugene Fisher is the Commissioner's designee)

This commission consists of eight members, including the Commissioners of Environmental Protection, Health, and Labor and Industry or their designees and five members with scientific training appointed by the Governor. The commission is empowered to formulate, adopt and promulgate codes, rules, and regulations necessary to prevent unnecessary radiation. Note, however, that public hearings must be held on all proposed regulations prior to their adoption. The commission is also authorized to review the policies and programs of DEP in regard to radiation protection, making recommendations thereon to the Department.

NEW JERSEY COMMISSION ON RADIATION PROTECTION
October 23, 1979

Name	Home Address, Telephone	Business Address, Telephone	Mailing Address	Term Expiration
Max M. Weiss, Ph.D., Chairman	15 Braidburn Way Convent, NJ 07961 201 - 538-6987	Bell Telephone Labs., Inc. Murray Hill, NJ 07971 201 - 582-2792	Bell Telephone Labs.	July 1, 1981
Benjamin P. Sonnenblick, Ph.D., Vice-Chairman	91 Chestnut St. Millburn, NJ 07041 201 - 376-5511	Professor of Zoology, Rutgers University 195 University Ave. Newark, NJ 07102 201 - 648-5071	Millburn.	July 1, 1982
Henry J. Powsner, M.D., Secretary	4 Queenston Place Princeton, NJ 08540 609 - 924-5891	Princeton Medical Center Radiology Department Princeton, NJ 08540 609 - 921-7700, Ext. 251	Home Address	July
Jerry Fitzgerald English, Commissioner Department of Environmental Protection	4 Drum Hill Drive Summit, NJ 07901	N.J. State Dept. of Environmental Protection P.O. Box 1390 Trenton, NJ 08625 609-292-2885	Department of Environmental Protection	Ex Officio
Joanne Finley, M.D., Commissioner Department of Health	57 Brookstone Dr. Princeton, NJ 08540 609 - 921-6498	N.J. State Dept. of Health P.O. Box 1540, Trenton, NJ 08625 609 - 292-7837	Department of Health	Ex Officio
John J. Horn, Commissioner Department of Labor & Industry		N.J. State Dept. of Labor & Industry P.O. Box V, Trenton, NJ 08625 609 - 292-2323	Department of Labor & Industry	Ex Officio
Seymour Baron, Ph.D.	684 Iroquois St. Oradell, NJ 07649 201 - 265-6032	Burns & Roe, Inc. 700 Kinderkamack Rd. Oradell, NJ 07649 201 - 265-2000	Burns & Roe, Inc.	July 1, 1980
Fred Sterzer, Ph.D.	4432 Provinceline Rd. Princeton, NJ 08540 609 - 921-7792	Microwave Technology Center RCA Laboratories Princeton, NJ 08540 609 - 734-2633	RCA Laboratories	July 1,

ERP-D16
May 72

New Jersey

Radiation Protection Act

As Amended To

January 1, 1972

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Chapter 116, P.L. 1958 approved July 8, 1958

as amended by Chapter 124, P.L. 1961 approved

December 4, 1961.

Be It Enacted by the Senate and General Assembly of the State New Jersey:

26:2D-1. This act shall be known and may be cited as the "Radia-on Protection Act."

26:2D-2. **Definitions.** As used in this act, unless the context in-cates another or different meaning or intent:

(a) "Commission" means the commission on radiation protection ated pursuant to this act;

(b) "Department" means the department of environmental pro-ection;

(c) "Unnecessary radiation" means the use of electromagnetic diation including microwave, infrared, visible, ultarviolet, x-ray, id gamma-ray; sonic infrasonic, or ultrasonic waves, and particle diation including alphas, betas, high energy electrons, neutrons, otons and other atomic or nuclear particles in such manner as be or tend to be injurious or dangerous to the health of the ople or the industrial or agriculture potentials of the state, or the ecology of the state and its wildlife.

urce. L. 1971, c. 372, § 1. Approved Dec. 30, 1971, effective immediately.
te. This section was enacted by L. 1958, c. 116, § 2, approved July 8, 1958, effective immediately.

26:2D-3. **Commission; members.** There is hereby created in the partment of environmental protection the commission on radia-on protection which shall consist of eight members, three of whom all be the commissioner of environmental protection, the com-issioner of health, and the commissioner of labor and industry, their designees, who shall serve ex officio and five members with ientific training in medicine, radiology, nonionizing radiation, frasonics, ultrasonics, radiaton physics, atomic energy or biology engineering to be appointed by the Governor, with the advice and nsent of the senate.

urce. L. 1971, c. 372, § 2. Approved Dec. 30, 1971, effective immediately.
te. This section was enacted by L. 1958, c. 116, § 3, approved July 8, 1958, effective immediately.

26:2D-4. Commissioners appointed by the Governor shall be ap-inted for a term of 4 years commencing on July 1 of the year of ppointment except that of those first appointed, 2 shall be ap-inted for terms of 1 year, 1 for a term of 2 years, 1 for a term of years, and 1 for a term of 4 years, which terms shall commence July 1, 1958. Each commissioner shall hold over after the ex-ration of his term until his successor has been appointed and has alified.

Vacancies shall be filled for the unexpired term only in the manner provided for the original appointment.

26:2D-5. Commissioners shall serve without compensation but shall be entitled to be reimbursed for expenses necessarily incurred in the performance of their duties.

26:2D-6. **Organization; officers; quorum.** The commission annually shall organize as soon as possible after July 1, and shall elect a chairman, vice-chairman and a secretary from its own membership. Four members of the commission shall constitute a quorum to transact its business. Codes, rules and regulations shall be adopted, amended or repealed by an affirmative vote of at least five members.

Source. L. 1971, c. 372, § 3. Approved Dec. 30, 1971, effective immediately.
Note. This section was enacted by L. 1958, c. 116, § 6, approved July 8, 1958, effective immediately.

26:2D-7. The commission shall have the power to formulate, adopt, promulgate, amend and repeal codes, rules and regulations as may be necessary to prohibit and prevent unnecessary radiation; provided, however, that no such code, rule or regulation and no such amendment or repeal shall be adopted except after a public hearing to be held after 30 days' prior notice thereof by public advertisement of the date, time and place of such hearing, in such a manner as may be provided by the commission, at which opportunity to be heard by the commission with respect thereto shall be given to the public; and provided, further, that no such code, rule or regulation and no such amendment or repeal shall be or become effective until 60 days after the adoption thereof as aforesaid. Any person heard at such public hearing shall be given written notice of the determination of the commission.

26:2D-8. It shall be the duty of the commission to review the policies and program of the department as developed under authority of this act; to make recommendations thereon to the department; to provide the department with such technical advice and assistance as may be requested by the department.

26:2D-9. **Duties of department.** The department shall:

(a) Administer this act and codes, rules or regulations promulgated by the commission;

(b) Provide the commission with the necessary personnel required to carry out its duties;

(c) Develop comprehensive policies and programs for the evaluation and determination of hazards associated with the use of radiation, and for their amelioration;

(d) Advise, consult, and cooperate with other agencies of the state, the federal government, other states and interstate agencies, and with affected groups, political subdivisions and industries;

(e) Accept and administer according to law loans, grants or other funds or gifts from the federal government and from other sources, public or private, for carrying out its functions under this act;

(f) Encourage, participate in or conduct studies, investigations, ining, research and demonstrations relating to the control of diation hazard, the measurement of radiation, the effects on alth of exposure to radiation and related problems as it may em necessary or advisable for the discharge of its duties under is act;

(g) Collect and disseminate health education information re- ing to radiation protection;

(h) Require registration of sources of radiation, and require recds concerning sources of radiation to be kept in such manner as ay be prescribed by codes, rules or regulations of the commission;

(i) Review plans and specifications on the design and shielding r radiation sources submitted pursuant to codes, rules or regulaons of the commission for the purpose of determining possible diation hazards;

(j) Inspect radiation sources, their shielding and immediate surundings and records concerning their operation for the determation of any possible radiation hazard;

(k) Have power, to be exercised subject to codes, rules and regutions of the commission, to require, issue, renew, amend, suspend id revoke licenses for the construction, operation or maintenance sources of radiation including byproduct materials, source marials and special nuclear materials in quantities not sufficient to rm a critical mass. The codes, rules and regulations may provide r recognition of other state or federal licenses, subject to the gistration requirements prescribed by or under the authority of is act;

(l) Have the power in accordance with a fee schedule adopted as rule or regulation in accordance with the "Administrative Pro-dure Act" P.L. 1968, c. 410 (C. 52:14B-1 et seq.), to establish and harge fees for any of the services it performs, which fees shall be nnual or periodic as the department shall determine. The fees harged by the department pursuant to this section shall not be less han $10.00 nor more than $500.00 based on criteria contained in the e schedule.

ource. L. 1971, c. 155, § 2. Approved May 20, 1971, effective June 1, 1971.

ote. This section, enacted by L. 1958, c. 116, § 9, was amended previously by L. 1961, c. 124, § 1, approved Dec. 4, 1961, effective immediately. L. 1971, c. 155, § 4, reads as follows:

4. This act shall take effect on the first day of the month following enactment.

26:2D-9.1. The Governor, on behalf of the state, may enter into greements with the Federal Government providing for discontinuce by the Federal Government and assumption by the state of e authority, in the interest of the protection of the public from diation hazards, to regulate sources of radiation including byroduct materials, source materials and special nuclear materials quantities not sufficient to form a critical mass. Subject to the rms of such agreements, regulatory authority assumed by the tate by virtue of such agreements shall be exercised by the departent in the manner provided in this act and as may be further

provided by codes, rules and regulations of the commission promulgated pursuant to this act.

26:2D-9.2. The department may (a) enter into agreements, subject to the approval of the Governor, with the Federal Government, other states or interstate agencies to perform inspections and other radiation protection functions on a cooperative basis with the Federal Government, other states or interstate agencies; and (b) subject to available appropriations, make its personnel available for participation in training programs of the Federal Government and otherwise secure assistance from the Federal Government to maintain and improve the department's administration of this act.

26:2D-10. All sources of radiation shall be shielded, transported, handled, used and kept in such manner as to prevent all users thereof and all persons within effective range thereof from being exposed to unnecessary radiation.

26:2D-11. Whenever the department finds that there has been a violation of any of the provisions of this act or any codes, rules or regulations of the commission, resulting from the construction, operation or maintenance of a source of radiation, it shall notify any person or legal entity found to be causing, allowing or permitting such violation, of the nature of that violation and order that prior to a time fixed by the department, which time shall not be later than 2 years from the date of service of the notice, that person or legal entity shall cease and abate causing, allowing or permitting such violation and take such action as may be necessary for the source of radiation to be constructed, operated or maintained in compliance with this act and codes, rules or regulations promulgated by the commission.

If the person or legal entity fails to comply with the order prior to the time fixed by the department, the department may cause the source of radiation being so constructed, operated or maintained to be secured or impounded. Within 10 days after securing or impounding a source of radiation, the department shall give notice to said person or legal entity prescribing conditions of construction, operation or maintenance under which the source of radiation will be returned to the custody of such person or legal entity. If such person or legal entity, within such reasonable time as may be fixed in said notice, furnishes evidence satisfactory to the department of present and intended future compliance with such conditions, the source of radiation so secured or impounded shall be returned to the custody of such person or legal entity for construction, operation or maintenance in accordance with such conditions, upon payment to the department of the costs incurred by the department incident to the securing or impounding. If the person or legal entity does not furnish such satisfactory evidence within such time, the rights of such person or legal entity with respect to the source of radiation so secured or impounded shall become the property of the state to be disposed of by the department on behalf of the state in any manner consistent with public health and safety. Any person or legal entity who (1) operates, maintains or otherwise uses a source

of radiation while the same is so secured or impounded, or (2) violates a condition under which a source of radiation so secured or impounded is returned, shall be subject to a fine not exceeding $500.00 for each day during which the violation exists, to be enforced by the department in a summary action in the Superior Court.

26:2D-11.1. Embargo of dangerous article. Notwithstanding any other remedy available to the department, whenever an agent of the department finds or has probable cause to believe that any material, machine, appliance, apparatus or device, or any part thereof, is a radiation hazard or danger of such nature as to constitute a threat to public health or welfare, he may embargo such article by affixing thereto a tag or other appropriate marking, giving notice that such article is, or is suspected to be, a radiation hazard or danger and has been detained or embargoed, and warning all persons not to use, remove or dispose of such article by sale or otherwise until permission for use, removal or disposal is given by the department. It shall be a violation of this act for any person to remove or dispose of such detained or embargoed article by sale or otherwise without such permission.

Source. L. 1971, c. 372, § 4. Approved Dec. 30, 1971, effective immediately.

26:2D-11.2. Appeal from embargo; hearing. Any person aggrieved by an embargo imposed under the provisions of this act who shall apply therefor within 30 days after the imposition of such embargo, shall be granted a hearing before the department. Pending the determination by the department before or after such hearing, the department may stay the operation of the embargo upon such terms and conditions, including performance bonds as it may deem proper.

Source. L. 1971, c. 372, § 5. Approved Dec. 30, 1971, effective immediately.

26:2D-11.3. Penalty; injunctive relief. Any person who uses, removes, or disposes of any property in violation of an embargo imposed under the provisions of this act shall be liable to a penalty of not more than $2,500.00 for each offense, to be collected by a summary proceeding under the penalty enforcement law (N. J. S. 2A:58-1 et seq.) or in any case before a court of competent jurisdiction wherein injunctive relief has been requested. The Superior Court, County Court, and County District Court shall have jurisdiction to enforce said penalty enforcement law. If the violation is of a continuing nature, each day which it continues shall constitute an additional, separate and distinct offense.

The department is hereby authorized and empowered to compromise and settle any claim for a penalty under this section in such amount in the discretion of the department as may appear appropriate and equitable under all of the circumstances.

Source. L. 1971, c. 372, § 6. Approved Dec. 30, 1971, effective immediately.

26:2D-12. Whenever the department finds that an emergency exists requiring immediate action to protect the public health or welfare, it may issue an order reciting the existence of such an emergency and requiring that such action be taken as it deems necessary to meet the emergency. Such order shall be effective immediately. Any person to whom such order is directed shall comply therewith immediately, but, on application to the department, shall be afforded a hearing within 5 days. On the basis of such hearing the department may continue such order in effect or revoke, amend or modify such order.

26:2D-13. The department may bring a civil action in the Superior Court to prevent the violation of the provisions of this act or codes, rules or regulations promulgated by the commission and orders of the department and said court may proceed in the action in a summary manner or otherwise and may restrain in all such cases any person or legal entity from violating any of the provisions of this act or said codes, rules, regulations or orders.

26:2D-14. Any notice, order or other instrument issued pursuant to this act may be served personally or by mailing a copy thereof by certified mail directed to the person or legal entity affected.

26:2D-15. No existing civil or criminal remedy for any action which is a violation of any code, rule or regulation of the commission shall be excluded or impaired by this act.

26:2D-16. Any code, or rule or regulation of the commission or determination or finding of the department shall be reviewable in the Superior Court by a proceeding in lieu of prerogative writ.

26:2D-17. No ordinance, resolution or regulation concerning unnecessary radiation adopted by any municipality, county or local board of health shall be effective until a certified copy of such ordinance or regulation has been submitted to the commission and approved by the commissioner of the department. Such ordinances or regulations may not be approved unless the same shall be consistent with this act or any code, rule or regulation issued pursuant hereto.

Note: This act shall take effect immediately. Approved July 8, 1958.

CHAPTER 28

BUREAU OF RADIATION PROTECTION

Authority

Unless otherwise expressly noted, all provisions of this Chapter 28 were adopted by the Department of Environmental Protection pursuant to authority delegated at N.J.S.A. 26:2C-1 *et seq.* and N.J.S.A. 26:2D-1 *et seq.*

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SUBCHAPTER 1. GENERAL PROVISIONS

7:28-1.1 Scope

Unless otherwise provided by rule or statute, the following provisions shall constitute the rules of the Bureau of Radiation Protection and shall govern all persons installing, using, handling, transporting or storing sources of radiation.

7:28-1.2 Construction

(a) These rules shall be liberally construed to permit the Department, the Bureau of Radiation Protection and its various agencies to discharge its statutory functions.

(b) The Commissioner or the Director of the Division of Environmental Quality may, upon notice to all parties, in the public interest, relax the application of these rules.

7:28-1.3 Practice where rules do not govern

(a) The Commissioner may rescind, amend or expand these rules from time to time, and such new rules shall be filed with the Secretary of State as provided by law.

(Note: Next page is 85.)

(b) The Commissioner, the Director of the Division of Environmental Quality or any agency chief shall exercise his discretion in respect of any other matters not governed by these rules.

7:28–1.4 Definitions

The following words and terms, when used in this Chapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Agreement state" means any state with which the United States Atomic Energy Commission has entered into an effective agreement under subsection 274b of the Atomic Energy Act of 1954, as amended.

"Airborne-radioactivity area" means an area accessible to individuals, in which airborne radioactive materials are present in concentrations such that the values at any time are in excess of the respective values stated in subsection (a) of Section 6.5 (Average conectrations) of this Chapter, Column B, or prorated values if more than one isotope is present; or values averaged over the hours of occupancy in any week are in excess of 25 per cent of the respective foregoing values.

"Area" means a bounded space such as a room, floor, building, plant or any designated geographical entity having physical or imaginary boundaries.

"Average dose rate" means an integrated or accumulated dose of radiation divided by the time over which the integration or accumulation took place or by a specified length of time.

"Beam-monitoring device" means a device placed in the useful beam to indicate the relative output of a radiation-producing machine.

"Byproduct material" means any radioactive material, (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.

"Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be so arranged that no day in any year is omitted from inclusion within a calendar quarter. For purposes of this Chapter, no licensee or registrant shall change the method observed by him of determining calendar quarters except at the beginning of a calendar year.

"Commission" means the New Jersey Commission on Radiation Protection.

"Contamination" means radioactive contamination.

"Contamination hazard" means a condition or situation which might result in an exposure of an individual to radioactive materials substantially in excess of the maximum permissible concentrations.

"Controlled area" means any area to which the access, occupancy and activity of those within are subject to control and supervision for the purpose of radiation protection.

"Curie" means that amount of a specific radionuclide which disintegrates at the rate of 37 billion atoms per second.

"Dead-man switch" means a switch which can be kept closed only when the operator applies continuous pressure.

"Department" means the New Jersey State Department of Environmental Protection.

"Diagnostic-type protective tube housing" means an X-ray tube housing so constructed that the leakage radiation at a distance of one meter from the target cannot exceed 100 mr in one hour when the tube is operated at any of its specified ratings.

"Dose" means the quantity of radiation absorbed per unit of mass, by the body or by any portion of the body. The units used are rad and rem.

"Dose rate" means dose per unit time.

"Emergency exposure" means an exposure to radiation of an emergency worker during rescue or other emergency operations.

"Emergency worker" means a member of the owner's staff or of a public voluntary or governmental agency engaged in safety or other emergency operations.

"Hazard" See "Contamination hazard" and "Radiation hazard"

"High radiation area" means an area which is accessible to individuals and in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem.

"Human use" means the internal or external administration of radiation or radioactive materials to human beings.

"Installation" means a radiation source, with its associated equipment, and the area in which it is housed.

"Instructed individual" means an individual who has received appropriate instructions as to the safe means and methods of performing work with or near radiation sources.

"Leakage radiation" means all radiation coming from within the tube housing except the useful beam.

"License", except where otherwise specified, means a license issued by the United States Atomic Energy Commission or any other state for possession and use of radioactive materials; see also "State license".

"Maximum permissible dose" means the maximum dose to which the body or a particular part of the body of a person shall be permitted to be exposed continuously or intermittently in a stated period of time.

"Monitoring" means a periodic or continuous determination of radiation levels or of radioactive contamination.

"Occupational dose" means exposure of an individual to radiation in a controlled area; or in the course of employment in which the individual's duties involve exposure to radiation, provided that "occupational dose" shall not be deemed to include any exposure of an individual to radiation for the purpose of medical diagnosis or medical therapy of such individual.

"Owner" means a person who has title to a radiation source or who possesses a radiation source as a lessee, bailee or pursuant to the terms of a license issued by the Department, by a Federal agency, or by any other state.

"Person" includes an individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, municipality, any state, or other legal entity; and any legal successor, representative agent, or agency of the foregoing.

"Personnel-monitoring equipment" means devices designed to be worn or carried by an individual for the purpose of measuring the dose received; for example, film badges, pocket chambers, pocket dosimeters, film rings, and so forth.

"Pharmacist" means an individual licensed by the State to practice pharmacy.

"Primary protective barrier" means barrier intended to attenuate the useful beam to the required degree.

"Qualified individual" means an individual suited by training and experience to perform dependable radiation surveys and to determine the degree of radiation hazard.

"Rad" means the dose corresponding to the absorption of 100 ergs per gram; a measure of the dose of any radiation to body tissues in terms of the energy absorbed per unit mass of the tissue.

"Radiation" means any or all of the following: alpha rays, beta rays, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles; but not sound or radio waves, or visible, infrared, or ultraviolet light.

"Radiation area" means an area which is accessible to individuals and in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose in excess of five millirems, or in any workweek a dose in excess of 100 millirems.

"Radiation hazard" means a condition or situation which might result in an exposure of individuals to radiation substantially in excess of the maximum permissible dose.

"Radiation incident" means any unexpected event, occurrence or circumstance involving substantial radiation exposure or radioactive contamination.

"Radiation producing machine" means a machine or device capable of generating radiation, such as x-ray producing machines, particle accelerators, high-voltage rectifiers, high-voltage projection equipment, electron microscopes and other types of high-voltage machines.

"Radiation source" See "Source of radiation".

"Radioactive material" means a natural or artificially produced substance, solid, liquid or gas, which emits radiation spontaneously.

"Radiographer" means any individual who performs or who, in attendance at the site where the radiation sources are being used, personally supervises radiographic operations and who is responsible to the owner for assuring compliance with the requirements of this Chapter.

"Radiographer's assistant" means any individual who, under the personal supervision of a radiographer, uses sources of radiation including radiation-producing machines, radiographic-exposure devices, sealed sources or related handling tools, or survey instruments in radiography.

"Radiographic-exposure device" means any instrument containing a sealed source fastened or contained therein in which the sealed source or shielding thereof may be moved or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure.

Radiography means the examination of humans or animals, or of the structure of materials by nondestructive methods, utilizing sealed sources or radiation-producing machines. This term is not intended to apply to techniques such as electron microscopy or x-ray diffraction.

"Rem" means a measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of one rad of x-rays. For the purpose of this Chapter, any of the following are considered to be equivalent to a dose of one rem:

1. An exposure of one rad due to x or gamma radiation;
2. A dose of one rad due to x, gamma, or beta radiation;

3. A dose of 0.1 rad due to neutrons or high-energy protons; or

4. A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye.

Note: If it is more convenient to measure the neutron flux, or equivalent, than to determine the neutron dose in rads, as provided in paragraph 3 of this definition, one rem of neutron radiation may, for purposes of this Chapter be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there exists sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to one rem may be estimated from the following table:

Neutron energy (Mev)	Number of neutrons per square centimeter equivalent to a dose of 1 rem (neutrons/cm^2)	Average flux to deliver 100 millirem in 40 hours (neutrons/cm^2 per sec.)
Thermal	970×10^6	670
0.0001	720×10^6	500
0.005	820×10^6	570
0.02	400×10^6	280
0.1	120×10^6	80
0.5	43×10^6	30
1.0	26×10^6	18
2.5	29×10^6	20
5.0	26×10^6	18
7.5	24×10^6	17
10	24×10^6	17
10 to 30	14×10^6	10

"Research and development" means theoretical analysis, exploration, or experimentation; or the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes including the experimental production and testing of models, devices, equipment, materials and processes. "Research and development" does not include the internal or external administration of radioactive material, or of radiation, to human beings.

"Roentgen" means the quantity of x or gamma radiation such that the associated corpuscular emission per .001293 grams of air produces, in air, ions carrying one electrostatic unit of quantity of electricity of either sign.

"Sealed source" means a radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal of the radioactive material under the most severe conditions which are likely to be encountered in normal use and handling.

"Secondary protective barrier" means a barrier intended to attenuate radiation other than the useful beam to the required degree.

"Shall" indicates a mandatory requirement.

"Shielding" means any material introduced into the path of radiation to reduce the radiation level.

"Source material" means uranium or thorium, or any combination thereof, in any physical or chemical form; or, ores which contain by weight 1/20 of one per cent (0.05 per cent) or more of uranium, thorium or any combination thereof. Source material does not include special nuclear material.

"Source of radiation" means a material, equipment or machine emitting or capable of emitting radiation.

"Special nuclear material" means plutonium, uranium 233, uranium enriched in the isotope 233, or in isotope 235, or any material artificially enriched by any of the foregoing but does not include source material.

"Special nuclear material in quantities not sufficient to form a critical mass" means uranium enriched in the isotope U-235 in quantities not exceeding 350 grams of contained U-235; uranium 233 in quantities not exceeding 200 grams; plutonium in quantities not exceeding 200 grams; or any combination of them in accordance with the following formula: for each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of such ratios for all the kinds of special nuclear material in combination shall not exceed "1", that is, unity. For example, the following quantities in combination would not exceed the limitation and is within the formula, as follows:

$$\frac{175\text{(grams contained U-235)}}{350} + \frac{50\text{(grams U-233)}}{200} + \frac{50\text{(grams Pu)}}{200} = 1$$

"State" means the State of New Jersey.

"State license" means a license for radioactive materials issued by the Department. See also "License".

"Storage container" means a device in which radioactive materials or sources are transported or stored.

"Survey" means evaluation for a specific set of conditions of actual or potential radiation or contamination hazards by or under the supervision of a qualified individual.

"Therapeutic-type protective tube housing" means x-ray tube housing so constructed that when the tube is operated at any of its specified ratings the leakage radiation at a distance of one meter from the target cannot exceed one rad in one hour and, at a distance of five centimeters from any point on the surface of the housing, cannot exceed 30 rad in one hour.

"Total filtration" means the filtration produced by all materials inserted in the useful beam including the materials comprising the tube and its housing, any measuring devices in the beam which act as a filter, and any material purposely placed in the beam as filters.

"Unneccessary radiation" means the use of gamma rays, x-rays, alpha and beta particles, high-speed electrons, neutrons, protons, and other atomic or nuclear particles in such a manner as to be injurious or dangerous to the health of the people or the industrial or agricultural potentials of the State, as defined in the Radiation Protection Act, Chapter 116, P.L. 1958.

"Unrefined and unprocessed ore" means ore in its natural form prior to any processing, such as grinding, roasting, beneficiating, or refining.

"Useful beam" means that part of the radiation beam which passes through the window, aperture, cone or other collimating device of the tube housing.

"User" means any individual who personally utilizes or manipulates a source of radiation.

7:28–1.5 Emergency precautions

(a) All owners of radioactive materials shall make a study of radiation hazards which may arise from radiation incidents, theft of radioactive materials, fires, floods, windstorms and other disasters within and near the installation with regard to the protection of the following:

1. Tenants and employees;
2. Emergency workers;
3. General public; and
4. Firefighters.

(b) Such studies shall be made for radioactive materials on hand and shall be made in advance of the receipt of additional radioactive materials.

(c) An emergency operational plan, prepared from these studies, shall inform all persons concerned of their duties and responsibilities. This plan shall be made available to the Department on request.

SUBCHAPTER 2. USE OF SOURCES OF RADIATION AND SPECIAL EXEMPTIONS

7:28–2.1 Supervision

All radiation installations, except those generally licensed as set forth in Section 4.18 (Devices generally licensed) of this Chapter shall be under the supervision of an individual who by training and experience is competent to assume the responsibilities for compliance with this Chapter. The owner shall designate this individual on the registration or license application forms provided by the Department.

7:28–2.2 Instruction

(a) All persons working in or frequenting the vicinity of radiation-producing machines or radioactive materials shall be properly and adequately instructed in the use of necessary safeguards and procedures and be supplied with such safety devices as may be required. All visitors to controlled areas shall be adequately instructed or escorted to prevent unnecessary exposure.

(b) Each owner shall make readily available for inspection by employees a copy of these rules, a copy of the license or registration, and a copy of the applicable operating procedures.

(c) Each owner of an installation where employee(s) are working in or frequenting any portion of a controlled area shall conspicuously post RH-D14 a Notice to Employees, in a sufficient number of places to permit observation of a copy by employees on their way to or from their place of employment.

7:28–2.3 Authorized use of radiation sources

The owner shall take all reasonable measures to prevent radiation-producing machines and radioactive materials from being used or possessed by individuals other than those specifically authorized by the owner; if operation is under a license, such authorization must be in conformity with the conditions of that license.

7:28–2.4 Unattended radiation sources

When radiation-producing machines or radioactive materials are left unattended, all reasonable measures shall be taken to prevent their use or possession by any unauthorized individual.

7:28–2.5 Faulty radiation installations

(a) Whenever any shielding is found to be defective or insufficient, or any protective device is found to be insufficient or operating improperly, the owner shall insure that the operation of the installation is either:

1. Discontinued and is not resumed until such shielding or device shall have been properly changed, augmented or repaired; or

2. Operated with sufficient additional precautions during the period of repair.

7:28–2.6 Intentional human irradiation

Only persons licensed or otherwise permitted by law shall arrange for irradiation of or apply radiation to a human being or integral part thereof.

7:28–2.7 Exemptions for prevention or control of diseases

Regulations contained in Subchapters 6 or 7, or Section 13.2 (Reportable radiation incidents) of this Chapter shall not apply insofar as they relate to the intentional exposure of patients to radiation for the purpose of diagnosis, treatment or investigation for the prevention or control of disease.

7:28–2.8 Special exemptions

The Department, upon request by an owner or on its own initiative with the approval of the Commission, may grant a specific exemption from any requirement of these rules should it determine that such exemption is not likely to result in unnecessary radiation.

SUBCHAPTER 3. REGISTRATION; RADIATION PROTECTION FEE SCHEDULE

7:28–3.1 Responsibility for registering

Except as exempted by Section 3.3 (Exemptions from registration) of this Chapter, or as otherwise specifically exempted by the New Jersey State Department of Environmental Protection, the owner shall register or cause to be registered every radiation-producing machine and all radioactive materials with the New Jersey State Department of Environmental Protection, Box 1392, Trenton, New Jersey, 08625 on forms available from the Department.

7:28–3.2 Date registration is due

Every radiation-producing machine and each radioactive source must be registered within 15 days of the date it is acquired. The registration shall be effective until further notice.

7:28–3.3 Exemptions from registration

(a) The following machines are exempt from registration and from the requirements of Subchapters 7, 8 and 10 of this Chapter:

1. Radiation machines not being used in such a manner as to produce radiation, such as equipment in storage or on display. This does not apply to machines which are operated while on display.

2. Electrical equipment that is not primarily intended to produce radiation and that does not produce radiation greater than 0.5 millirem per hour at any readily accessible point five cm from the surface. Production-testing facilities for such equipment shall not be exempt if any individual might receive a radiation dose exceeding the limits established in Section 6.2 (Radiation levels outside controlled areas) of this Chapter.

(b) Those radioactive materials covered in specific and general state licenses issued by the Department in accordance with Subchapter 4 (Licensing) of this Chapter are exempt from registration requirements.

(c) Quantities of radioactive material equal to or less than those listed in Section 3.6 (Table of exempt quantities) of this Chapter are exempt from registration requirements provided that no individual user of radioactive material shall have more than ten such quantitities at any one time.

7:28–3.4 Amendments to registration

Any change in the information contained in a registration shall require an amendment to the registration by the owner within 15 days after such change.

7:28–3.5 Sale, transfer of title, or disposal of radiation-producing machines

(a) Whenever a manufacturer, his agent or a dealer sells or transfers title to a radiation-producing machine, said manufacturer, his agent or the dealer shall give written notification thereof to the Department. Written notification shall be given within 15 days of such sale or transfer of title and shall include the name and address of the new owner or owners.

(b) Whenever an owner sells, transfers title to or disposes of a radiation-producing machine, said owner shall give written notification thereof to the Department. This written notification shall be given within 15 days of such sale, transfer of title or disposal and shall include the name and address of the owner(s) or details of the final disposal of the machine.

7:28–3.6 Table of exempt quantities

Radioactive Material	Column A Not as a sealed source (micro-curies)	Column B As a sealed source (micro-curies)
Antimony (Sb 124)	1	10
Arsenic 76 (As 76)	10	10
Arsenic 77 (As 77)	10	10
Barium 140 + Lanthanum 140 (Ba 140 + La 140)	1	10
Beryllium (Be 7)	50	50
Cadmium 109 + Silver 109 (Cd 109 + Ag 109)	10	10
Calcium 45 (Ca 45)	10	10
Carbon 14 (C 14)	50	50
Cerium 144 + Praseodymium 144 (Ce 144 + Pr 144)	1	10
Cesium 137 + Barium 137 (Ce 137 + Ba 137)	1	10
Chlorine 36 (Cl 36)	1	10
Chromium 51 (Cr 51)	50	50
Cobalt 60 (Co 60)	1	10
Copper 64 (Cu 64)	50	50
Europium 154 (Eu 154)	1	10
Fluorine 18 (F 18)	50	50
Gallium 72 (Ga 72)	10	10
Germanium 71 (Ge 71)	50	50
Gold 198 (Au 198)	10	10
Gold 199 (Au 199)	10	10
Hydrogen 3 (Tritium) H 3)	250	250
Indium 114 (In 114)	1	10
Iodine 131 (I 131)	10	10
Iridium 192 (Ir 192)	10	10

Radioactive Material	Column A Not as a sealed source (micro-curies)	Column B As a sealed source (micro-curies)
Iron 55 (Fe 55)	50	50
Iron 59 (Fe 59)	1	10
Lanthanum 140 (La 140)	10	10
Manganese 52 (Mn 52)	1	10
Manganese 56 (Mn 56)	50	50
Molybdenum 99 (Mo 99)	10	10
Nickel 59 (Ni 59)	1	10
Nickel 63 (Ni 63)	1	10
Niobium 95 (Nb 95)	10	10
Palladium 109 (Pd 109)	10	10
Palladium 103 + Rhodium 103 (Pd 103 + Rh 103)	50	50
Phosphorus 32 (P 32)	10	10
Polonium 210 (Po 210)	0.1	1
Potassium 42 (K 42)	10	10
Praseodymium 143 (Pr 143)	10	10
Promethium 147 (Pm 147)	10	10
Radium + daughters	0.1	1
Rhenium 186 (Re 186)	10	10
Rhodium 105 (Rh 105)	10	10
Rubidium 86 (Rb 86)	10	10
Ruthenium 106 + Rhodium 106 (Ru 106 + Rh 106)	1	10
Samarium 153 (Sm 153)	10	10
Scandium 46 (Sc 46)	1	10
Silver 105 (Ag 105)	1	10
Silver 111 (Ag 111)	10	10
Sodium 22 (Na 22)	10	10
Sodium 24 (Na 24)	10	10
Strontium 89 (Sr 89)	1	10
Strontium 90 + Yttrium 90 (Sr 90 + Y 90)	0.1	1
Sulfur 35 (S 35)	50	50
Tantalum 182 (Ta 182)	10	10
Technetium 96 (Tc 96)	1	10
Technetium 99 (Tc 99)	1	10
Tellurium 127 (Te 127)	10	10
Tellurium 129 (Te 129)	1	10
Thallium 204 (Tl 204)	50	50
Tin 113 (Sn 113)	10	10
Tungsten 185 (W 185)	10	10
Vanadium 48 (V 48)	1	10
Yttrium 90 (Y 90)	1	10
Yttrium 91 (Y 91)	1	10
Zinc 65 (Zn 65)	10	10
Beta and/or Gamma emitting radioactive material not listed above	1	10

7:28–3.7 Application process

(a) Any person having within his possession, custody or control any item enumerated in this Subchapter shall apply for and obtain a license or registration, as the case may be, as herein provided. Application for such license or registration shall be made within 30 days after the adoption of these regulations, or within 30 days after taking possession, custody or control thereof, whichever is later.

(b) Any license or registration issued pursuant to these regulations shall be valid for one year from the date of issuance. Fees for the initial application and license or registration shall accompany the original application. The fees for the annual renewal of an existing license or registration shall be submitted at least 30 days prior to the expiration date of such existing license or registration. In the event that the fees for renewal are received later than 60 days after the anniversary date, a new application fee must be paid. All checks shall be made payable to, "The Treasurer, State of New Jersey".

R.1972 d.77, eff. April 20, 1972.

See: 4 N.J.R. 101(a).

7:28–3.8 Fee schedule for the use, possession, receipt, storage and transfer of radioactive material

(a) The fee schedule for the use, possession, receipt, storage and transfer of radioactive material is as follows:

Code	Category	Initial Application Fee	Annual License Fee
50	Possession and use of radioactive materials other than those listed as codes 51, 52, 53, and 54 hereof, and not greater than 10,000 nor less than 0.1 Curies.	$ 40.00	$ 40.00
51	Possession and use of radioactive materials of 10,000 Curies or more in sealed sources for irradiation of materials.	375.00	375.00
52	Commercial distribution of radioactive material for processing, or manufacturing of items containing radioactive material, or quantities of radioactive materials.	500.00	500.00

53	Possession and use of radioactive materials used for industrial radiography.	$150.00	$150.00
54	Distributors of items containing radioactive materials, or quantities of radioactive materials to persons exempt from licensing requirements.	500.00	500.00

(b) Before a license is issued, the applicant shall be required to demonstrate that he is properly qualified to use, possess, receive, store or transfer radioactive material.

(c) Radioactive material users in New Jersey who are subjec. to United States Atomic Energy Commission jurisdiction shall be exempt from the fees provided by this Section.

R.1972 d.77, eff. April 20, 1972.

See: 4 N.J.R. 101(a).

7:28–3.9 Fee schedule for certain machine sources

(a) The fee schedule for certain machine sources is:

Category	Machine Source	Initial Application Fee	Annual Registration Fee
01	Therapeutic Units capable of operation at no more than 60 kVp (Grenz-Ray and Dermatological)	$ 10.00	$ 25.00
02	Dental Units	10.00	25.00
03	Fixed Radiographic Diagnostic X-ray units	25.00	25.00
04	Portable Radiographic Diagnostic X-ray Units	30.00	25.00
05	Medical Fluoroscopic Units (Fixed or Portable)	35.00	25.00
06	Mobile Diagnostic Units (motor vehicle mounted)	100.00	35.00
07	Medical Radiographic-Fluoroscopic Units (Fixed or Portable)	40.00	25.00
08	For each additional machine in the above categories at the same address	10.00	15.00

09	Therapeutic Units capable of operation at no more than 500 kVp	$25.00 each	$35.00 each
10	Therapeutic Units capable of operation at no more than 1 MeVp	50.00 each	45.00 each
11	Therapeutic Units including Accelerators capable of operation at no more than 6 MeV	100.00 each	50.00 each
12	Therapeutic Units capable of operation at no more than 25 MeV	250.00 each	100.00 each
13	Therapeutic Units delivering a Neutron Beam to 14 MeV	500.00 each	150.00 each
14	Industrial and Research Machine Sources (including Radiography)	35.00 each	35.00 each
15	X-ray Diffraction Units	25.00 each	25.00 each
16	X-ray Diffraction Units in same room	10.00 each	15.00 each
17	Industrial Accelerators other than Radiographic	100.00 each	25.00 each
18	Research Accelerators to 1 MeV	25.00 each	25.00 each
19	Research Accelerators to 100 MeV	100.00 each	50.00 each
20	Research Accelerators above 100 MeV	200.00 each	100.00 each
21	Commercial, Industrial and Institutional Microwave Ovens	15.00 each	25.00 each
22	Industrial Steady-State Lasers except CO_2 Lasers	10.00 each	20.00 each
23	Industrial CO_2 Lasers	15.00 each	20.00 each
24	Industrial Pulsed Lasers	20.00 each	25.00 each
25	Industrial Q Switched Lasers	25.00 each	35.00 each

(b) The term "diagnostic units" as used herein means and shall include chiropractic and veterinary units.

(c) The initial application fee shall not be charged for units registered pursuant to the Radiation Protection Code prior to the adoption of these regulations. However, the annual registration fee shall be applicable to all units.

(d) The fee schedule shall not apply to machines possessed, stored or used by agencies of the United States Government, State of New Jersey, and county or local governments within New Jersey.

R. 1972 d. 77, eff. April 20, 1972.
See: 4 N.J.R. 101(a).

7:28-3.10 Fee schedule for civilian nuclear reactors

(a) The fee schedule for civilian nuclear reactors is:

Thermal Capacity	Application Fee	Annual Registration Fee
to 500 kW(t)	$25.00	$25.00
to 1 MW(t)	50.00	50.00
to 5 MW(t)	75.00	75.00
to 10 MW(t)	100.00	100.00
to 25 MW(t)	150.00	150.00
to 100 MW(t)	250.00	250.00
to 500 MW(t)	500.00	500.00
to 1500 MW(t)	500.00	500.00
to 3000 MW(t)	500.00	500.00
to 5000 MW(t)	500.00	500.00
to 10,000 MW(t)	500.00	500.00
>10,000 MW(t)	500.00	500.00

(b) In the event a pulsing reactor is proposed, the fee schedule above shall apply either to the maximum steady-state power or maximum time integrated power per pulse, whichever is greater. Fees shall be determined by the time integrated power expressed in MW sec.

(c) The fees listed above shall apply to civilian nuclear reactors of any type. The term nuclear reactors includes both fission and fusion reactors.

(d) Training and research reactors owned or operated by nonprofit educational institutions which do not derive income from their use shall be exempt from fees provided in this schedule. This facility shall be subject to an annual registration fee of $10.00.

R.1972 d.77, eff. April 20, 1972.

See: 4 N.J.R. 101(a).

SUBCHAPTER 4. LICENSING

7:28-4.1 Application

New Jersey licenses issued in accordance with this Subchapter are for the possession and use of radioactive substances obtained from naturally occurring materials or produced by an accelerator.

7:28-4.2 Requirements

No person shall produce, transfer, receive, acquire, own, possess or use any radioactive substance obtained from naturally occurring materials or produced by an accelerator unless authorized by a specific State license issued by the Department, a general State license as provided in Section 4.6 (General licenses) of this Chapter, or an exemption as provided in Section 4.4 (Exemptions) of this Chapter. Excepted from this provision are source materials and special nuclear materials.

7:28-4.3 Recognition of licenses under other jurisdictions

(a) Subject to these regulations, any person who possesses a specific license or equivalent licensing document issued by a Federal agency or any other state may, pursuant to such document, transport, receive, possess, and/or use the radioactive materials specified in such licensing document within this State for a period not in excess of 20 days in any period of 12 consecutive months without obtaining a specific license from the Department, provided that:

1. The licensing document does not limit the activity authorized by such document to specified installations or locations;

2. The user notifies the Department in writing at least two days prior to the time that such radioactive material is brought into this State. Such notification shall indicate the location, period, and type of proposed possession and use within this State, and shall be accompanied by a copy of the pertinent licensing document. If in a specific case the two-day period would impose an undue hardship on the user, he may, upon application to the Department, obtain permission to proceed sooner;

3. The user complies with all applicable regulations of the Department and with all the terms and conditions of his licensing document, except any such terms and conditions which may be inconsistent with applicable regulations of the Department; and

4. Provided further that the Department may require the user to supply such other information as the Department may reasonably request.

(b) The Department may withdraw, limit or qualify its acceptance of such licenses issued by another agency, or any product distributed pursuant to such licensing documents, upon determining that such action is necessary in order to prevent undue hazard to public health and safety or property.

7:28–4.4 Exemptions

(a) Plants or laboratories owned by or operated on behalf of a Federal agency, are exempt from the provisions of this Subchapter.

(b) Common and contract carriers are exempt from the licensing requirements of this Subchapter while transporting or storing radioactive materials covered by Section 4.2 (Requirements) of this Chapter in the regular course of carriage for another, or storage incident thereto.

(c) Any person is exempt from the licensing requirements of this Subchapter to the extent that such person receives, possesses, uses, transfers, owns or acquires products or materials containing radioactive substances specified in Section 4.2 (Requirements) of this Chapter in concentrations not in excess of those listed in Section 4.20 (Exempt concentrations) of this Chapter.

(d) Any person is exempt from the requirements for a State license set forth in the Radiation Protection Act and from the regulations to the extent that such person receives, possesses, uses, transfers, owns or acquires luminous timepieces or hands or dials containing radium.

(e) Any person who desires to apply radium to luminous timepieces or hands or dials shall apply for a specific State license.

(f) Naturally occurring radioactive materials of an equivalent specific radioactivity not exceeding that of natural potassium (10^9 curies per gram of potassium) are exempt from the provisions of this Subchapter.

(g) The Department, upon request by an owner or on its own initiative with the approval of the Commission, may grant a specific exemption from any requirement of this Subchapter should it determine that such exemption is not likely to result in unnecessary radiation.

7:28–4.5 Types of licenses

(a) State licenses for radioactive materials are as follows:

1. General State licenses described in Section 4.6 (General licenses) of this Subchapter are effective without the filing of an application with the Department or the issuance of licensing documents to particular persons;

2. Specific State licenses are issued to named persons upon application filed pursuant to the requirements of this Subchapter.

7:28–4.6 General licenses

(a) Authorization is hereby given under general State license for radioactive materials to use, transfer, receive, acquire, own and possess radioactive materials specified in Section 4.2 (Requirements) of this Chapter, as follows:

1. Radioactive material incorporated in a device or equipment which is listed in Section 4.18 (Devices generally licensed) of this Chapter and has been manufactured pursuant to a specific State license issued by the Department, or a specific license of a Federal agency or other state.

2. The quantities of radioactive materials listed in Section 4.19 (Quantities generally licensed) of this Chapter provided that no person shall at any one time possess or use, pursuant to the general licensing provisions of this Section, more than a total of ten such listed quantities.

(b) The general State licenses provided in subsection (a) of this Section are subject to the provisions of the Radiation Protection Act, and to the provisions of this Chapter. In addition, persons who transfer, receive, acquire, own, possess or use items and quantities of radioactive materials set forth in Sections 4.18 and 4.19 of this Chapter pursuant to the general State licenses provided in subsection (a) of this Section shall not:

1. Effect an increase in the radioactivity of this scheduled items or quantities by adding other radioactive material thereto, by combining radioactive material from two or more such items or quantities, or by altering them in any other manner so as to increase the rate of radiation;

2. Administer externally or internally, or direct the administration of the scheduled items or quantities or any part thereof to a human being for any purpose including, but not limited to, diagnostic, therapeutic and research purposes;

3. Add or direct the addition of the scheduled items or quantities or any part thereof to any food, beverage, cosmetic, drug or other product designed for ingestion or inhalation by, or application to, a human being; or

4. Include the scheduled items or quantities or any part thereof in any device, instrument, apparatus, including component parts and accessories intended for use in diagnosis, treatment or prevention of disease in human beings or animals or otherwise intended to affect the structure or any function of the body of human beings or animals.

(c) Authorization is given under general State licensure to own, receive, acquire, possess and use radioactive material when contained in devices designed and manufactured for the purpose of detecting, measuring, gauging or controlling thickness, density, level, interface location, radiation, leakage,

or qualitative or quantitative chemical composition or for producing light or an ionized atmosphere, when such devices are manufactured in accordance with the specifications contained in a specific license authorizing distribution under a general license issued to the supplier by the Department, a Federal agency, or any other state; provided that:

1. The devices are labeled in accordance with the provisions of the specific license which authorizes the distribution of the devices.

2. The devices bear a label containing the following or substantially similar statement:

"This device has been manufactured for distribution as a generally licensed device pursuant to

_____

(identify appropriate section of the regulations)

_____

(name of licensing agency and state)

License No. _____ by _____

(name of supplier)

Removal of this label is prohibited."

3. The devices shall be installed on the premises of the general licensee by a person authorized to install the devices under a specific license issued to the installer by the Department, a Federal agency, or any other state.

(d) Persons who receive, acquire, possess or use a device pursuant to a general license specified in subsection (c) of this Section:

1. Shall not transfer, abandon or dispose of the device except by transfer to a person duly authorized to receive such device by a specific license issued by the Department, a Federal agency, or any other state;

2. Shall assure that all labels affixed to the device at the time of receipt and bearing the statement, "Removal of this label is prohibited," are maintained thereon and shall comply with the instructions contained in such labels;

3. Shall have the device tested for leakage of radioactive material and proper operation of the on-off mechanism and indicator, if any, at no longer than six-month intervals; provided that, devices containing only tritium need not be tested for any purpose and that devices containing only krypton need not be tested for leakage;

4. Shall have the tests required by paragraph 3 of this subsection and all other services involving the radioactive material, its shielding and containment, performed by the supplier or other person duly authorized by a

specific license issued by the Department, a Federal agency, or any other state to manufacture, install or service such devices;

5. Shall maintain records of all tests performed on the devices as required under this Section, including the dates and results of the tests and the names and addresses of the persons conducting the tests;

6. Upon the occurrence of a failure of or damage to, or any indication of a possible failure of or damage to, the shielding or containment of the radioactive material or the on-off mechanism or indicator, shall immediately suspend operation of the device until it has been either:

i. Repaired by a person, that is, supplier, manufacturer, or other holding a specific license issued by the Department, a Federal agency, or any other state to manufacture, install or service such devices; or

ii. Disposed of by transfer to a person holding a specific license issued by the Department, a Federal agency, or any other state to receive the radioactive material contained in the device; and

7. Shall be exempt from the requirements of this Chapter, except the provisions of Sections 4.10, 4.15–4.18, 8.2, 8.4, and Subchapter 13 (Reports of Thefts and Radiation Incidents) of this Chapter.

7:28–4.7 Application for specific State licenses and renewals

(a) Application for specific State licenses and renewals shall be filed with the New Jersey State Department of Environmental Protection, Box 1392, Trenton, New Jersey, 08625, Attention: Bureau of Radiation Protection Program, on Form RH-25, "Application for Radioactive Material License." Applications may also be filed in person at the Department's offices in Trenton, New Jersey.

(b) An application for a license may include a request for a State license authorizing one or more activities.

(c) In his application, the applicant may incorporate by reference information contained in previous applications, statements, or reports filed with the Department.

(d) Except as provided in subsection (e) of this Section, applications and documents submitted to the Department will be made available for public inspection.

(e) A person who proposes that a document or a part be withheld in whole or in part from public disclosure shall, at the time of filing, submit an application for withholding or make timely application thereafter identifying the document or part, and stating reasons why it should be withheld. He shall, as far as possible, incorporate in a separate paper any part sought to be

withheld. The Department may withhold any document or part thereof from public inspection if disclosure of its contents is not required in the public interest and would adversely affect the interest of a person concerned.

(f) The Department may at any time after the filing of the original or renewal application, and before the expiration of the license, require further statements in order to enable the Department to determine whether the application should be granted or denied or whether a license should be modified or revoked. All applications and statements shall be signed by the applicant or licensee or a person duly authorized to act for and on his behalf.

7:28–4.8 General requirements for approval of specific State license applications

(a) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license will be issued, provided:

1. The applicant is qualified by reason of training and experience to use the radioactive material for the purpose requested in such manner as to protect health, minimize danger to life or property and prevent unnecessary radiation;

2. The applicant's proposed equipment, facilities and procedures are adequate to protect health, minimize danger to life or property and prevent unnecessary radiation; and

3. The applicant satisfies special requirements as may be applicable in Section 4.9 of this Chapter.

7:28–4.9 Special requirements for approval of specific State license applications

(a) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license for human use by an institution of radioactive materials specified in Section 4.2 (Requirements) of this Chapter will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant has appointed a medical isotopes committee of at least three members to evaluate all proposals for research, diagnosis, and therapeutic use of radioactive material within that institution. Membership of the committee should include physicians expert in internal medicine,

hematology and therapeutic radiology, and a person experienced in assay of radioactive material and protection against ionizing radiation;

3. The applicant possesses adequate facilities for the clinical care of patients;

4. The physician(s) designated on the application as the individual user(s) has substantial pertinent experience in the use, the handling and administration of radioactive material and, where applicable, the clinical management of radioactive patients; and

5. If the application is for a State license to use unspecified quantities or multiple types of radioactive materials, the applicant's staff has had substantial pertinent experience in using a variety of radioactive materials for various human uses.

(b) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license for human use by a physician or dentist of radioactive materials specified in Section 4.2 (Requirements) of this Chapter will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant has access to a hospital possessing adequate facilities to hospitalize and monitor the applicant's radioactive patients whenever it is advisable; and

3. The applicant has had extensive training and supervised experience in the proposed use, the handling and administration of radioisotopes, and where applicable, the clinical management of radioactive patients. The applicant shall furnish suitable evidence of such experience with his application. A statement from the institution where he acquired his training and experience, indicating its amount and nature, may be submitted as evidence of such experience.

(c) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license for human use of a sealed source of radioactive materials specified in Section 4.2 (Requirements) of this Chapter will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant, or if the application is made by an institution, the individual user has specialized training in the therapeutic use of the radioactive device considered or has experience equivalent to such training; and

3. The individual user is a physician or dentist.

(d) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license for multiple quantities or types of radioactive material specified in Section 4.2 (Requirements) of this Chapter for use in research and development will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant's staff has had substantial training and experience with a variety of radioisotopes for various research and development uses;

3. The applicant has established an isotope committee, composed of such persons as a radiological safety officer, a representative of the business office, and one or more persons trained or experienced in the safe use of radioactive materials, which will review and approve or disapprove proposals for use of radioactive materials in advance of purchase of such materials; and

4. The applicant has appointed a radiological safety officer who shall be responsible for rendering advice and assistance on radiological safety.

(e) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license for multiple quantities or types of radioactive material specified in Section 4.2 (Requirements) of this Chapter for use in processing for distribution to other authorized persons will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant's staff has had training and experience in the processing and distribution of a variety of radioisotopes; and

3. The applicant has appointed a radiological safety officer who shall be responsible for rendering advice and assistance on radiological safety.

(f) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license to distribute certain devices to persons generally licensed under Sections 4.6(c) and 4.6(d) of this Chapter will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant submits sufficient information relating to the design, manufacturer, prototype testing, quality control procedures, labeling, proposed uses and potential hazards of the device to provide reasonable assurance that:

i. The radioactive material contained in the device will not be lost;

ii. That no person will receive a radiation dose to a major portion of his body in excess of 0.5 rem in any one year under ordinary circumstances of use;

iii. The device can be safely operated by persons not having training in radiological protection; and

iv. The radioactive material within the device would not be accessible to unauthorized persons.

3. In describing the label or labels and contents thereon to be affixed to the device, the applicant shall separately indicate those instructions and precautions which are necessary to assure safe operation of the device. Such instructions and precautions shall be contained on labels bearing the statement: "Removal of this label is prohibited."

(g) Upon determination by the Department that an applicant meets the requirements of this Chapter and the New Jersey Radiation Protection Act, a specific State license for use in industrial and nonmedical radiography of a sealed source or sources of radioactive materials specified in Section 4.2 (Requirements) of this Chapter will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant will have an adequate program for training radiographers and radiographers' assistants and submits to the Department a schedule or description of such program which specifies the following:

i. Initial training;

ii. Periodic training;

iii. On-the-job training;

iv. Means to be used by the licensee to determine the radiographer's knowledge and understanding of and ability to comply with the requirements of this Chapter, the specific licensing requirements, and the operating and emergency instructions of the applicant; and

v. Means to be used by the licensee to determine the radiographer's assistant's knowledge and understanding of and ability to comply with the operating and emergency procedures of the applicant.

3. The applicant has established and submitted to the Department satisfactory written operating and emergency instructions as prescribed by Subchapter 17 (Industrial and Nonmedical Radiology) of this Chapter and/or other regulation of the Commission;

4. The applicant will have an adequate internal inspection system, or other management control, providing assurance that the requirements of this Chapter, the specific State license provisions, and the applicant's operating and emergency instructions are followed by radiographers and radiographers' assistants;

5. The applicant submits a description of its overall organizational structure pertaining to the radiography program, including specified delegations of authority and responsibility for operation of the program; and

6. The applicant who desires to conduct his own leak tests has established adequate procedures to be followed in leak testing sealed sources for possible leakage and contamination and submits to the Department a description of such procedures, including:

i. Instrumentation to be used;

ii. Method of performing test; for example, points on equipment to be smeared and method of taking smear; and

iii. Pertinent experience of the person who will perform the test.

(h) Upon determination by the Department that an applicant meets the requirements of this Chapter and the Radiation Protection Act, a specific State license to transfer possession or control of products or materials containing exempt concentrations of radioactive material specified in Section 4.2 (Requirements) of this Chapter which the transferor has introduced into the product or material will be issued; provided:

1. The applicant satisfies the general requirements specified in Section 4.8 (General requirements for approval of specific State license applications) of this Chapter;

2. The applicant submits a description of the product or material into which the radioactive material will be introduced; intended use of the radioactive material and the product into which it is introduced; method of introduction; initial concentration of the radioactive material in the product or material; control methods to assure that no more than the specified concentration is introduced into the product or material; estimated time interval between introduction and transfer of the product or material; and estimated concentration of the radioisotope in the product or material at the time of proposed transfer by the applicant; and

3. The applicant provides reasonable assurance that the concentrations of the radioactive material at the time of transfer will not exceed the concentrations in Section 4:19 (Quantities generally licensed) that reconcentration of the radioactive material in concentrations exceeding those in Section 4.20 (Exempt concentrations) is not likely, that the product or material is not likely to be inhaled or ingested, and that the use of lower concentrations is not feasible.

i. Each licensee licensed under the provisions of subsection (h) of this Section shall file an annual report with the Department describing the kinds and quantities of products transferred, the concentration of radioactive material contained and the quantity of radioactive material transferred during the reporting period.

ii. Each report shall cover the 12-month period ending June 30 and shall be filed within 30 days thereafter.

7:28–4.10 Terms and conditions of State licenses

(a) Each State license issued pursuant to this Subchapter shall be subject to all the provisions of the Radiation Protection Act, Chapter 116, P.L. 1958, now or hereafter in effect, and to all rules, regulations of the Commission and orders of the Department.

(b) State licenses and privileges thereunder shall not be assigned or otherwise transferred except as specifically authorized by the Department in writing.

(c) Each person licensed by the Department pursuant to this Subchapter shall confine his possession and use of radioactive material to the locations and purposes authorized by such license, and shall not use or permit the use of radioactive materials contrary to the applicable requirements of these regulations. Persons licensed under the provisions of this Subchapter may transfer radioactive material within the State only to other persons authorized to receive such material or as otherwise authorized by the Department in writing.

(d) The Department may incorporate in any State license at the time of issuance, or thereafter, all such additional requirements and conditions with respect to the licensee's receipt, possession, use or transfer of radioactive

material as it deems appropriate or necessary in order to assure compliance with this Chapter.

(e) Each licensee authorized under Section Section 4.9(f) (Special requirements for approval of specific State license applications) of this Chapter to distribute certain devices to generally licensed persons shall:

1. Report to the New Jersey State Department of Environmental Protection Box 1390, Trenton, New Jersey 08625 Attention: Bureau of Radiation Protection, all transfers of such devices to persons in New Jersey generally licensed under Section 4.6(c) and (d) (General licenses) of this Chapter. Such report shall identify each general licensee by name and address, the type and number of device transferred, and the quantity and kind of radioactive material contained in the device. The report shall be submitted within 30 days after the end of each calendar quarter in which such a device is transferred to generally licensed persons; and

2. Furnish to each general licenses to whom he transfers such device a copy of Section 4.6(c) and (d) (General licenses) of this Chapter.

7:28–4.11 Expiration of State license

Except as provided in Section 4.12 (Status of State licenses pending renewal) of this Chapter, each specific State license shall expire at 12:00 A.M. of the day, in the month and year stated.

7:28–4.12 Status of State licenses pending renewal

In any case in which a licensee, not less than 30 days prior to expiration of his existing State license, has filed an application in proper form for renewal, such existing license shall not expire until the Department has acted upon the application.

7:28–4.13 Amendment of State licenses at request of licensee

Applications for amendment of a State license shall be filed in accordance with Section 4.7 (Application for specific State licenses and renewals) of this Chapter and shall specify the amendment desired and the grounds for such amendment.

7:28–4.14 Records

All licensees under the provisions of this Subchapter shall keep records in accordance with Subchapter 8 (Records) of this Chapter.

7:28–4.15 Inspections

(a) All licensees shall afford to the Department an opportunity to inspect radioactive material and the facilities and premises where radioactive material is used or stored.

(b) Upon request of the Department, licensees shall make available for inspection by the Department records kept pursuant to the regulations in this Chapter.

7:28–4.16 Tests

(a) Each licensee shall perform at the request of the Department, or permit the Department to perform if it so desires, such tests as the Department deems appropriate or necessary for the administration of this Chapter including the following tests:

1. Radioactive material;
2. Facilities where radioactive material is utilized or stored;
3. Radiation detection and monitoring instruments; and
4. Other equipment and devices used in connection with the utilization or storage of radioactive material.

7:28–4.17 Modification, revocation and termination of State licenses

(a) The terms and conditions of each State license shall be subject to amendment, revision or modification, or the license may be suspended or revoked by reason of amendments to the Radiation Protection Act, or by reason of rules, regulations, codes and orders issued pursuant to authority of said Act.

(b) Any State license may be revoked, suspended or modified, in whole or in part, for any material false statement in the application, or because of conditions revealed by such application or statement of fact or any report, records or inspection or other means which would warrant the Department to refuse to grant a State license on an original application, or for violation of, or failure to observe any of the terms and provisions of the Act or the license, or of any rule or regulation of the Commission or order of the Department.

(c) Except in cases of emergency as defined by N.J.S.A. 26:2D-12, no State license shall be modified, suspended or revoked prior to a hearing conducted by the Department on the basis of a complaint filed by it indicating facts or conduct warranting suspension, modification or re-

vocation of a license. This complaint and a notice of hearing shall be served at least two weeks prior to the date scheduled for the hearing.

(d) The Department may terminate a specific State license upon request submitted by the licensee to the Department in writing.

7:28–4.18 Devices generally licensed

(a) The following devices and equipment incorporating radioactive material, when manufactured, tested and labeled by the manufacturer in accordance with the specifications contained in a specific State license issued by the Department, or a specific license of a Federal agency or any other state, are placed under a general State license pursuant to Section 4.6(a) (General licenses) of this Chapter:

1. Devices designed for use as static eliminators which contain, as a sealed source or sources, radioactive material consisting of a total of not more than 500 microcuries of Polonium 210 per device.

2. Spark gap tubes and electronic tubes which contain radioactive material consisting of not more than one microcurie of Radium per tube.

3. Devices designed for ionizing of air which contain, as a sealed source or sources, radioactive material consisting of a total of not more than 500 microcuries of Polonium 210 or 50 microcuries of Radium per device.

4. Such other devices as the Commission may authorize.

7:28–4.19 Quantities generally licensed

(a) The following quantities of radioactive substances, when obtained from naturally-occurring materials or when produced by an accelerator, are generally licensed pursuant to Section 4.6(a)2 (General licenses) of this Chapter:

Radioactive Material	Column A Not as a Sealed Source (microcuries)	Column B As a Sealed Source (microcuries)
Beryllium (Be 7)	50	50
Bismuth 207 (Bi 207)	1	10
Cadmium 109 - Silver 109 (Cd 109 + Ag 109)	10	10
Cerium 141 (Ce 141)	1	10
Chromium 51 (Cr 51)	50	50
Cobalt 57 (Co 57)	20	20
Germanium 68 (Ge 68)	1	10
Iron 55 (Fe 55)	50	50
Manganese 52 (Mn 52)	1	10
Polonium 210 (Po 210)	0.1	1
Radium and daughters	0.1	1
Sodium 22 (Na 22)	10	10
Vanadium 48 (V 48)	1	10
Zinc 65 (Zn 65)	10	10
Beta and/or gamma emitting radioactive material not listed above	1	10

(b) There are no generally licensed quantities for alpha-emitting materials other than those set forth in subsection (a) of this Section.

7:28–4.20 Exempt concentrations

The following concentrations of radioactive substances when obtained from naturally occuring materials or when produced by an accelerator are exempt concentrations:

Element (Atomic Number)	Isotope	Column I Gas Concentrations uc/cc*	Column II Liquid & Solid Concentrations uc/cc**
Beryllium (4)	Be 7	—	2×10^{-2}
Cadmium (48)	Cd 109	—	2×10^{-3}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Chromium (24)	Cr 51	—	2×10^{-2}
Cobalt (27)	Co 57	—	5×10^{-3}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Iron (26)	Fe 55	—	8×10^{-3}
Manganese (25)	Mn 52	—	3×10^{-4}
Manganese (25)	Mn 54	—	1×10^{-3}
Tungsten (74)	W 181	—	4×10^{-3}
Vanadium (23)	V 48	—	3×10^{-4}
Zinc (30)	Zn 65	—	1×10^{-3}
Beta and/or gamma emitting radioactive material not listed above with half life less than 3 years	—	1×10^{-10}	1×10^{-6}

NOTE 1: Many radioisotopes disintegrate into isotopes which are also radioactive. In expressing the concentrations in this Section the value given is that of the parent isotope and takes into account the radioactivity of the daughters.

NOTE 2: For purposes of Section 4.4(c) through (e) (Exemptions) of this Chapter where a combination of isotopes is involved, the limit for the combination shall be computed as follows:

Determine for each isotope in the product the ratio between the concentration present in the product and the exempt concentration established in this Section for the specific isotope when not in combination. The sum of such ratios may not exceed "1" (unity).

Example:

$$\frac{\text{Concentration of Isotope A in Product}}{\text{Exempt Concentration of Isotope A}} + \frac{\text{Concentration of Isotope B in Product}}{\text{Exempt Concentration of Isotope B}}$$

*Values are given only for those materials normally used as gases.

** uc/gm for solids.

Cross Reference

See Sections 4.4(c) (Exemptions) and 4.9(h) (Special requirements for approval of specific State license applications) of this Chapter

SUBCHAPTER 5. CONTROLLED AREAS

7:28–5.1 Areas which must be controlled

(a) Every area in which there is any reasonable possibility of an occupant receiving more than the radiation does specified in Section 6.2 (Radiation levels outside controlled areas) of this Chapter shall be set apart as a controlled area.

(b) Subsection (a) of this Section shall not be applicable to outgoing or incoming shipments of radioactive material while being transported in conformance with the regulations of Subchapter 12 (Transportation) of this Chapter.

7:28–5.2 Limitations on controlled areas

No area within a controlled area shall be used for residential quarters, although a room or rooms in residential buildings may be set apart as a controlled area.

SUBCHAPTER 6. PERMISSIBLE DOSE RATES, RADIATION LEVELS AND CONCENTRATIONS

7:28–6.1 Exposure of individuals in controlled areas

(a) Except as provided in subsection (b) of this Section, no individual in a controlled area shall receive in any period of one calendar quarter a dose in excess of the following specified limits:

1. Whole body; head and truck; active blood-forming organs; lens of eyes; or gonads — 1¼ Rems;

2. Hands and forearms; feet and ankles — 18¾ Rems;

3. Skin of whole body — 7½ Rems.

Note: Doses received by human patients from intentional exposure to radiation for the purpose of diagnosis or therapy shall be excluded.

(b) An individual in a controlled area may receive a dose to the whole body greater than that permitted under subsection (a) of this Section, provided:

1. During any calendar quarter the dose to the whole body shall not exceed three rems;

2. The dose to the whole body, when added to the accumulated occupational dose to the whole body, shall not exceed five (N-18) rems where "N" equals the individual's age in years at his last birthday; and

3. The owner has determined the individual's accumulated occupational dose to the whole body on Form BRP-27, or on a clear and legible record containing all the information required in that form: and has otherwise complied with the requirements of subsection (c) of this Section. As used in this subsection "dose to the whole body" includes any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye; and

4. Doses received by human patients from intentional exposure to radiation for the purpose of diagnosis or therapy shall be excluded, in the computations set forth in paragraphs 1 and 2 of this subsection.

(c) The following requirements must be satisfied by owners who propose, pursuant to subsection (b) of this Section to permit individuals in a controlled area to receive exposure to radiation in excess of the limits specified in subsection (a) of this Section:

1. Before permitting any individual in a controlled area to receive exposure to radiation in excess of the limits specified in subsection (a) of this Section each owner shall:

i. Obtain a certificate on Form BRP-27, or on a clear and legible record containing all the information required in that form, signed by the individual showing each period of time after the individual attained the age of 18 in which the individual received, or may have received, an occupational dose of radiation; and

ii. Calculate on Form BRP-27, in accordance with the instructions, or on a clear and legible record containing all the information required in that form, the previously accumulated occupational dose received by the individual and the additional dose allowed for that individual under subsection (b) of this Section.

2. In the preparation of Form BRP-27, or a clear and legible record containing all information required in that form, the owner shall make a reasonable effort to obtain reports of the individual's previously accumulated occupational dose. In any case where an owner is unable to obtain reports of the individual's occupational dose for a previous complete calendar quarter, it shall be assumed that the individual has received the occupational dose specified in whichever of the following columns apply:

Parts of body	Assumed exposure in rems for calendar quarters prior to Jan. 1, 1961	Assumed exposure in rems for calendar quarters beginning on or after Jan. 1, 1961
Whole body, gonads, active blood-forming organs, head and trunk, lens of eye	3¾	1¼

3. If calculation of the individual's accumulated occupational dose for all periods prior to January 1, 1961, yields a result higher than the applicable accumulated dose value for the individual as of that date, as specified in subsection (b) of this Section, the excess may be disregarded. The owner shall retain and preserve records used in preparing Form BRP-27, or its equivalent, as specified in subsection (b)3 of this Section.

(d) For individuals within a controlled area, the radiation dose to tissues of the body from radioactive materials within the body shall be controlled by limiting the average rates at which such materials are taken into the body. Where the intake results from the occurrence of radioactive materials in the air, the concentration of the radioisotopes in the air,

averaged over any seven consecutive days, shall not be permitted to exceed the concentrations listed in Section 6.5(a) (Average concentrations) of this Chapter, Column B, or prorated values if more than one isotope is present. The limits given in Section 6.5(a) of this Chapter, Column B, are based upon exposure to the concentrations specified for 40 hours in any period of seven consecutive days. In any such period where the number of hours of exposure is less than 40, the limits specified in the table may be increased proportionately. In any such period, where the number of hours of exposure is greater than 40, the limits specified in the table shall be decreased proportionately.

(e) Except as authorized by the Department in writing, no allowance shall be made in subsection (d) of this Section or the use of protective clothing or equipment, or particle size.

1. The Department may authorize an owner to expose an individual in a controlled area to airborne concentrations in excess of the limits specified in Section 6.5(a) of this Chapter, Column B, upon receipt of an application demonstrating that the concentration is composed in whole or in part of particles of such size that such particles are not respirable and that the individual will not inhale concentrations in excess of the limits established in Section 6.5(a) of this Chapter, Column B. Each application under this paragraph shall include an analysis of particle size in the concentrations and a description of the methods used in determining the particle size.

2. The Department may authorize an owner to expose an individual in a controlled area to airborne concentrations in excess of the limits specified in Section 6.5 (a) of this Chapter, Column B, upon receipt of an application demonstrating that the individual will wear appropriate protective equipment and that the individual will not inhale, ingest, or absorb quantities of radioactive material in excess of those which might otherwise be permitted under this Chapter for individuals in controlled areas during a 40-hour week. Each application under this paragraph shall contain the following information:

i. A description of the protective equipment to be employed, including the efficiency of the equipment for the material involved;

ii. Procedures for the fitting, maintenance, and cleaning of the protective equipment;

iii. Procedures governing the use of the protective equipment, including supervisory procedures and length of time the equipment will be used by the individuals in each workweek. The proposed periods for use of the equipment by an individual shall not be of such duration as would discourage observance by the individual of the proposed procedures; and

iv. The average concentrations present in the areas occupied by the individuals.

(f) The dose received by any individual under 18 years of age shall not exceed ten per cent of the limits established in subsection (a) of this Section nor shall such an individual be exposed to concentrations of radioactive material greater than those listed in Section 6.5(a) of this Chapter, Column D. For purposes of this subsection, concentrations may be averaged over periods not greater than one week.

7:28–6.2 Radiation levels outside controlled areas

(a) The radiation level at any point outside the confines of the controlled area shall be limited to a value such that there is no reasonable possibility that any individual outside the controlled area will receive a radiation dose to the whole body, head and trunk, active blood-forming organs, gonads, or lens of the eyes, in excess of 0.5 rem in any one year.

(b) The radiation level at any point outside the confines of a controlled area shall not exceed:

1. A radiation level which, if an individual were continuously present in the area, could result in his receiving a dose in excess of two millirems in any one hour; or

2. A radiation level which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 100 millirems in any seven consecutive days.

(c) Any person may apply to the Department for proposed limits upon levels of radiation outside of controlled areas in excess of those specified in subsection (b) of this Section resulting from the applicant's possession or use of sources of radiation. Such applications shall include information as to anticipated average radiation levels and anticipated occupancy times for each area involved. The Department will approve the proposed limits if the applicant demonstrates to the satisfaction of the Department that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of one calendar year in excess of 0.5 rem.

(d) The limitations of this Section shall not be applicable to outgoing or incoming shipments of radioactive materials while being transported in conformance with the regulations of Subchapter 14 (Therapeutic Installations).

7:28–6.3 Concentrations in effluents from controlled areas

Concentrations of radioactive materials in effluents from controlled areas shall meet the requirements of Sections 11.2 (Disposal by release into

sanitary sewerage systems) and 11.3 (Disposal by discharges into the air, ground waters or surface waters) of this Chapter.

7:28–6.4 Exposures in the event of radiation incidents or emergencies

In the event of a radiation incident in which an employee or emergency worker receives more than the limits specified in Section 6.1(a) (Exposure of individuals in controlled areas) of this Chapter or in the event of emergency conditions in which immediate action required to minimize danger to life results in an employee or emergency worker receiving doses beyond the limits specified in Section 6.1(a) (Exposure of individuals in controlled areas) of this Chapter each employer shall take measures to limit additional exposure of his employees to an extent and for a period, which shall be subject to approval by the Department. All such doses shall be reported as required by Subchapter 13 (Reports of Thefts and Radiation Incidents) of this Chapter and shall be included in the records required by Subchapter 8 (Records) of this Chapter.

7:28–6.5 Average concentrations

(a) Maximum permissable average concentrations of radioactive materials in air and water shall be as follows:

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Actinium 227	(sol.)	6×10^{-5}	2×10^{-12}	2×10^{-6}	8×10^{-14}
	(insol.)	9×10^{-3}	3×10^{-11}	3×10^{-4}	9×10^{-13}
Actinium 228	(sol.)	1×10^{-3}	8×10^{-8}	9×10^{-5}	3×10^{-9}
	(insol.)	3×10^{-3}	2×10^{-8}	9×10^{-5}	6×10^{-10}
Americium 241	(sol.)	10^{-4}	6×10^{-12}	4×10^{-6}	2×10^{-13}
	(insol.)	8×10^{-4}	10^{-10}	2×10^{-5}	4×10^{-12}
Americium 242m	(sol.)	1×10^{-4}	6×10^{-12}	4×10^{-6}	2×10^{-13}
	(insol.)	3×10^{-3}	3×10^{-10}	9×10^{-5}	9×10^{-12}
Americium 242	(sol.)	4×10^{-3}	4×10^{-8}	1×10^{-4}	1×10^{-9}
	(insol.)	4×10^{-3}	5×10^{-8}	1×10^{-4}	2×10^{-9}
Americium 243	(sol.)	10^{-4}	6×10^{-12}	4×10^{-6}	2×10^{-13}
	(insol.)	8×10^{-4}	10^{-10}	3×10^{-5}	4×10^{-12}
Americium 244	(sol.)	1×10^{-1}	4×10^{-6}	5×10^{-3}	1×10^{-7}
	(insol.)	1×10^{-1}	2×10^{-6}	5×10^{-3}	8×10^{-7}
Antimony 122	(sol.)	8×10^{-4}	2×10^{-7}	3×10^{-5}	6×10^{-9}
	(insol.)	8×10^{-4}	10^{-7}	3×10^{-5}	5×10^{-9}
Antimony 124	(sol.)	7×10^{-4}	2×10^{-7}	2×10^{-5}	5×10^{-9}
	(insol.)	7×10^{-4}	2×10^{-8}	2×10^{-5}	7×10^{-10}
Antimony 125	(sol.)	3×10^{-3}	5×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	3×10^{-3}	3×10^{-8}	10^{-4}	9×10^{-10}
Argon 37	(imm.)	....	6×10^{-5}		10^{-6}
Argon 41	(imm.)	....	2×10^{-6}	....	4×10^{-8}
Arsenic 73	(sol.)	0.01	2×10^{-6}	5×10^{-4}	7×10^{-8}
	(insol.)	0.01	4×10^{-7}	5×10^{-4}	10^{-8}
Arsenic 74	(sol.)	2×10^{-3}	3×10^{-7}	5×10^{-5}	10^{-8}
	(insol.)	2×10^{-3}	10^{-7}	5×10^{-5}	4×10^{-9}
Arsenic 76	(sol.)	6×10^{-4}	10^{-7}	2×10^{-5}	4×10^{-9}
	(insol.)	6×10^{-4}	10^{-7}	2×10^{-5}	3×10^{-9}
Arsenic 77	(sol.)	2×10^{-3}	5×10^{-8}	8×10^{-5}	2×10^{-8}
	(insol.)	2×10^{-3}	4×10^{-7}	8×10^{-5}	10^{-8}
Astatine 211	(sol.)	5×10^{-5}	7×10^{-9}	2×10^{-6}	2×10^{-10}
	(insol.)	2×10^{-3}	3×10^{-8}	7×10^{-5}	10^{-8}
Barium 131	(sol.)	5×10^{-3}	10^{-6}	2×10^{-4}	4×10^{-8}
	(insol.)	5×10^{-3}	4×10^{-7}	2×10^{-4}	10^{-8}
Barium 140	(sol.)	8×10^{-4}	10^{-7}	3×10^{-5}	4×10^{-9}
	(insol.)	7×10^{-4}	4×10^{-8}	2×10^{-5}	10^{-8}
Berkelium 249	(sol.)	0.02	9×10^{-10}	6×10^{-4}	3×10^{-11}
	(insol.)	0.02	10^{-7}	6×10^{-4}	4×10^{-9}
Berkelium 250	(sol.)	6×10^{-3}	1×10^{-7}	2×10^{-4}	5×10^{-9}
	(insol.)	6×10^{-3}	1×10^{-8}	2×10^{-4}	4×10^{-8}
Beryllium 7	(sol.)	0.05	6×10^{-6}	0.002	2×10^{-7}
	(insol.)	0.05	10^{-8}	0.002	4×10^{-8}
Bismuth 206	(sol.)	10^{-3}	2×10^{-7}	4×10^{-5}	6×10^{-9}
	(insol.)	10^{-3}	10^{-7}	4×10^{-5}	5×10^{-9}
Bismuth 207	(sol.)	2×10^{-3}	2×10^{-7}	6×10^{-5}	6×10^{-9}
	(insol.)	2×10^{-3}	10^{-8}	6×10^{-5}	5×10^{-10}
Bismuth 210	(sol.)	10^{-3}	6×10^{-9}	4×10^{-5}	2×10^{-10}
	(insol.)	10^{-3}	6×10^{-9}	4×10^{-5}	2×10^{-10}
Bismuth 212	(sol.)	0.01	10^{-7}	4×10^{-4}	1×10^{-9}
	(insol.)	0.01	2×10^{-7}	4×10^{-4}	7×10^{-9}
Bromine 82	(sol.)	8×10^{-3}	10^{-6}	3×10^{-4}	4×10^{-8}
	(insol.)	10^{-3}	2×10^{-7}	4×10^{-5}	6×10^{-9}
Cadmium 109	(sol.)	5×10^{-3}	5×10^{-8}	2×10^{-4}	2×10^{-7}
	(insol.)	5×10^{-3}	7×10^{-8}	2×10^{-4}	3×10^{-9}
Cadmium 115m	(sol.)	2×10^{-4}	4×10^{-8}	3×10^{-5}	10^{-8}
	(insol.)	7×10^{-4}	4×10^{-8}	3×10^{-5}	10^{-8}

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Cadmium 115	(sol.)	10^{-3}	2×10^{-7}	3×10^{-5}	8×10^{-9}
	(insol.)	10^{-3}	2×10^{-7}	4×10^{-5}	6×10^{-9}
Calcium 45	(sol.)	3×10^{-4}	3×10^{-8}	9×10^{-6}	10^{-8}
	(insol.)	5×10^{-3}	10^{-7}	2×10^{-4}	4×10^{-10}
Calcium 47	(sol.)	10^{-3}	2×10^{-7}	5×10^{-5}	6×10^{-9}
	(insol.)	10^{-3}	2×10^{-7}	3×10^{-5}	6×10^{-9}
Californium 249	(sol.)	10^{-4}	2×10^{-12}	4×10^{-6}	5×10^{-14}
	(insol.)	7×10^{-4}	10^{-10}	2×10^{-5}	3×10^{-12}
Californium 250	(sol.)	4×10^{-4}	5×10^{-12}	10^{-5}	2×10^{-13}
	(insol.)	7×10^{-4}	10^{-10}	3×10^{-5}	3×10^{-12}
Californium 251	(sol.)	1×10^{-4}	2×10^{-12}	4×10^{-6}	6×10^{-14}
	(insol.)	8×10^{-4}	1×10^{-10}	3×10^{-5}	3×10^{-12}
Californium 252	(sol.)	7×10^{-4}	2×10^{-11}	2×10^{-5}	7×10^{-13}
	(insol.)	7×10^{-4}	10^{-10}	2×10^{-5}	4×10^{-12}
Californium 253	(sol.)	4×10^{-3}	8×10^{-10}	1×10^{-4}	3×10^{-11}
	(insol.)	4×10^{-3}	8×10^{-10}	1×10^{-4}	3×10^{-11}
Californium 254	(sol.)	4×10^{-4}	5×10^{-12}	10^{-7}	2×10^{-13}
	(insol.)	4×10^{-4}	5×10^{-12}	10^{-7}	2×10^{-13}
Carbon 14	(sol.)	0.02	4×10^{-6}	8×10^{-4}	10^{-7}
	(insol.)	....	5×10^{-5}	....	10^{-6}
Cerium 141	(sol.)	3×10^{-3}	4×10^{-7}	9×10^{-5}	2×10^{-8}
	(insol.)	3×10^{-3}	2×10^{-7}	9×10^{-5}	5×10^{-9}
Cerium 143	(sol.)	10^{-3}	3×10^{-7}	4×10^{-5}	9×10^{-9}
	(insol.)	10^{-3}	2×10^{-7}	4×10^{-5}	7×10^{-9}
Cerium 144	(sol.)	3×10^{-4}	10^{-8}	10^{-5}	3×10^{-10}
	(insol.)	3×10^{-4}	6×10^{-9}	10^{-5}	2×10^{-10}
Cesium 131	(sol.)	0.07	10^{-5}	0.002	4×10^{-7}
	(insol.)	0.03	3×10^{-6}	9×10^{-4}	10^{-7}
Cesium 134m	(sol.)	0.2	4×10^{-5}	0.006	10^{-6}
	(insol.)	0.03	6×10^{-6}	0.001	2×10^{-7}
Cesium 134	(sol.)	3×10^{-4}	4×10^{-8}	9×10^{-6}	10^{-8}
	(insol.)	10^{-3}	10^{-8}	4×10^{-5}	4×10^{-10}
Cesium 135	(sol.)	3×10^{-3}	5×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	7×10^{-3}	9×10^{-8}	2×10^{-4}	3×10^{-9}
Cesium 136	(sol.)	2×10^{-3}	4×10^{-7}	9×10^{-5}	10^{-8}
	(insol.)	2×10^{-3}	2×10^{-7}	6×10^{-5}	6×10^{-9}
Cesium 137	(sol.)	4×10^{-4}	6×10^{-8}	2×10^{-5}	2×10^{-9}
	(insol.)	10^{-3}	10^{-8}	4×10^{-5}	5×10^{-10}
Chlorine 36	(sol.)	2×10^{-3}	4×10^{-7}	8×10^{-5}	10^{-8}
	(insol.)	2×10^{-3}	2×10^{-8}	6×10^{-5}	8×10^{-10}
Chlorine 38	(sol.)	0.01	3×10^{-6}	4×10^{-4}	9×10^{-8}
	(insol.)	0.01	2×10^{-6}	4×10^{-4}	7×10^{-8}
Chromium 51	(sol.)	0.05	10^{-5}	0.002	4×10^{-7}
	(insol.)	0.05	2×10^{-6}	0.002	8×10^{-8}
Cobalt 57	(sol.)	0.02	3×10^{-6}	5×10^{-4}	10^{-7}
	(insol.)	0.01	2×10^{-7}	4×10^{-4}	6×10^{-9}
Cobalt 58m	(sol.)	0.08	2×10^{-5}	0.003	6×10^{-7}
	(insol.)	0.06	9×10^{-6}	0.002	3×10^{-7}
Cobalt 58	(sol.)	4×10^{-3}	8×10^{-7}	10^{-4}	3×10^{-8}
	(insol.)	3×10^{-3}	5×10^{-8}	9×10^{-5}	2×10^{-9}
Cobalt 60	(sol.)	10^{-3}	3×10^{-7}	5×10^{-5}	10^{-8}
	(insol.)	10^{-3}	9×10^{-9}	3×10^{-5}	3×10^{-10}
Copper 64	(sol.)	0.01	2×10^{-6}	3×10^{-4}	7×10^{-8}
	(insol.)	6×10^{-3}	10^{-6}	2×10^{-4}	4×10^{-8}
Curium 242	(sol.)	7×10^{-4}	10^{-10}	2×10^{-5}	4×10^{-12}
	(insol.)	7×10^{-4}	2×10^{-10}	3×10^{-5}	6×10^{-12}

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Curium 243	(sol.)	10^{-4}	$6x10^{-12}$	$5x10^{-6}$	$2x10^{-10}$
	(insol.)	$7x10^{-4}$	10^{-10}	$2x10^{-5}$	$3x10^{-12}$
Curium 244	(sol.)	$2x10^{-4}$	$9x10^{-12}$	$7x10^{-6}$	$3x10^{-12}$
	(insol.)	$8x10^{-4}$	10^{-10}	$3x10^{-5}$	$3x10^{-10}$
Curium 245	(sol.)	10^{-4}	$5x10^{-12}$	$4x10^{-6}$	$2x10^{-10}$
	(insol.)	$8x10^{-4}$	10^{-10}	$3x10^{-5}$	$4x10^{-10}$
Curium 246	(sol.)	10^{-4}	$5x10^{-12}$	$4x10^{-6}$	$2x10^{-10}$
	(insol.)	$8x10^{-4}$	10^{-10}	$3x10^{-5}$	$4x10^{-10}$
Curium 247	(sol.)	$1x10^{-4}$	$5x10^{-12}$	$4x10^{-6}$	$2x10^{-10}$
	(insol.)	$6x10^{-4}$	$1x10^{-10}$	$2x10^{-5}$	$4x10^{-10}$
Curium 248	(sol.)	$1x10^{-5}$	$6x10^{-13}$	$4x10^{-7}$	$2x10^{-11}$
	(insol.)	$4x10^{-5}$	$1x10^{-11}$	$1x10^{-6}$	$4x10^{-10}$
Curium 249	(sol.	$6x10^{-3}$	$1x10^{-3}$	$2x10^{-3}$	$4x10^{-7}$
	(insol.)	$6x10^{-3}$	$1x10^{-3}$	$2x10^{-3}$	$4x10^{-7}$
Dysprosium 165	(sol.)	0.01	$3x10^{-6}$	$4x10^{-4}$	$9x10^{-8}$
	(insol.)	0.01	$2x10^{-6}$	$4x10^{-4}$	$7x10^{-8}$
Dysprosium 166	(sol.)	10^{-3}	$2x10^{-7}$	$4x10^{-5}$	$8x10^{-9}$
	(insol.)	10^{-3}	$2x10^{-7}$	$4x10^{-5}$	$7x10^{-9}$
Einsteinium 253	(sol.)	$7x10^{-4}$	$8x10^{-10}$	$2x10^{-5}$	$3x10^{-11}$
	(insol.)	$7x10^{-4}$	$6x10^{-10}$	$2x10^{-5}$	$2x10^{-11}$
Einsteinium 254m	(sol.)	$5x10^{-4}$	$5x10^{-9}$	$2x10^{-5}$	$2x10^{-10}$
	(insol.)	$5x10^{-4}$	$6x10^{-9}$	$2x10^{-5}$	$2x10^{-10}$
Einsteinium 254	(sol.)	$4x10^{-4}$	$2x10^{-11}$	$1x10^{-5}$	$6x10^{-12}$
	(insol.)	$4x10^{-4}$	$1x10^{-10}$	$1x10^{-5}$	$4x10^{-12}$
Einsteinium 255	(sol.)	$8x10^{-4}$	$5x10^{-10}$	$3x10^{-5}$	$2x10^{-11}$
	(insol.)	$8x10^{-4}$	$4x10^{-10}$	$3x10^{-5}$	$1x10^{-11}$
Erbium 169	(sol.)	$3x10^{-3}$	$6x10^{-7}$	$9x10^{-5}$	$2x10^{-8}$
	(insol.)	$3x10^{-3}$	$4x10^{-7}$	$9x10^{-5}$	10^{-8}
Erbium 171	(sol.)	$3x10^{-3}$	$7x10^{-7}$	10^{-4}	$2x10^{-8}$
	(insol.)	$3x10^{-3}$	$6x10^{-7}$	10^{-4}	$2x10^{-8}$
Europium 152	(9.2 hr.)				
	(sol.)	$2x10^{-3}$	$4x10^{-7}$	$6x10^{-5}$	10^{-8}
	(insol.)	$2x10^{-3}$	$3x10^{-7}$	$6x10^{-5}$	10^{-8}
Europium 152	(13 yr.)				
	(sol.)	$2x10^{-3}$	10^{-8}	$8x10^{-5}$	$4x10^{-10}$
	(insol.)	$2x10^{-3}$	$2x10^{-8}$	$8x10^{-5}$	$6x10^{-10}$
Europium 154	(sol.)	$6x10^{-4}$	$4x10^{-9}$	$2x10^{-5}$	10^{-10}
	(insol.)	$6x10^{-4}$	$7x10^{-9}$	$2x10^{-5}$	$2x10^{-10}$
Europium 155	(sol.)	$6x10^{-3}$	$9x10^{-8}$	$2x10^{-4}$	$3x10^{-9}$
	(insol.)	$6x10^{-3}$	$7x10^{-8}$	$2x10^{-4}$	$3x10^{-9}$
Fermium 254	(sol.)	$4x10^{-3}$	$6x10^{-8}$	$1x10^{-4}$	$2x10^{-9}$
	(insol.)	$4x10^{-3}$	$7x10^{-8}$	$1x10^{-4}$	$2x10^{-9}$
Fermium 255	(sol.)	$1x10^{-3}$	$2x10^{-8}$	$3x10^{-5}$	$6x10^{-10}$
	(insol.)	$1x10^{-3}$	$1x10^{-8}$	$3x10^{-5}$	$4x10^{-10}$
Fermium 256	(sol.)	$3x10^{-5}$	$3x10^{-9}$	$9x10^{-7}$	$1x10^{-10}$
	(insol.)	$3x10^{-5}$	$2x10^{-9}$	$9x10^{-7}$	$6x10^{-11}$
Fluorine 18	(sol.)	0.02	$5x10^{-6}$	$8x10^{-4}$	$2x10^{-7}$
	(insol.)	0.01	$3x10^{-6}$	$5x10^{-4}$	$9x10^{-8}$
Gadolinium 153	(sol.)	$6x10^{-3}$	$2x10^{-7}$	$2x10^{-4}$	$8x10^{-9}$
	(insol.)	$6x10^{-3}$	$9x10^{-8}$	$2x10^{-4}$	$3x10^{-9}$
Gadolinium 159	(sol.)	$2x10^{-3}$	$5x10^{-7}$	$8x10^{-5}$	$2x10^{-8}$
	(insol.)	$2x10^{-3}$	$4x10^{-7}$	$8x10^{-5}$	10^{-8}
Gallium 72	(sol.)	10^{-3}	$2x10^{-7}$	$4x10^{-5}$	$8x10^{-9}$
	(insol.)	10^{-3}	$2x10^{-7}$	$4x10^{-5}$	$6x10^{-9}$
Germanium 71	(sol.)	0.05	10^{-5}	0.002	$4x10^{-7}$
	(insol.)	0.05	$6x10^{-6}$	0.002	$2x10^{-7}$

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Gold 196	(sol.)	$5x10^{-3}$	10^{-6}	$2x10^{-4}$	$4x10^{-8}$
	(insol.)	$4x10^{-3}$	$6x10^{-7}$	10^{-4}	$2x10^{-8}$
Gold 198	(sol.)	$2x10^{-3}$	$3x10^{-7}$	$5x10^{-5}$	10^{-8}
	(insol.)	10^{-3}	$2x10^{-7}$	$5x10^{-5}$	$8x10^{-9}$
Gold 199	(sol.)	$5x10^{-3}$	10^{-6}	$2x10^{-4}$	$4x10^{-8}$
	(insol.)	$4x10^{-3}$	$8x10^{-7}$	$2x10^{-4}$	$3x10^{-8}$
Hafnium 181	(sol.)	$2x10^{-3}$	$4x10^{-8}$	$7x10^{-5}$	10^{-9}
	(insol.)	$2x10^{-3}$	$7x10^{-8}$	$7x10^{-5}$	$3x10^{-9}$
Holmium 166	(sol.)	$9x10^{-4}$	$2x10^{-7}$	$3x10^{-5}$	$7x10^{-9}$
	(insol.)	$9x10^{-4}$	$2x10^{-7}$	$3x10^{-5}$	$6x10^{-9}$
Hydrogen 3	(sol., insol.	0.1	$5x10^{-6}$	0.003	$2x10^{-7}$
	(imm.)	....	$2x10^{-5}$	....	$4x10^{-5}$
Indium 113m	(sol.)	0.04	$8x10^{-6}$	0.001	$3x10^{-7}$
	(insol.)	0.04	$7x10^{-6}$	0.001	$2x10^{-7}$
Indium 114m	(sol.)	$5x10^{-4}$	10^{-7}	$2x10^{-5}$	$4x10^{-9}$
	(insol.)	$5x10^{-4}$	$2x10^{-6}$	$2x10^{-5}$	$7x10^{-10}$
Indium 115m	(sol.)	0.01	$2x10^{-6}$	$4x10^{-4}$	$8x10^{-8}$
	(insol.)	0.01	$2x10^{-6}$	$4x10^{-4}$	$6x10^{-8}$
Indium 115	(sol.)	$3x10^{-3}$	$2x10^{-7}$	$9x10^{-5}$	$9x10^{-9}$
	(insol.)	$3x10^{-3}$	$3x10^{-8}$	$9x10^{-5}$	10^{-9}
Iodine 125	(sol.)	$4x10^{-5}$	$5x10^{-9}$	$2x10^{-7}$	$8x10^{-11}$
	(insol.)	$6x10^{-3}$	$2x10^{-7}$	$2x10^{-4}$	$6x10^{-9}$
Iodine 126	(sol.)	$5x10^{-5}$	$8x10^{-9}$	$3x10^{-7}$	$9x10^{-11}$
	(insol.)	$3x10^{-3}$	$3x10^{-7}$	$9x10^{-5}$	10^{-8}
Iodine 129	(sol.)	10^{-3}	$2x10^{-8}$	$6x10^{-8}$	$2x10^{-11}$
	(insol.)	$6x10^{-3}$	$7x10^{-8}$	$2x10^{-4}$	$2x10^{-9}$
Iodine 131	(sol.)	$6x10^{-5}$	$9x10^{-9}$	$3x10^{-7}$	$1x10^{-10}$
	(insol.)	$2x10^{-3}$	$3x10^{-7}$	$6x10^{-5}$	10^{-8}
Iodine 132	(sol.)	$2x10^{-3}$	$2x10^{-7}$	$8x10^{-6}$	$3x10^{-9}$
	(insol.)	$5x10^{-3}$	$9x10^{-7}$	$2x10^{-4}$	$3x10^{-8}$
Iodine 133	(sol.)	$2x10^{-4}$	$3x10^{-8}$	$1x10^{-6}$	$4x10^{-10}$
	(insol.)	10^{-3}	$2x10^{-7}$	$4x10^{-5}$	$7x10^{-9}$
Iodine 134	(sol.)	$4x10^{-3}$	$5x10^{-7}$	$2x10^{-5}$	$6x10^{-9}$
	(insol.)	0.02	$3x10^{-6}$	$6x10^{-4}$	10^{-7}
Iodine 135	(sol.)	$7x10^{-4}$	10^{-7}	$4x10^{-6}$	$1x10^{-9}$
	(insol.)	$2x10^{-3}$	$4x10^{-7}$	$7x10^{-5}$	10^{-8}
Iridium 190	(sol.)	$6x10^{-3}$	10^{-6}	$2x10^{-4}$	$4x10^{-8}$
	(insol.)	$5x10^{-3}$	$4x10^{-7}$	$2x10^{-4}$	10^{-8}
Iridium 192	(sol.)	10^{-3}	10^{-7}	$4x10^{-5}$	$4x10^{-9}$
	(insol.)	10^{-3}	$3x10^{-8}$	$4x10^{-5}$	$9x10^{-10}$
Iridium 194	(sol.)	10^{-3}	$2x10^{-7}$	$3x10^{-5}$	$8x10^{-9}$
	(insol.)	$9x10^{-4}$	$2x10^{-7}$	$3x10^{-5}$	$5x10^{-9}$
Iron 55	(sol.)	0.02	$9x10^{-7}$	$8x10^{-4}$	$3x10^{-8}$
	(insol.)	0.07	10^{-6}	0.002	$3x10^{-8}$
Iron 59	(sol.)	$2x10^{-3}$	10^{-7}	$6x10^{-5}$	$5x10^{-9}$
	(insol.)	$2x10^{-3}$	$5x10^{-8}$	$5x10^{-5}$	$2x10^{-8}$
Krypton 85m	(imm.)	....	$6x10^{-6}$	....	10^{-7}
Krypton 85	(imm.)	....	10^{-5}	....	$3x10^{-7}$
Krypton 87	(imm.)	....	10^{-6}	....	$2x10^{-8}$
Lanthanum 140	(sol.)	$7x10^{-4}$	$2x10^{-7}$	$2x10^{-5}$	$5x10^{-9}$
	(insol.)	$7x10^{-4}$	10^{-7}	$2x10^{-5}$	$4x10^{-9}$
Lead 203	(sol.)	0.01	$3x10^{-6}$	$4x10^{-4}$	$9x10^{-8}$
	(insol.)	0.01	$2x10^{-6}$	$4x10^{-4}$	$6x10^{-8}$
Lead 210	(sol.)	$4x10^{-6}$	10^{-10}	10^{-7}	$4x10^{-12}$
	(insol.)	$5x10^{-3}$	$2x10^{-10}$	$2x10^{-4}$	$8x10^{-12}$

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Lead 212	(sol.)	$6x10^{-4}$	$2x10^{-8}$	$2x10^{-5}$	$6x10^{-10}$
	(insol.)	$5x10^{-4}$	$2x10^{-8}$	$2x10^{-6}$	$7x10^{-10}$
Lutetium 177	(sol.)	$3x10^{-3}$	$6x10^{-7}$	10^{-4}	$2x10^{-8}$
	(insol.)	$3x10^{-3}$	$5x10^{-7}$	10^{-4}	$2x10^{-8}$
Manganese 52	(sol.)	10^{-3}	$2x10^{-7}$	$3x10^{-5}$	$7x10^{-9}$
	(insol.)	$9x10^{-4}$	10^{-7}	$3x10^{-5}$	$5x10^{-9}$
Manganese 54	(sol.)	$4x10^{-3}$	$4x10^{-7}$	10^{-4}	10^{-8}
	(insol.)	$3x10^{-3}$	$4x10^{-8}$	10^{-4}	10^{-9}
Manganese 56	(sol.)	$4x10^{-3}$	$8x10^{-7}$	10^{-4}	$3x10^{-8}$
	(insol.)	$3x10^{-3}$	$5x10^{-7}$	10^{-4}	$2x10^{-8}$
Mercury 197m	(sol.)	$6x10^{-3}$	$7x10^{-7}$	$2x10^{-4}$	$3x10^{-8}$
	(insol.)	$5x10^{-3}$	$8x10^{-7}$	$2x10^{-4}$	$3x10^{-8}$
Mercury 197	(sol.)	$9x10^{-3}$	10^{-6}	$3x10^{-4}$	$4x10^{-8}$
	(insol.)	0.01	$3x10^{-6}$	$5x10^{-4}$	$9x10^{-8}$
Mercury 203	(sol.)	$5x10^{-4}$	$7x10^{-8}$	$2x10^{-5}$	$2x10^{-9}$
	(insol.)	$3x10^{-3}$	10^{-7}	10^{-4}	$4x10^{-9}$
Molybdenum 99	(sol.)	$5x10^{-3}$	$7x10^{-7}$	$2x10^{-4}$	$3x10^{-8}$
	(insol.)	10^{-3}	$2x10^{-7}$	$4x10^{-5}$	$7x10^{-9}$
Neodymium 144	(sol.)	$2x10^{-3}$	$8x10^{-11}$	$7x10^{-5}$	$3x10^{-12}$
	(insol.)	$2x10^{-3}$	$3x10^{-10}$	$8x10^{-5}$	10^{-11}
Neodymium 147	(sol.)	$2x10^{-3}$	$4x10^{-7}$	$6x10^{-5}$	10^{-8}
	(insol.)	$2x10^{-3}$	$2x10^{-7}$	$6x10^{-5}$	$8x10^{-9}$
Neodymium 149	(sol.)	$8x10^{-3}$	$2x10^{-6}$	$3x10^{-4}$	$6x10^{-8}$
	(insol.)	$8x10^{-3}$	10^{-6}	$3x10^{-4}$	$5x10^{-8}$
Neptunium 237	(sol.)	$9x10^{-4}$	$4x10^{-12}$	$3x10^{-5}$	10^{-13}
	(insol.)	$9x10^{-4}$	10^{-10}	$3x10^{-5}$	$4x10^{-12}$
Neptunium 239	(sol.)	$4x10^{-3}$	$8x10^{-7}$	10^{-4}	$3x10^{-8}$
	(insol.)	$4x10^{-3}$	$7x10^{-7}$	10^{-4}	$2x10^{-8}$
Nickel 59	(sol.)	$6x10^{-3}$	$5x10^{-7}$	$2x10^{-4}$	$2x10^{-8}$
	(insol.)	0.06	$8x10^{-7}$	0.002	$3x10^{-8}$
Nickel 63	(sol.)	$8x10^{-4}$	$6x10^{-8}$	$3x10^{-5}$	$2x10^{-9}$
	(insol.)	0.02	$3x10^{-7}$	$7x10^{-4}$	10^{-8}
Nickel 65	(sol.)	$4x10^{-3}$	$9x10^{-7}$	10^{-4}	$3x10^{-8}$
	(insol.)	$3x10^{-3}$	$5x10^{-7}$	10^{-4}	$2x10^{-8}$
Niobium 93m	(sol.)	0.01	10^{-7}	$4x10^{-4}$	$4x10^{-8}$
	(insol.)	0.01	$2x10^{-7}$	$4x10^{-4}$	$5x10^{-9}$
Niobium 95	(sol.)	$3x10^{-3}$	$5x10^{-7}$	10^{-4}	$2x10^{-8}$
	(insol.)	$3x10^{-3}$	10^{-7}	10^{-4}	$3x10^{-9}$
Niobium 97	(sol.)	0.03	$6x10^{-6}$	$9x10^{-3}$	$2x10^{-7}$
	(insol.)	0.03	$5x10^{-6}$	$9x10^{-3}$	$2x10^{-7}$
Osmium 185	(sol.)	$2x10^{-3}$	$5x10^{-7}$	$7x10^{-5}$	$2x10^{-8}$
	(insol.)	$2x10^{-3}$	$5x10^{-6}$	$7x10^{-5}$	$2x10^{-9}$
Osmium 191m	(sol.)	0.07	$2x10^{-5}$	0.003	$6x10^{-7}$
	(insol.)	0.07	$9x10^{-6}$	0.002	$3x10^{-7}$
Osmium 191	(sol.)	$5x10^{-3}$	10^{-6}	$2x10^{-4}$	$4x10^{-8}$
	(insol.)	$5x10^{-3}$	$4x10^{-7}$	$2x10^{-4}$	10^{-8}
Osmium 193	(sol.)	$2x10^{-3}$	$4x10^{-7}$	$6x10^{-5}$	10^{-8}
	(insol.)	$2x10^{-3}$	$3x10^{-7}$	$5x10^{-5}$	$9x10^{-9}$
Palladium 103	(sol.)	0.01	10^{-6}	$3x10^{-4}$	$5x10^{-8}$
	(insol.)	$8x10^{-3}$	$7x10^{-7}$	$3x10^{-4}$	$3x10^{-8}$
Palladium 109	(sol.)	$3x10^{-3}$	$6x10^{-7}$	$9x10^{-5}$	$2x10^{-8}$
	(insol.)	$2x10^{-3}$	$4x10^{-7}$	$7x10^{-5}$	10^{-8}
Phosphorus 32	(sol.)	$5x10^{-4}$	$7x10^{-8}$	$2x10^{-5}$	$2x10^{-9}$
	(insol.)	$7x10^{-4}$	$8x10^{-8}$	$2x10^{-5}$	$3x10^{-9}$
Platinum 191	(sol.)	$4x10^{-3}$	$8x10^{-7}$	10^{-4}	$3x10^{-8}$
	(insol.)	$3x10^{-3}$	$6x10^{-7}$	10^{-4}	$2x10^{-8}$

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Platinum 193m	(sol.)	0.03	$7x10^{-6}$	0.001	$2x10^{-7}$
	(insol.)	0.03	$5x10^{-6}$	0.001	$2x10^{-7}$
Platinum 193	(sol.)	0.03	10^{-6}	$9x10^{-4}$	$4x10^{-8}$
	(insol.)	0.05	$3x10^{-7}$	0.002	10^{-8}
Platinum 197m	(sol.)	0.03	$6x10^{-6}$	0.001	$2x10^{-7}$
	(insol.)	0.03	$5x10^{-6}$	$9x10^{-4}$	$2x10^{-7}$
Platinum 197	(sol.)	$4x10^{-3}$	$8x10^{-7}$	10^{-4}	$3x10^{-8}$
	(insol.)	$3x10^{-3}$	$6x10^{-7}$	10^{-4}	$2x10^{-8}$
Plutonium 238	(sol.)	10^{-4}	$2x10^{-12}$	$5x10^{-6}$	$7x10^{-14}$
	(insol.)	$8x10^{-4}$	$3x10^{-11}$	$3x10^{-5}$	10^{-13}
Plutonium 239	(sol.)	10^{-4}	$2x10^{-12}$	$5x10^{-6}$	$6x10^{-14}$
	(insol.)	$8x10^{-4}$	$4x10^{-11}$	$3x10^{-5}$	10^{-13}
Plutonium 240	(sol.)	10^{-4}	$2x10^{-12}$	$5x10^{-6}$	$6x10^{-14}$
	(insol.)	$8x10^{-4}$	$4x10^{-11}$	$3x10^{-5}$	10^{-13}
Plutonium 241	(sol.)	$7x10^{-3}$	$9x10^{-11}$	$2x10^{-4}$	$3x10^{-12}$
	(insol.)	0.04	$4x10^{-8}$	0.001	10^{-9}
Plutonium 242	(sol.)	10^{-4}	$2x10^{-12}$	$5x10^{-6}$	$6x10^{-14}$
	(insol.)	$9x10^{-4}$	$4x10^{-11}$	$3x10^{-5}$	10^{-13}
Plutonium 243	(sol.)	$1x10^{-3}$	$2x10^{-8}$	$3x10^{-4}$	$6x10^{-8}$
	(insol.)	$1x10^{-3}$	$2x10^{-8}$	$3x10^{-4}$	$8x10^{-8}$
Plutonium 244	(sol.)	$1x10^{-4}$	$2x10^{-12}$	$4x10^{-6}$	$6x10^{-14}$
	(insol.)	$3x10^{-4}$	$3x10^{-11}$	$1x10^{-5}$	$1x10^{-13}$
Polonium 210	(sol.)	$2x10^{-3}$	$5x10^{-10}$	$7x10^{-7}$	$2x10^{-11}$
	(insol.)	$8x10^{-4}$	$2x10^{-10}$	$3x10^{-6}$	$7x10^{-12}$
Potassium 42	(sol.)	$9x10^{-3}$	$2x10^{-6}$	$3x10^{-4}$	$7x10^{-8}$
	(insol.)	$6x10^{-4}$	10^{-7}	$2x10^{-5}$	$4x10^{-9}$
Praseodymium 142	(sol.)	$9x10^{-4}$	$2x10^{-7}$	$3x10^{-5}$	$7x10^{-9}$
	(insol.)	$9x10^{-4}$	$2x10^{-7}$	$3x10^{-5}$	$5x10^{-9}$
Praseodymium 143	(sol.)	10^{-3}	$3x10^{-7}$	$5x10^{-5}$	10^{-8}
	(insol.)	10^{-3}	$2x10^{-7}$	$5x10^{-5}$	$6x10^{-9}$
Promethium 147	(sol.)	$6x10^{-3}$	$6x10^{-8}$	$2x10^{-4}$	$2x10^{-9}$
	(insol.)	$6x10^{-3}$	10^{-7}	$2x10^{-4}$	$3x10^{-9}$
Promethium 149	(sol.)	10^{-3}	$3x10^{-7}$	$4x10^{-5}$	10^{-8}
	(insol.)	10^{-3}	$2x10^{-7}$	$4x10^{-5}$	$8x10^{-9}$
Protactinium 230	(sol.)	$7x10^{-3}$	$2x10^{-9}$	$2x10^{-4}$	$6x10^{-11}$
	(insol.)	$7x10^{-3}$	$8x10^{-10}$	$2x10^{-4}$	$3x10^{-11}$
Protactinium 231	(sol.)	$3x10^{-5}$	10^{-12}	$9x10^{-7}$	$4x10^{-14}$
	(insol.)	$8x10^{-4}$	10^{-10}	$2x10^{-5}$	$4x10^{-12}$
Protactinium 233	(sol.)	$4x10^{-3}$	$6x10^{-7}$	10^{-4}	$2x10^{-8}$
	(insol.)	$3x10^{-3}$	$2x10^{-7}$	10^{-4}	$6x10^{-9}$
Radium 223	(sol.)	$2x10^{-5}$	$2x10^{-8}$	$7x10^{-7}$	$6x10^{-11}$
	(insol.)	10^{-4}	$2x10^{-10}$	$4x10^{-6}$	$8x10^{-12}$
Radium 224	(sol.)	$7x10^{-5}$	$5x10^{-9}$	$2x10^{-6}$	$2x10^{-10}$
	(insol.)	$2x10^{-4}$	$7x10^{-10}$	$5x10^{-6}$	$2x10^{-11}$
Radium 226	(sol.)	$4x10^{-7}$	$3x10^{-11}$	$3x10^{-9}$	$3x10^{-12}$
	(insol.)	$9x10^{-4}$	$5x10^{-11}$	$3x10^{-5}$	$2x10^{-12}$
Radium 228	(sol.)	$8x10^{-7}$	$7x10^{-11}$	$3x10^{-8}$	$2x10^{-12}$
	(insol.)	$7x10^{-4}$	$4x10^{-11}$	$3x10^{-5}$	10^{-12}
Radon 220		....	$3x10^{-7}$	....	10^{-8}
Radon 222		....	$3x10^{-8}$	....	$1x10^{-9}$
Rhenium 183	(sol.)	0.02	$3x10^{-6}$	$6x10^{-4}$	$9x10^{-8}$
	(insol.)	$8x10^{-3}$	$2x10^{-7}$	$3x10^{-4}$	$5x10^{-9}$
Rhenium 186	(sol.)	$3x10^{-3}$	$6x10^{-7}$	$9x10^{-5}$	$2x10^{-8}$
	(insol.)	10^{-3}	$2x10^{-7}$	$5x10^{-5}$	$8x10^{-9}$
Rhenium 187	(sol.)	0.07	$9x10^{-6}$	0.003	$3x10^{-7}$
	(insol.)	0.04	$5x10^{-7}$	0.002	$2x10^{-8}$

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Rhenium 188	(sol.)	2×10^{-3}	4×10^{-7}	6×10^{-5}	10^{-8}
	(insol.)	9×10^{-4}	2×10^{-7}	3×10^{-5}	6×10^{-9}
Rhodium 103m	(sol.)	0.4	8×10^{-5}	0.01	3×10^{-6}
	(Insol.)	0.3	6×10^{-6}	0.01	2×10^{-6}
Rhodium 105	(sol.)	4×10^{-3}	8×10^{-7}	10^{-4}	3×10^{-8}
	(insol.)	3×10^{-3}	5×10^{-7}	10^{-4}	2×10^{-8}
Rubidium 86	(sol.)	2×10^{-3}	3×10^{-7}	7×10^{-5}	10^{-8}
	(insol.)	7×10^{-4}	7×10^{-8}	2×10^{-5}	2×10^{-9}
Rubidium 87	(sol.)	3×10^{-3}	5×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	5×10^{-3}	7×10^{-8}	2×10^{-4}	2×10^{-8}
Ruthenium 97	(sol.)	0.01	2×10^{-6}	4×10^{-4}	8×10^{-8}
	(insol.)	0.01	2×10^{-6}	3×10^{-4}	6×10^{-8}
Ruthenium 103	(sol.)	2×10^{-3}	5×10^{-7}	8×10^{-5}	2×10^{-8}
	(insol.)	2×10^{-3}	8×10^{-8}	8×10^{-5}	3×10^{-9}
Ruthenium 105	(sol.)	3×10^{-3}	7×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	3×10^{-3}	5×10^{-7}	10^{-4}	2×10^{-8}
Ruthenium 106	(sol.)	4×10^{-4}	8×10^{-8}	10^{-5}	3×10^{-9}
	(insol.)	3×10^{-4}	6×10^{-9}	10^{-5}	2×10^{-10}
Samarium 147	(sol.)	2×10^{-3}	7×10^{-7}	6×10^{-5}	2×10^{-12}
	(insol.)	2×10^{-3}	3×10^{-10}	7×10^{-5}	9×10^{-12}
Samarium 151	(sol.)	0.01	6×10^{-6}	4×10^{-4}	2×10^{-8}
	(insol.)	0.01	10^{-7}	4×10^{-4}	5×10^{-9}
Samarium 153	(sol.)	2×10^{-3}	5×10^{-7}	8×10^{-5}	2×10^{-8}
	(insol.)	2×10^{-3}	4×10^{-7}	8×10^{-5}	10^{-8}
Scandium 46	(sol.)	10^{-3}	2×10^{-7}	4×10^{-5}	8×10^{-9}
	(insol.)	10^{-3}	2×10^{-8}	4×10^{-5}	8×10^{-10}
Scandium 47	(sol.)	3×10^{-3}	6×10^{-7}	9×10^{-5}	2×10^{-8}
	(insol.)	3×10^{-3}	5×10^{-7}	9×10^{-5}	2×10^{-8}
Scandium 48	(sol.)	8×10^{-4}	2×10^{-7}	3×10^{-5}	6×10^{-9}
	(insol.)	8×10^{-4}	10^{-7}	3×10^{-5}	5×10^{-9}
Selenium 75	(sol.)	9×10^{-3}	10^{-6}	3×10^{-4}	4×10^{-8}
	(insol.)	8×10^{-3}	10^{-7}	3×10^{-4}	4×10^{-9}
Silicon 31	(sol.)	0.03	6×10^{-6}	9×10^{-4}	2×10^{-7}
	(insol.)	6×10^{-3}	10^{-6}	2×10^{-4}	3×10^{-8}
Silver 105	(sol.)	3×10^{-3}	6×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	3×10^{-3}	8×10^{-8}	10^{-4}	3×10^{-9}
Silver 110m	(sol.)	9×10^{-4}	2×10^{-7}	3×10^{-5}	7×10^{-9}
	(insol.)	9×10^{-4}	10^{-8}	3×10^{-5}	3×10^{-10}
Silver 111	(sol.)	10^{-3}	3×10^{-7}	4×10^{-5}	10^{-8}
	(insol.)	10^{-3}	2×10^{-7}	4×10^{-5}	8×10^{-9}
Sodium 22	(sol.)	10^{-3}	2×10^{-7}	4×10^{-5}	6×10^{-9}
	(insol.)	9×10^{-4}	9×10^{-9}	3×10^{-5}	3×10^{-10}
Sodium 24	(sol.)	6×10^{-3}	10^{-6}	2×10^{-4}	4×10^{-8}
	(insol.)	8×10^{-4}	10^{-7}	3×10^{-5}	5×10^{-9}
Strontium 85m	(sol.)	0.2	4×10^{-5}	0.007	10^{-6}
	(insol.)	0.2	3×10^{-5}	0.007	10^{-6}
Strontium 85	(sol.)	3×10^{-3}	2×10^{-7}	10^{-4}	8×10^{-9}
	(insol.)	5×10^{-4}	10^{-7}	2×10^{-4}	4×10^{-9}
Strontium 89	(sol.)	3×10^{-4}	3×10^{-8}	3×10^{-6}	3×10^{-10}
	(insol.)	8×10^{-4}	4×10^{-8}	3×10^{-5}	10^{-9}
Strontium 90	(sol.)	1×10^{-5}	1×10^{-9}	4×10^{-7}	4×10^{-11}
	(insol.)	10^{-3}	5×10^{-9}	4×10^{-5}	2×10^{-10}
Strontium 91	(sol.)	2×10^{-3}	4×10^{-7}	7×10^{-5}	2×10^{-8}
	(insol.)	10^{-3}	3×10^{-7}	5×10^{-5}	9×10^{-9}
Strontium 92	(sol.)	2×10^{-3}	4×10^{-7}	7×10^{-5}	2×10^{-8}
	(insol.)	2×10^{-3}	3×10^{-7}	6×10^{-5}	10^{-8}

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Sulfur 35	(sol.)	2×10^{-3}	3×10^{-7}	6×10^{-5}	9×10^{-9}
	(insol.)	8×10^{-4}	3×10^{-7}	3×10^{-4}	9×10^{-9}
Tantalum 182	(sol.)	10^{-3}	4×10^{-8}	4×10^{-5}	10^{-9}
	(insol.)	10^{-3}	2×10^{-8}	4×10^{-5}	7×10^{-10}
Technetium 96m	(sol.)	0.4	8×10^{-5}	0.01	3×10^{-6}
	(insol.)	0.3	3×10^{-5}	0.01	10^{-6}
Technetium 96	(sol.)	3×10^{-3}	6×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	10^{-3}	2×10^{-7}	5×10^{-5}	8×10^{-9}
Technetium 97m	(sol.)	0.01	2×10^{-6}	4×10^{-4}	8×10^{-9}
	(insol.)	5×10^{-3}	2×10^{-7}	2×10^{-4}	5×10^{-9}
Technetium 97	(sol.)	0.05	10^{-5}	0.002	4×10^{-7}
	(insol.)	0.02	3×10^{-7}	8×10^{-4}	10^{-8}
Technetium 99m	(sol.)	0.2	4×10^{-5}	0.006	10^{-6}
	(insol.)	0.08	10^{-5}	0.003	5×10^{-7}
Technetium 99	(sol.)	0.01	2×10^{-6}	3×10^{-4}	7×10^{-8}
	(insol.)	5×10^{-3}	6×10^{-8}	2×10^{-4}	2×10^{-9}
Tellurium 125m	(sol.)	5×10^{-3}	4×10^{-7}	2×10^{-4}	10^{-8}
	(insol.)	3×10^{-3}	10^{-7}	10^{-4}	4×10^{-9}
Tellurium 127m	(sol.)	2×10^{-3}	10^{-7}	6×10^{-5}	5×10^{-9}
	(insol.)	2×10^{-3}	4×10^{-8}	5×10^{-5}	10^{-9}
Tellurium 127	(sol.)	8×10^{-3}	2×10^{-6}	3×10^{-4}	6×10^{-8}
	(insol.)	5×10^{-3}	9×10^{-7}	2×10^{-4}	3×10^{-8}
Tellurium 129m	(sol.)	10^{-3}	8×10^{-8}	3×10^{-5}	3×10^{-9}
	(insol.)	6×10^{-4}	3×10^{-8}	2×10^{-5}	10^{-9}
Tellurium 129	(sol.)	0.02	5×10^{-6}	8×10^{-4}	2×10^{-7}
	(insol.)	0.02	4×10^{-6}	8×10^{-4}	10^{-7}
Tellurium 131m	(sol.)	2×10^{-3}	4×10^{-7}	6×10^{-5}	10^{-8}
	(insol.)	10^{-3}	2×10^{-7}	4×10^{-5}	6×10^{-9}
Tellurium 132	(sol.)	9×10^{-4}	2×10^{-7}	3×10^{-5}	7×10^{-9}
	(insol.)	6×10^{-4}	10^{-7}	2×10^{-5}	4×10^{-9}
Terbium 160	(sol.)	10^{-3}	10^{-7}	4×10^{-5}	3×10^{-9}
	(insol.)	10^{-3}	3×10^{-8}	4×10^{-5}	10^{-9}
Thallium 200	(sol.)	0.01	3×10^{-6}	4×10^{-4}	9×10^{-8}
	(insol.)	7×10^{-3}	10^{-6}	2×10^{-4}	4×10^{-8}
Thallium 201	(sol.)	9×10^{-3}	2×10^{-6}	3×10^{-4}	7×10^{-8}
	(insol.)	5×10^{-3}	9×10^{-7}	2×10^{-4}	3×10^{-8}
Thallium 202	(sol.)	4×10^{-3}	8×10^{-7}	10^{-4}	3×10^{-8}
	(insol.)	2×10^{-3}	2×10^{-7}	7×10^{-5}	8×10^{-9}
Thallium 204	(sol.)	3×10^{-3}	6×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	2×10^{-3}	3×10^{-8}	6×10^{-5}	9×10^{-10}
Thorium 227	(sol.)	5×10^{-4}	3×10^{-10}	2×10^{-5}	10^{-11}
	(insol.)	5×10^{-4}	2×10^{-10}	2×10^{-5}	6×10^{-12}
Thorium 228	(sol.)	2×10^{-4}	9×10^{-12}	7×10^{-6}	3×10^{-13}
	(insol.)	4×10^{-4}	6×10^{-12}	10^{-5}	2×10^{-13}
Thorium 230	(sol.)	5×10^{-3}	2×10^{-12}	2×10^{-6}	8×10^{-14}
	(insol.)	9×10^{-4}	10^{-11}	3×10^{-5}	3×10^{-13}
Thorium 231	(sol.)	7×10^{-3}	10^{-6}	2×10^{-4}	5×10^{-8}
	(insol.)	7×10^{-3}	10^{-6}	2×10^{-4}	4×10^{-8}
Thorium 232	(sol.)	5×10^{-5}	3×10^{-11}	2×10^{-6}	10^{-12}
	(insol.)	10^{-3}	3×10^{-11}	4×10^{-5}	10^{-12}
Thorium 234	(sol.)	5×10^{-4}	6×10^{-8}	2×10^{-5}	2×10^{-9}
	(insol.)	5×10^{-4}	3×10^{-8}	2×10^{-5}	10^{-9}
Thorium Nat.	(sol.)	3×10^{-5}	3×10^{-11}	10^{-6}	10^{-12}
	(insol.)	3×10^{-4}	3×10^{-11}	10^{-5}	10^{-12}
Thulium 170	(sol.)	10^{-3}	4×10^{-8}	5×10^{-5}	10^{-9}
	(insol.)	10^{-3}	3×10^{-8}	5×10^{-5}	10^{-9}

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Thulium 171	(sol.)	0.01	10^{-7}	5×10^{-6}	4×10^{-9}
	(insol.)	0.01	2×10^{-7}	5×10^{-6}	8×10^{-9}
Tin 113	(sol.)	2×10^{-3}	4×10^{-7}	9×10^{-5}	10^{-8}
	(insol.)	2×10^{-3}	5×10^{-8}	8×10^{-5}	2×10^{-9}
Tin 125	(sol.)	5×10^{-4}	10^{-7}	2×10^{-5}	4×10^{-8}
	(insol.)	5×10^{-4}	8×10^{-8}	2×10^{-5}	3×10^{-9}
Tungsten 181	(sol.)	0.01	2×10^{-6}	4×10^{-4}	8×10^{-8}
	(insol.)	0.01	10^{-7}	3×10^{-4}	4×10^{-9}
Tungsten 185	(sol.)	4×10^{-3}	8×10^{-7}	10^{-4}	3×10^{-8}
	(insol.)	3×10^{-3}	10^{-7}	10^{-4}	4×10^{-9}
Tungsten 187	(sol.)	2×10^{-3}	4×10^{-7}	7×10^{-5}	2×10^{-8}
	(insol.)	2×10^{-3}	3×10^{-7}	6×10^{-5}	10^{-8}
Uranium 230	(sol.)	7×10^{-5}	3×10^{10}	2×10^{-6}	10^{-11}
	(insol.)	10^{-4}	10^{-10}	5×10^{-6}	4×10^{-12}
Uranium 232	(sol.)	2×10^{-5}	10^{-10}	8×10^{-7}	3×10^{-12}
	(insol.)	8×10^{-4}	3×10^{-11}	3×10^{-5}	9×10^{-13}
Uranium 233	(sol.)	10^{-4}	5×10^{-10}	4×10^{-6}	2×10^{-11}
	(insol.)	9×10^{-4}	10^{-10}	3×10^{-5}	4×10^{-12}
Uranium 234	(sol.)	10^{-4}	6×10^{-10}	4×10^{-6}	2×10^{-11}
	(insol.)	9×10^{-4}	10^{-10}	3×10^{-5}	4×10^{-12}
Uranium 235	(sol.)	10^{-4}	5×10^{-10}	4×10^{-6}	2×10^{-11}
	(insol.)	8×10^{-4}	10^{-10}	3×10^{-5}	4×10^{-12}
Uranium 236	(sol.)	10^{-4}	6×10^{-10}	5×10^{-6}	2×10^{-11}
	(insol.)	10^{-3}	10^{-10}	3×10^{-5}	4×10^{-12}
Uranium 238	(sol.)	2×10^{-5}	7×10^{-11}	6×10^{-7}	3×10^{-12}
	(insol.)	10^{-3}	10^{-10}	4×10^{-5}	5×10^{-12}
Uranium 240	(sol.)	1×10^{-3}	2×10^{-7}	3×10^{-5}	8×10^{-9}
& Neptunium 240	(insol.)	1×10^{-3}	2×10^{-7}	3×10^{-5}	6×10^{-9}
Uranium-Nat.	(sol.)	2×10^{-5}	7×10^{-11}	6×10^{-7}	3×10^{-12}
	(insol.)	5×10^{-4}	6×10^{-11}	2×10^{-5}	2×10^{-12}
Vanadium 48	(sol.)	9×10^{-4}	2×10^{-7}	3×10^{-5}	6×10^{-9}
	(insol.)	8×10^{-4}	6×10^{-8}	3×10^{-5}	2×10^{-9}
Xenon 131m	(imm.)	....	2×10^{-6}	....	4×10^{-7}
Xenon 133	(imm.)	....	10^{-6}	....	3×10^{-7}
Xenon 133m	(imm.)	....	1×10^{-6}	....	3×10^{-7}
Xenon 135	(imm.)	....	4×10^{-6}	....	10^{-7}
Ytterbium 175	(sol.)	3×10^{-3}	7×10^{-7}	10^{-4}	2×10^{-8}
	(insol.)	3×10^{-3}	6×10^{-7}	10^{-4}	2×10^{-8}
Yttrium 90	(sol.)	6×10^{-4}	10^{-7}	2×10^{-5}	4×10^{-9}
	(insol.)	6×10^{-4}	10^{-7}	2×10^{-5}	3×10^{-9}
Yttrium 91m	(sol.)	0.1	2×10^{-5}	0.003	8×10^{-7}
	(insol.)	0.1	2×10^{-5}	0.003	6×10^{-7}
Yttrium 91	(sol.)	8×10^{-4}	4×10^{-8}	3×10^{-5}	10^{-8}
	(insol.)	8×10^{-4}	3×10^{-8}	3×10^{-5}	10^{-8}
Yttrium 92	(sol.)	2×10^{-3}	4×10^{-7}	6×10^{-5}	10^{-8}
	(insol.)	2×10^{-3}	3×10^{-7}	6×10^{-5}	10^{-8}
Yttrium 93	(sol.)	8×10^{-4}	2×10^{-7}	3×10^{-5}	6×10^{-9}
	(insol.)	8×10^{-4}	10^{-7}	3×10^{-5}	5×10^{-9}
Zinc 65	(sol.)	3×10^{-3}	10^{-7}	10^{-4}	4×10^{-9}
	(insol.)	5×10^{-3}	6×10^{-8}	2×10^{-4}	2×10^{-9}
Zinc 69m	(sol.)	2×10^{-3}	4×10^{-7}	7×10^{-5}	10^{-8}
	(insol.)	2×10^{-3}	3×10^{-7}	6×10^{-5}	10^{-8}
Zinc 69	(sol.)	0.05	7×10^{-6}	0.002	2×10^{-7}
	(insol.)	0.05	9×10^{-6}	0.002	3×10^{-7}
Zirconium 93	(sol.)	0.02	10^{-7}	8×10^{-4}	4×10^{-9}
	(insol.)	0.02	3×10^{-7}	8×10^{-4}	10^{-8}

Radionuclide		Occupational 40-hr. Week		Non-Occupational	
		Water uc/ml	Air uc/ml	Water uc/ml	Air uc/ml
Column		A	B	C	D
Zirconium 95	(sol.)	2×10^{-3}	10^{-7}	6×10^{-5}	4×10^{-9}
	(insol.)	2×10^{-3}	3×10^{-8}	6×10^{-5}	10^{-9}
Zirconium 97	(sol.)	5×10^{-4}	10^{-7}	2×10^{-5}	4×10^{-9}
	(insol.)	5×10^{-4}	9×10^{-8}	2×10^{-5}	3×10^{-9}
Unidentified Radionuclide(s)		3×10^{-7}	1×10^{-12}	10^{-8}	4×10^{-14}

Abbreviations
sol. = soluble
insol. = insoluble
imm. = immersion
m = metastable

(b) In any case where there is a mixture in air or water of more than o radionuclide, the limiting values for purposes of this Section shall b determined as follows:

1. If the identity and concentration of each radionuclide in th mixture are known, the limiting values shall be derived as follows:

i. Determine, for each radionuclide in the mixture, the rat between the quantity present in the mixture, the ratio between the quantit present in the mixture and the limit otherwise established in this Section fo the specific radionuclide when not in a mixture.

ii. The sum of such ratios for all the radionuclides in the mixtu may not exceed "1" ("unity").

iii. For example, if radionuclides A, B, and C are present i concentrations C_a, C_b, and C_c, and if the applicable MPC's are MPC_a an MPC_b and MPC_c respectively, then the concentrations shall be limited s that the following relationship exists:

$$\frac{C_a}{MPC_a} + \frac{C_b}{MPC_b} + \frac{C_c}{MPC_c} < 1$$

2. If either the identity or the concentration of any radionuclide i the mixture is not known, the limiting values for purposes of this section are:

i. For purposes of Column A — 3×10^{-7}

ii. For purposes of Column B — 1×10^{-12}

iii. For purposes of Column C — 1×10^{-8}

iv. For purposes of Column D — 4×10^{-14}

3. If any of the conditions specified in this paragraph are met, th corresponding values specified in this paragraph may be used in lieu of thos specified in paragraph 2 of this subsection.

i. If the identity of each radionuclide in the mixture is know but the concentration of one or more of the radionuclides in the mixture i not known, the concentration limit for the mixture is the limit specified i subsection (a) of this Section for the radionuclide in the mixture having th lowest concentration limit;

ii. If the identity of each radionuclide in the mixture is no known, but it is known that certain radionuclides specified in subsection (a

of this Section are not present in the mixture, the concentration limit for the mixture is the lowest concentration limit specified in subsection (a) of this Section for any radionuclide which is not known to be absent from the mixture; or

iii.

c. Element (atomic number) and isotope	Table I		Table II	
	Col. 1 Air (uc/ml)	Col. 2 Water (uc/ml)	Col. 1 Air (uc/ml)	Col. 2 Water (uc/ml)
If it is known that Sr 90, I 129, Pb 210, Po 210, At 211, Ra 223, Ra 224, Ra 226, Ac 227, Ra 228, Th 230, Pa 231, Th 232, and Th-nat are not present	....	9×10^{-5}	....	3×10^{-6}
If it is known that Sr 90, I 129, Pb 210, Po 210, Ra 223, Ra 226, Ra 228, Pa 231, and Th-nat are not present	....	6×10^{-5}	....	2×10^{-6}
If it is known that Sr 90, Pb 210, Ra 226 and Ra 228 are not present	....	2×10^{-5}	....	6×10^{-7}
If it is known that Ra 226 and Ra 228 are not present	....	3×10^{-6}	....	1×10^{-7}
If it is known that alpha-emitters and Sr 90, I 129, Pb 210, Ac 227, Ra 228, Pa 230, Pu 241 and Bk 249 are not present	3×10^{-11}	....	1×10^{-10}	....
If it is known that alpha-emitters and Pb 210, Ac 227, Ra 228 and Pu 241 are not present	3×10^{-10}	....	1×10^{-11}	....
If it is known that alpha-emitters and Ac 227 are not present	3×10^{-11}	....	1×10^{-12}	....
If it is known that Ac 227, Th 230, Pa 231, Pu 238, Pu 239, Pu 240, Pu 242, and Cf 249 are not present	3×10^{-12}	....	1×10^{-13}	....
If Pa 231, Pu 239, Pu 240, Pu 242 and Cf 249 are not present	2×10^{-12}	....	7×10^{-14}	....

4. If the mixture of radionuclides consists of uranium and its daughter products in ore dust prior to chemical processing of the uranium ore, the values specified in this paragraph may be used in lieu of those determined in accordance with paragrpah 1 of this subsection. or those specified in paragraphs 2 and 3 of this subsection.

i. For purposes of subsection (a) of this Section, Column B, 1×10^{-10} uc/ml gross alpha activity; or 2.5×10^{-11} uc/ml natrual uranium; or 75 micrograms per cubic meter of air natural uranium.

ii. For purposes of subsection (a) of this Section, Column D, 3×10^{-13} uc/ml gross alpha activity; or 8×10^{-13} uc/ml natural uranium; or 3 micrograms per cubic meter of air natural uranium.

5. For purposes of this subsection, a radionuclide may be considered as not present in a mixture if:

i. The ratio of the concentration of that radionuclide in the mixture (C_a) to the concentration limit for the radionuclide specified in Columns C and D of subsection (a) of this Section, (MPC_a) does not exceed $1/10$, that is

$$C_a / MPC_a \leq 1/10$$

ii. The sum of such ratios for all the radionuclides considered as not present in the mixture does not exceed $1/4$; that is

$$C_a / MPC_a + C_b / MPC_b + \leq 1/4$$

SUBCHAPTER 7. RADIATION SURVEYS AND PERSONNEL MONITORING

7:28–7.1 Surveys inside controlled areas

(a) Controlled areas shall be surveyed by, or under the direction of, a qualified individual to determine if the installation is maintained and operations are conducted in compliance with this Chapter.

(b) Radiation levels shall be determined with the use of suitable instruments and methods.

(c) Surveys shall be made of the air for radioactive content when the average concentrations may exceed $1/4$ the amount specified in Section 6.5(a) (Average concentrations) of this Chapter, Column B, or prorated values when more than one isotope is present.

(d) Installations where unsealed radioactive materials are stored or used shall be periodically surveyed for contamination of surfaces. These surveys shall be conducted in a manner to insure that the levels of surface

contamination are below those which could lead to exposures amounting to ten per cent of the limits specified in Section 6.1(a), (d) (Exposure of individuals in controlled areas) of this Chapter.

(e) The record of a survey shall contain, but shall not be limited to the radiation levels, the time the radiation is produced, the workweek and the fraction of the workweek that any individual may be exposed to the radiation and when required, the radioactive air concentrations and surface contaminations.

(f) Subsequent surveys shall be conducted at such times and as frequently as may be necessary to assure that the controlled areas and operations remain in compliance with this Chapter.

7:28–7.2 Surveys outside controlled areas

Surveys shall be made outside controlled areas at sufficient intervals and locations as may be necessary to insure compliance with Sections 6.2 (Radiation levels outside controlled areas) and 6.3 (Concentrations in effluents from controlled areas) of this Chapter.

7:28–7.3 Statement in lieu of actual survey

A written statement signed by a qualified individual and including his calculations and analysis of the dose rates in the vicinity of a radiation source may be acceptable in place of the survey required in Sections 7.1 (Surveys inside controlled areas) of this Chapter, except when radioactive-air contamination or surface contamination is involved.

7:28–7.4 Use of personnel-monitoring equipment

(a) Each owner shall supply appropriate personnel-monitoring equipment to and shall require that it be used by:

1. Each individual who enters a controlled area under such circumstances that he receives or is likely to receive, a dose in excess of 25 millirems in any period of seven consecutive days;

2. Each individual under 18 years of age who enters a controlled area under such circumstances that he receives or is likely to receive a dose in excess of ten millirems in any period of seven consecutive days;

3. Each individual who enters a high radiation area; and

4. At least one visitor in a group of visitors entering a controlled area.

(b) All individuals required to wear personnel-monitoring equipment shall be instructed in its proper use and purpose. Records shall be kept in accordance with Section 8.1 (Personnel-monitoring records) of this Chapter.

(c) When an individual working on the premises of an owner, but not employed by him is wearing personnel-monitoring equipment provided by his employer, the owner of the radiation source shall not be required to provide additional personnel-monitoring equipment.

7:28–7.5 Requirements for bio-assays

Where necessary or desirable in order to aid in determining the extent of an individual's exposure to concentrations of radioactive material, the Department may incorporate license provisions or issue an order requiring the owner to have appropriate bio-assays made and to furnish the Department with copies of such bio-assays.

SUBCHAPTER 8. RECORDS

7:28–8.1 Personnel-monitoring records

(a) Clear and legible records shall be maintained by the owner for calendar quarters on Form RH-26, or on a clear and legible form containing all the information required on RH-26. These records shall show the radiation exposures of all individuals who are required to wear personnel-monitoring equipment according to Section 7.4 (Use of personnel-monitoring equipment) of this Chapter and any required bio-assays according to Section 7.5 (Requirements for bio-assays) of this Chapter.

(b) Each employee, at his request, shall be supplied by the owner with an annual statement of his radiation exposure record and any bio-assays.

(c) At the request of an individual formerly employed by the owner, each owner shall furnish such individual a report of his exposure to radiation, including bio-assays, as shown in records maintained by the owner pursuant to subsection (a) of this Section. Such report shall be furnished within 30 days from the time the request is made or within 60 days from termination of employment, whichever is later. The report shall cover each calendar quarter of the individual's employment involving exposure to radiation.

(d) When an individual working on the premises of an owner, but not employed by him, is required by the owner to wear personnel-monitoring equipment, the owner of the radiation source shall furnish such individual's

employer within 90 days a statement of the individual's radiation record and this shall be incorporated in the individual's exposure record.

(e) Each report or statement required by subsections (b) through (d) of this Section shall contain the following statement: "This report is furnished to you under the provisions of Subchapter 8 of the New Jersey Radiation Protection Code. You should preserve this report for future reference."

(f) The exposure records on each employee shall be preserved during the course of his employment and for at least ten years after termination of employment. Exposure records of other persons shall be preserved for at least ten years.

(g) These records or true copy of same shall be made available to the Department on request.

7:28–8.2 Records of surveys

(a) Records shall be maintained showing the results of such surveys as are required pursuant to Subchapter 7 (Radiation Surveys and Personnel Monitoring) of this Chapter.

(b) The records of each survey shall be retained for at least ten years.

(c) These records or true copy of same shall be made available to the Department on request.

(d) The owner of any installation covered in Subchapters 14 through 16 of this Chapter shall submit to the Department within 30 days of receipt a copy of each report of radiation surveys made in compliance with Subchapter 7 (Radiation Surveys and Personnel Monitoring) of this Chapter.

7:28–8.3 Records of radioactive materials

(a) An accurate accounting for all radioactive materials shall be maintained for a radiation installation. Such records shall show radioactive materials received, produced, and disposed, the amounts and form of the radioactive material received or produced and the amount on hand.

(b) Such records shall be retained for at least two years after the final disposition of any radioactive material.

(c) These records or true copy of same shall be made available to the Department on request.

7:28–8.4 Records of sealed source testing

Records of the results of sealed source testing shall be kept at least two years.

7:28–8.5 Records from discontinued installations

The discontinuance of a radiation installation does not relieve the owner from the responsibility of retaining the records required by this Subchapter. Such owner may, however, request the Department to accept the records. The acceptance of such records by the Department relieves the owner of subsequent responsibility only in respect to their preservation as required by this Chapter.

SUBCHAPTER 9. RADIOACTIVE CONTAMINATION CONTROL

7:28–9.1 General precautions

All work with radioactive materials shall be carried out under such conditions as to minimize the radioactive contamination of the area and of the person(s) working therein.

7:28–9.2 Personnel and material contamination

(a) When the nature of the work is such that an individual or his clothing may become contaminated, the individual and his clothing shall be suitably monitored.

(b) Any contamination which might lead to exposures greater than ten per cent of the limits specified in Section 6.1(a) or (d) (Exposure of individuals in controlled areas) of this Chapter shall be removed from the contaminated individual before that individual is permitted to leave the area.

(c) No clothing, equipment, or other material having contamination which might lead to exposures greater than those specified in subsection (b) of this Section shall be permitted to leave the area except as radioactive material.

7:28–9.3 Decontamination of premises

Radioactively contaminated premises shall be decontaminated so that individuals using these premises shall not receive exposures greater than those listed in Section 9.2 (b) (Personnel and material contamination) of this Chapter.

7:28–9.4 Sealed source testing

(a) Unless otherwise specified in a Federal agency license, or a State license, sealed sources except trituim and krypton containing more than ten times the exempt quantities of Section 3.6 (Table of exempt quantitites) of this Chapter, shall be leak tested than ten times the generally licensed quantities of Section 4.19 (Quantities generally licensed) of this Chapter, Column B, or more at intervals of not longer than six months.

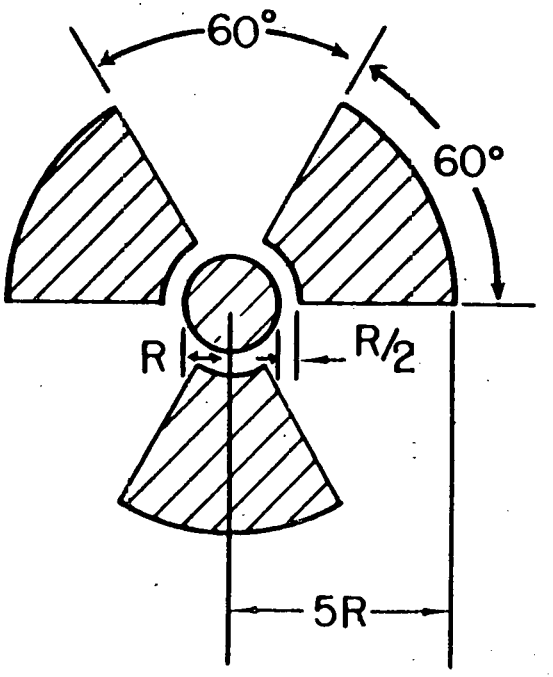
(b) Records of all sealed source testing shall be kept in accordance with Section 8.4 (Records of sealed source testing) of this Chapter.

SUBCHAPTER 10. LABELING, POSTING, AND CONTROLS

7:28–10.1 General requirement

(a) All signs and labels required by this Subchapter shall use the conventional radiation caution symbol shaped and colored as follows:

Radiation Caution Symbol



1. Cross-hatched area is to be magenta or purple;
2. Background is to be yellow.

(b) In addition to the language prescribed in the various sections of this Subchapter, any supplementary information which might be appropriate in aiding individuals to minimize exposure to radiation or to radioactive materials may be provided on or near such required signs or labels.

7:28–10.2 Radiation areas

(a) Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

1. CAUTION—RADIATION AREA; or
2. DANGER—RADIATION AREA.

7:28–10.3 High radiation areas

(a) Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

1. CAUTION—HIGH RADIATION AREA; or
2. DANGER—HIGH RADIATION AREA

(b) Each high radiation area shall be under direct, constant surveillance to protect, against unauthorized or accidental entry unless:

1. It is equipped with a control device which shall cause the level of radiation to be reduced below that at which an individual might receive a dose of 100 millirems in one hour upon entry into the area;

2. It is equipped with a control device which shall energize a conspicuous visible or audible alarm signal in such a manner that the individual entering and the owner or the supervisor of the activity are made aware of the entry; or

3. It is locked to protect against unauthorized or accidental entry and the owner or the supervisor of the activity maintains direct personal control over access to the key.

7:28–10.4 Airborne radioactivity areas

(a) Each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

1. CAUTION—AIRBORNE RADIOACTIVITY AREA; or
2. DANGER—AIRBORNE RADIOACTIVITY AREA

7:28–10.5 Areas containing radioactive materials

(a) Each area or room in which radioactive material, other than natural uranium or thorium is used or stored in an amount greater than ten times that listed in Section 10.9 (Labeling, posting and desposal quantities of radioactive material) of this Chapter shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

1. CAUTION—RADIOACTIVE MATERIAL(S); or
2. DANGER—RADIOACTIVE MATERIAL(S)

(b) Each area or room in which natural uranium or thorium is used or stored in an amount exceeding 100 times the quantity listed in Section 10.9 (Labeling, posting and disposal quantities of radioactive material) of this Chapter shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

1. CAUTION—RADIOACTIVE MATERIAL(S); or
2. DANGER—RADIOACTIVE MATERIAL(S)

7:28–10.6 Labeling of equipment and containers

(a) Any equipment or container in which radioactive material, other than natural uranium or thorium, is transported, stored, or used, in an amount greater than that specifically listed in Section 10.9 (Labeling, posting and disposal quantities of radioactive material) of this Chapter shall bear a durable, clearly visible label bearing the radiation caution symbol and the words:

1. CAUTION—RADIOACTIVE MATERIAL; or
2. DANGER—RADIOACTIVE MATERIAL

(b) Each container in which natural uranium or thorium is transported, stored, or used in a quantity greater than 10 times the quantity listed in Section 10.9 (Labeling, posting and disposal quantities of radioactive material) of this Chapter shall bear a durable, clearly visible label bearing the radiation caution symbol and the words:

1. CAUTION—RADIOACTIVE MATERIAL; or

2. DANGER—RADIOACTIVE MATERIAL

(c) Where containers are used for storage, the labels required in this Section shall state also the quantities and kinds of radioactive materials in the containers and the date of measurement of the quantities.

(d) All radiation-producing machines capable when operated, of producing a radiation area shall be labeled in a manner which cautions individuals of this fact.

7:28–10.7 Removal of signs and labels

All radiation caution signs and labels which may have been posted at a time when they were required shall be removed when the condition which originally required the posting no longer exists.

7:28–10.8 Exceptions from posting and labeling requirements

(a) Radiation areas and high radiation areas which result from the operation of therapeutic x-ray machines operated at potentials of 60 kv and below or from the operation of diagnostic x-ray machines shall be exempt from the posting requirements of Sections 10.2, 10.3 and 10.6 (d) of this Chapter provided that the operator of the equipment has taken precautions to insure that no individual other than the patient shall be in the radiation area.

(b) Rooms or other areas in hospitals are not required to be posted with radiation caution signs because of the presence of patients containing radioactive material provided that there are personnel in attendance who shall take the precautions necessary to prevent the exposure of any individual other than the patient to radiation or radioactive material in excess of the limits established in this Chapter.

(c) A room or area is not required to be posted with a radiation caution sign because of the presence of a sealed source provided the radiation level 12 inches from the surface of the source container or source housing does not exceed five millirems per hour.

(d) Radiation caution signs are not required to be posted at areas or rooms containing radioactive materials for periods of less than eight hours provided that:

1. The materials are constantly attened during such periods by an individual who shall take the precautions necessary to prevent the exposure of any other individual to radiation or radioactive materials in excess of the limits established in these regulations; and
2. Such area or room is subject to the user's control.

(e) Laboratory containers such as beakers, flasks and test tubes need not be labeled if they are being used transiently in laboratory procedures when the user is present.

(f) A container in which radioactive material is transported, stored, or used need not be labeled, if the concentration of the material in the container does not exceed that specified in Section 6.5(a) (Average concentrations) of this Chapter, Column A.

(g) Radioactive materials packaged and labeled in accordance with regulations of the appropriate Federal agency shall be exempt from the labeling and posting requirements of this Section during shipment, provided that the inside containers are labeled in accordance with the provisions of Section 10.6 (Labeling of equipment and containers) of this Chapter.

7:28–10.9 Labeling, posting and disposal quantities of radioactive materials

(a) Microcuries table is as follows:

Material	Microcuries	Material	Microcuries
Ag^{103}	1	$Pd^{103} + Rh^{103}$	50
Ag^{111}	10	Pd^{109}	10
As^{76}	10	Pm^{147}	10
As^{77}	10	Po^{210}	0.1
Au^{198}	10	Pr^{142}	10
Au^{199}	10	Pu^{239}	1
$Ba^{140} + La^{140}$	1	Ra^{226}	0.1
Be^{7}	50	Rb^{86}	10
C^{14}	50	Re^{186}	10
Ca^{45}	10	Rh^{103}	10
$Cd^{109} + Ag^{109}$	10	$Ru^{106} + Rh^{106}$	1
$Ce^{144} + Pr^{144}$	1	S^{35}	50
Cl^{36}	1	Sb^{124}	1
Co^{60}	1	Sc^{46}	1
Cr^{51}	50	Sm^{153}	10
$Cs^{137} + Ba^{137}$	1	Sn^{113}	10
Cu^{64}	50	Sr^{89}	1
Eu^{152}	1	$Sr^{90} + Y^{90}$	0.1
F^{18}	50	Ta^{182}	10
Fe^{55}	50	Tc^{96}	1
Fe^{59}	1	Tc^{99}	1
Ga^{72}	10	Te^{127}	10
Ge^{71}	50	Te^{129}	1
H^3(HTO or H^3_2O)	250	Th (natural)	50
I^{131}	10	Tl^{204}	50
In^{114}	1	Tritium (See H^3)	250
Ir^{192}	10	U (natural)	50
K^{42}	10	U^{233}	1
Kr^{85}	5	U^{234},U^{235}	50
La^{140}	10	V^{48}	1
Mn^{52}	1	W^{185}	10
Mn^{56}	50	Y^{90}	1
Mo^{99}	10	Y^{91}	1
Na^{22}	10	Zn^{65}	10
Na^{24}	10	Unidentified radioactive materials or any of the above in unknown mixtures	0.1
Nb^{95}	10		
Ni^{59}	1		
Ni^{65}	1		
P^{32}	10		

(b) For purposes of Sections 10.5 (Areas containing radioactive material) and 10.6 (Labeling of equipment and containers), where there is involved a combination of isotopes in known amounts, the limit for the combination shall be derived by determining for each isotope in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific isotope when not in combination. The sum of such ratios for all the isotopes in the combination may not exceed "1" ("unity").

SUBCHAPTER 11. DISPOSAL OF RADIOACTIVE MATERIALS

7:28–11.1 General requirements

The disposal of radioactive materials is permitted only to the extent and under the conditions specified in Sections 11.2 through 11.7 of this Chapter.

7:28–11.2 Disposal by release into sanitary sewerage systems

(a) An owner may discharge radioactive material into a sanitary sewerage system providing:

1. It is readily soluble or dispersible in water;

2. The quantity of any radioactive material released into the system by the owner in any one day does not exceed the larger of subparagraphs (i) or (ii) of this paragraph:

i. The quantity which, if diluted by the average daily quantity of sewage released into the sewer by the owner, will result in an average concentration not greater than the limits specified in Section 6.5 (a) (Average concentrations) of this Chapter Column A, or prorated values if more than one isotope is released: or

ii. Ten times the quantity of such material specified in Section 10.9 (Labeling, posting and disposal quantities of radioactive materials) of this Chapter and

3. The quantitiy of any radioactive material released in any one month, if diluted by the average monthly quantity of sewage released by the owner, will not result in an average concentration exceeding the limits specified in Section 6.5 (a) (Average concentrations) of this Chapter Column A, or prorated values if more than one isotope is released; and

4. The gross quantity of radioactive material released into the sewerage system by the owner does not exceed one curie per year.

(b) Radioactive wastes excreted by humans shall be exempt from the limitations of subsection (a) of this Section.

7:28–11.3 Disposal by discharges into the air, ground waters or surface waters

(a) An owner may dispose of radioactive material into the air outside a controlled area provided the concentration at the point where the material leaves the controlled area is not in excess of the concentration specified in Section 6.5 (a) (Average concentrations) of this Chapter Column D, or prorated values if more than one isotope is discharged. Where the material is discharged through a stack, tube pipe, or similar conduit, the determination may be made with respect to the point where the material leaves such conduit. For purposes of this subsection, concentrations may be averaged over periods not greater than one year.

(b) No owner shall dispose of radioactive material into surface waters or into ground waters without specific, prior permission in writing from the Department.

7:28–11.4 Disposal by burial in the soil

(a) No owner shall dispose of radioactive material by burial in the soil without prior approval in writing from the Department.

(b) Sites that have been used for burial of radioactive materials shall not be converted to other uses except with the written permission of the Department.

(c) The owner of any burial ground shall notify the Department in writing not less than 30 days in advance of any transfer of title to the property involved.

7:28–11.5 Disposal by transfer to a radioisotope disposal service

(a) An owner may dispose of radioactive materials by transfer to a radioisotope disposal service providing this service has been approved by the Department to receive such materials.

(b) An owner may dispose of radioactive materials by transfer to a person who is authorized to receive such material under a license issued by the Department, a Federal agency, or any agreement state.

7:28–11.6 Disposal by incineration

No owner shall incinerate radioactive materials for the purpose of disposal or preparation for disposal except as specifically approved by the Department in writing.

7:28–11.7 Disposal by a specially approved method

(a) Any person may apply to the Department for approval of proposed procedures to dispose of radioactive material in a manner not otherwise authorized in this Subchapter.

(b) Each application shall include a description of the radioactive material, including the quantities and kinds of radioactive material and the levels of radioactivity involved, and the proposed manner and conditons of disposal.

(c) The application, where approriate, shall also include an analysis and evaluation of pertinent information as to the nature of the environment, including topographical, geological, meteorological, and hydrological characteristics; usage of ground and surface waters in the general area; the nature and location of other potentially affected facilities; and procedures to be observed to minimize the risk of unexpected or hazardous exposures.

7:28–11.8 Unauthorized removal

Sources of radiation shall be secured against unauthorized removal from the place of storage.

SUBCHAPTER 12. TRANSPORTATION

7:28–12.1 Purpose and scope

(a) This Subchapter establishes requirements for transportation of radioactive material and for approval by the Department of shipping procedures for certain quantities of radioactive materials as defined in N.J.A.C. 7:28-12.3.

(b) The provisions of this Subchapter shall apply to the transportation of certain quantities of radioactive materials into, through or within the State of New Jersey and to any storage of such materials during or pending such transportation notwithstanding the applicability of other provisions of this Chapter or compliance with other applicable law or regulations.

7:28–12.2 Definitions

The following words and terms, when used in this Subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Certificate of handling" means a written document issued by the Department approving the use of certain specified New Jersey routes for the transport of specified quantities of radioactive materials.

"Certificate of handling for intransit storage" means a written document issued by the Department approving the use of a specifically designated location for the temporary storage of specified quantities of radioactive materials.

"Certification number" means the number associated with the written document issued by the Department.

"Certified shipment" means a shipment which meets the certification requirements as set forth in this Subchapter.

"Intransit storage" means the storing, holding, or otherwise detaining of radioactive material during shipment at a location other than its ultimate delivery point or point where material is to be used, processed, disposed of or otherwise utilized.

"Irradiated reactor fuel" means materials used as a source of fuel in a nuclear reactor and which have been subjected to neutron bombardment.

"Radiopharmaceutical" means a radionuclide or radioactive compound designed and prepared for organ or body system administration.

7:28–12.3 General requirements

(a) No person shall cause, suffer, allow or permit the transportation, intransit storage or detention pending transportation of any of the following materials without first having obtained a certificate of handling or a certification number in advance of such certificate from the Department:

1. Plutonium isotopes in any quantity and form exceeding two grams or 20 curies, whichever is less;

2. Uranium enriched in the isotope U-235 exceeding 25 atomic percent of the total uranium content in quantities where the U-235 content exceeds one kilogram;

3. Any quantity of radioactive material which, when combined with any other quantity of such material, exceeds 20 curies including, but not limited to, any of the actinides, spent reactor fuel elements or mixed fission products associated with such spent fuel elements.

(b) In the case of intrastate shipments, no person shall cause, suffer, allow or permit the transportation or intransit storage of any amount of radioactive material outside the confines of the location authorized for its use unless there is compliance with all relevant rules and regulations, as amended, of the United States Department of Transportation, United States Nuclear Regulatory Commission, and the United States Postal Service to the same extent as if the transportation were subject to the rules and regulations of that agency directly.

7:28–12.4 Application for certificate of handling for the transporation of radioactive material

(a) No person shall cause, suffer, allow or permit the transportation of radioactive material in quantities specified in N.J.A.C. 7:28-12.3(a) without having first obtained a certificate of handling or a certification number in advance of such certificate from the Department.

(b) All shipments of radioactive material shall be accompanied by either a certificate of handling or a certification number issued by the Department.

1. In those cases where a certificate of handling is issued by the Department, the certificate of handling shall be included with the shipping documents accompanying the certified shipment;

2. In those cases where a certification number is issued by the Department, the certification number and a 24-hour emergency telephone number will be supplied by the Department for notifying the State Police in the event of a public safety accident. Both the certification number and 24-hour emergency telephone number shall appear on all shipping documents accompanying the certified shipment;

3. All documents accompanying a certified shipment shall be available for inspection by authorized enforcement personnel.

(c) All applications for a certificate of handling or certification number shall be made to the Department not less than seven business days prior to shipment and shall include the following information:

1. Name of shipper;

2. Name of carrier and name of driver;

3. Type and quantity of radioactive material;

4. Date and time of shipment;

5. Starting point, scheduled route and destination;

6. Year, make, color, State of Registration and plate number of vehicle, if applicable;

7. Names and phone numbers of individuals with knowledge as to the type and quantity of material, who will be available on a 24-hour basis to assist in radiological assessment in the event of a public safety accident;

8. An affidavit of insurance which complies with the requirements of subsection (j) of this Section;

9. Any additional information required by the Department.

(d) The Department may require changes in dates, routes or time of transporting such material, if necessary, to maximize protection to public health and safety.

(e) The Department, upon receipt of the information specified in N.J.A.C. 7:28-12.4(c) and after consultation with the Superintendent of State Police, may approve an application for a certificate of handling or a certification number, if it determines that the shipment of such material shall be accomplished in a manner which does not jeopardize the public health and safety.

(f) Where the applicant supplies a shipping schedule for a number of shipments along with the information specificed in N.J.A.C. 7:28-12.4(c) for each shipment, the Department, after consultation with the Superintendent of State Police, may issue certificates of handling or certification numbers for the specified shipments for a period not exceeding one year in advance of any shipment.

(g) The Department may issue yearly certificates of handling or yearly certification numbers for the routine shipment of radioactive materials.

(h) In the case of certain shipments, the Department may require an escort and special handling and may prohibit any shipment until the applicant has satisfactorily demonstrated that he has arranged, at his own expense, such escort or other special handling.

1. Where an escort or other special handling is required, the applicant shall submit the plans or specification for review and approval by the Department and by the Superintendent of State Police.

2. The Superintendent of State Police reserves the right to disapprove such specifications and to require such modifications as deemed appropriate or in certain extraordinary cases to direct that any shipment be prohibited until a State Police escort or other action can be arranged. Any condition stipulated by the State Police will be imposed by the Department as a condition of the certificate of handling.

(i) All certified shipments which do not require placarding on the outside of the shipping vehicle shall have a placard conspicuously posted in the cab to be readily visible from outside the cab of the vehicle bearing the conventional radiation symbol and the words:

" CAUTION: THIS VEHICLE CONTAINS RADIOACTIVE MATERIAL"

(j) The applicant shall have adequate insurance coverage in order to indemnify all parties against injury, loss, or damage resulting from accidents.

(k) The Department may amend or revoke any certificate of handling issued pursuant to this Subchapter whenever it has cause to believe that the information upon which the certificate is issued is in anyway inaccurate, incomplete or otherwise invalid.

7:28–12.5 Application for a certificate of handling for the transportation of irradiated reactor fuel (spent fuel)

(a) No person shall cause, suffer, allow or permit the transportation of irradiated reactor fuel without first having obtained a certificate of handling from the Department.

(b) All shipments of irradiated reactor fuel shall be accompanied by a certificate of handling issued by the Department.

(c) The certificate of handling shall be included with the shipping documents accompanying the certified shipment. All such documents shall be available for inspection by authorized enforcement personnel.

(d) In order to obtain a certificate of handling for the shipment of irradiated reactor fuel, the applicant shall satisfy the following requirements in addition to any other regulations applicable to irradiated reactor fuel shipments.

(e) All applications for a certificate of handling shall be made to the Department in writing not less than 30 days prior to the planned shipment date and shall include the following information:

1. Name of shipper;

2. Name of carrier;

3. Type and quantity of radioactive material, including the number of fuel assemblies and activity in Curies;

4. Date of shipment;

5. Starting point, scheduled route, and destination including mileage and estimated elapsed time for each distinct segment of the route

within New Jersey. The scheduled shipment shall comply with the requirements of N.J.A.C. 7:28-12.5(i), (j), (k), and (m);

6. Type of transport vehicle, cask identification, and loaded weight of the transport vehicle;

7. A written safeguard plan which shall include procedures for the physical protection of the irradiated reactor fuel shipment which complies with, but is not limited to, the requirements of N.J.A.C. 7:28-12.5(h) and (l);

8. Any unusual characteristics of the shipment that would require special preparations or countermeasures in the event of a transportation emergency;

9. Names and phone numbers of available personnel responsible for emergency control and cleanup;

10. The names and phone numbers of individuals with knowledge of the type and quantity of material who will be available on a 24-hour basis to assist in radiological assessment in the event of a public safety accident;

11. An affidavit of insurance which complies with the requirements of N.J.A.C. 7:28-12.5(g); and

12. Any additional information required by the Department.

(f) Upon approval, all applicants shall update and verify information given to the Department on the original application, and shall provide the Department with the following additional information in writing not less than seven (7) days prior to the approved shipment date:

1. Time of shipment, including starting time, and if applicable, estimated time of entry into and departure from the State of New Jersey;

2. Names of personnel accompanying shipment;

3. Year, make, color, State of Registration, and plate number of vehicles escorting the shipment, if applicable; and

4. Means by which the Department can contact the transport and escort vehicles while enroute in New Jersey.

(g) The applicant shall have adequate insurance coverage in order to indemnify all parties against injury, loss, or damage resulting from accident.

(h) The applicant shall provide a statement setting forth arrangements made with law enforcement agencies along the route of the shipment for their response to an emergency or call for assistance.

(i) The proposed route shall utilize railways, roadways, or other transport modalities deemed safe by the Department and State Police. For

road shipments, the applicant shall use major highways in all routing except where the Department judges such routing would place a greater threat to the public health and safety than alternate routing, or where secondary roadways must be used for a minimum distance for egress from the point of origin or ingress to the final destination.

(j) In addition to complaince with all applicable standards, the applicant shall not transport in any county in New Jersey which has a population density exceeding 1,000 persons per square mile as measured in the most recent decennial census. The Department may waive this requirement only when it is shown to the satisfaction of the Department that routing excluding densely populated areas would place a greater threat to the public health and safety than routing traversing these areas.

(k) If, in accordance with N.J.A.C. 7:28-12.5(j), movement through a densely populated area is unavoidable, the following additional measures shall be taken;

1. Transit of the irradiated reactor fuel shall be nonstop. Provisions shall be made in advance so that refueling will be unnecessary in densely populated areas.

2. Primary roads shall be used for road shipments.

3. Protection by an armed escort force consisting of local police or trained armed private guards shall be provided by the shipper. At least two armed guards in a separate vehicle shall accompany the transport vehicle for road shipments.

4. No movement of irradiated reactor fuel shall occur through densely populated areas between 7:00 a.m. and 9:00 a.m. and 4:00 p.m. and 6:00 p.m.

(l) Each shipment of irradiated reactor fuel shall be accompanied by an armed escort; the plans and specifications for which shall be submitted at the time of application for review by the Department and Superintendent of State Police.

(m) The shipment of irradiated reactor fuel shall be scheduled wherever practicable without any intermediate stops within New Jersey except for refueling and obtaining provisions, and at all stops, at least one individual shall maintain constant surveillance of the transport vehicle. Irradiated reactor fuel is specifically excluded from the provision of N.J.A.C.7:28-12.7.

(n) The Superintendent of State Police reserves the right to disapprove escort or special handling specifications and to require such modifications as deemed appropriate or, in certain extraordinary cases, to direct that any

shipment be prohibited until a State Police escort or other action can be arranged. Any conditions stipulated by the State Police will be imposed by the Department as a condition of the certificate of handling.

(o) The Department may require changes in dates, routes, or times of transporting irradiated reactor fuel if necessary to maximize protection of the public health and safety.

(p) The Department will issue certificates of handling for individual shipments only. Irradiated reactor fuel is specifically excluded from the provisions of N.J.A.C. 7:28:12.4(f) and (g).

(q) The Department, upon review of the information specified in N.J.A.C. 7:28-5(e), and after consultation with the Superintendent of State Police, may approve the application for a certificate of handling if it determines that the shipment shall be accomplished in a manner which does not jeopardize the public health and safety.

(r) The Department may amend or revoke any certificate of handling issued pursuant to this Section whenever it has cause to believe that the information upon which the certificate is issued is in any way inaccurate, incomplete, or otherwise invalid or has not been verified pursuant to N.J.A.C. 7:28-12.5(f).

7:28–12.6 Application for certificate of handling for the transportation of radiopharmaceuticals or radiographic exposure devices

(a) No person shall transport or cause, suffer, allow or permit the shipment of radiopharmaceuticals or radiochemicals used to produce such radiopharmaceuticals or radiographic exposure devices in quantities of 20 or more curies without first obtaining a certificate of handling from the Department.

(b) The Department, after consultation with the Superintendent of State Police, may issue to the applicant a certficate of handling for a period not exceeding one year subject to fulfillment of the following conditions by the applicant.

1. The applicant shall submit a written application to the Department containing the information required by N.J.A.C. 7:28-12.4(c) 1 to 9 except that where such information is unavailable at the time the application is made, the applicant shall submit his best judgement as to such information and report deviations in accordance with N.J.A.C. 7:28-12.6(b) (3).

2. The applicant shall submit a report to the Department which supplies the specific information required by N.J.A.C. 7:28-12.4 (c) 3,4,5 for each shipment. Such reports shall be received by the Department not later than 30 days following each of the following periods or partial period during which the certificate of handling is in force: January 1 to March 31; April 1 to June 30; July 1 to September 30; October 1 to December 31.

3. The applicant shall request approval from the Department whenever a shipment deviates from the general conditions set forth in the applicants' annual certificate of handling.

4. When an applicant consistently or routinely applies to the Department for approval of deviations from the annual certificate of handling, the Department may require the applicant to reapply for new annual certificate of handling.

5. In the case of radiographic exposure devices, a statement shall be submitted that such devices and the radiation sources utilized therein meet all the requirements of N.J.A.C. 7:28-17.1 et seq.

7:28–12.7 Application for certificate of handling for the storage of intransit radioactive material

(a) No person shall cause, suffer, allow or permit any intransit storage of radioactive material unless measures are taken to insure that the material cannot be removed by other than authorized personnel, and to insure compliance with such provisions of N.J.A.C. 7:28-6.1 et seq., 7.1 et seq., and 8.1 et seq. as the Department may have imposed, on a case by case basis, as a conditon of certification.

(b) Any person who holds, detains or otherwise stores radioactive material while intransit, where the combined amounts of radioactive materials continually or periodically exceed the quantities specified in N.J.A.C. 7:28-12.3, shall apply for a certificate of handling for intransit storage.

(c) Any person seeking to obtain a certificate of handling for intransit storage shall submit to the Department the following information:

1. The type, maximum quantity, and maximum time period for storage of each radioactive material to be stored;

2. A description of the location and manner of storage;

3. Names, addresses and telephone numbers of the chiefs of local police and fire departments of the jurisdiction in which the storage facility is situated;

4. Names and phone numbers of individuals, with knowledge as to the type and quantities of materials in storage, who will be available on a 24-hour basis to assist in radiological assessment in the event of a public safety accident;

5. An affidavit of insurance which complies with the requirements of subsection (g) of this Section;

6. Any additional information required by the Department.

(d) The Department, upon receipt of the information specified in subsection (c) of this Section, after consultation with the Superintendent of State Police, may issue to the applicant a certificate of handling for intransit storage upon finding that such material will be stored in a manner which does not jeopardize the public health or safety.

(e) Any person storing radioactive material while such material is in transit shall imediately notify the Department of any additions in type, or increases in quantities or length of time of storage.

(f) The certificate of handling for intransit storage shall be posted prominently in the storage facility.

(g) The applicant shall have adequate insurance coverage in order to indemnify all parties against injury, loss, or damage resulting from accidents.

7:28–12.8 Noncompliance with certification conditions

(a) Any person who deviates from the conditions of any certificate of handling issued by the Department, or who handles radioactive material in nonconformity with the required information submitted in applying for a certificate of handling, shall be considered to be transporting, storing or otherwise handling radioactive material without such certificate.

(b) Any person who knowingly makes any false statement on any application, label, shipping document, record, report or other document required to be submitted to the Department or maintained pursuant to these regulations shall, upon conviction, be guilty of a crime of the fourth degree.

7:28–12.9 Fees

The Department may charge fees for any service performed pursuant to this Subchapter in accordance with a fee schedule promulgated pursuant to N.J.S.A. 26:2D-1 et seq. if it determines that such is necessary for the efficient implementation of the provisions of this Subchapter.

SUBCHAPTER 13. REPORTS OF THEFTS AND RADIATION INCIDENTS

7:28–13.1 Reports of theft or loss of radioactive materials

The owner from whose possession a theft or loss occurs shall immediately notify the Department by telephone and telegraph of any theft or loss of radioactive material in such quantities and under such circumstances that a substantial radiation hazard and/or contamination hazard may result.

7:28–13.2 Reportable radiation incidents

(a) The owner shall immediately notify the Department by telephone and telegraph of any radiation incident which may have caused or threatens to cause the following:

1. Exposure of the whole body of any individual to 25 rems or more of radiation; exposure of the skin of the whole body of any individual to 150 rems or more of radiation; or exposure of the feet, ankles, hands or forearms of any individual to 375 rems or more of radiation;

2. The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limits specified for such materials in Section 6.5(a) (Average concentrations) of this Chapter Columns C and D, or prorated values if more than one isotope is released;

3. A loss of one working week or more of the operation of any facilities affected; or

4. Damage to property in excess of $100,000.

(b) The names of any individuals who have been exposed to radiation levels set forth in subsection (a) of this Section shall not be included in the report.

(c) The owner shall notify the Department within 24 hours by telephone and telegraph of any radiation incident which may have caused or threatens to cause the following:

1. Exposure of the whole body of any individual to five rems or more of radiation; exposure of the skin of the whole body of any individual to 30 rems or more of radiation; or exposure of the feet, ankles, hands or forearms to 75 rems or more of radiation;

2. The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limit specified for such materials in Section 6.5(a) (Average concentrations) of this Chapter Columns C and D, or prorated values if more than one isotope is released;

3. A loss of one day or more of the operation of any facilities affected; or

4. Damage to property in excess of $1,000.

(d) The names of any individuals who have been exposed to radiation levels set forth in subsection (c) of this Section shall not be included in the report.

(e) The owner shall notify the Department in writing within 30 days of the following:

1. Each exposure of an individual to radiation or concentrations of radioactive material in excess of any applicable limit of Subchapter 6 (Permissible Dose Rated, Radiation Levels and Concentrations) of this Chapter, or of a licensee's license;

2. Any incident for which notification is required by subsections (a) and (c) of this Section; or

3. Levels of radiation or concentrations of radioactivity, not involving exposure of any individual in excess of any applicable limit Subchapter 6 (Permissible Dose Rated, Radiation Levels and Concentrations) of this Chapter, outside a controlled area in excess of ten times the limits of Section 6.2 (Radiation levels outside controlled areas) and Subchapter 11 (Disposal of Radioactive Materials) of this Chapter, or of a licensee's license.

(f) The reports set forth in subsection (e) of this Section shall describe the extent of exposure of individuals to radiation or to radioactive materials, the levels of radiation and concentrations of radioactive materials involved, the cause of the exposure, levels, or concentrations and corrective steps taken or planned to assure against a recurrence.

(g) In each case where subsection (e) 1 of this Section requires a report to the Department of exposure of an individual, the owner shall:

1. Delete from the report all references to the names and addresses of individuals so exposed. The identity of such individuals shall be privileged and shall be submitted as a separate document of such report: and

2. Concurrently given written notification to the individual of the nature and extent of the exposure. Such notice shall contain the following statement: "This report is furnished to you under the provisions of Subchapter 13 (Reports of Thefts and Radiation Incidents) of the New Jersey Administrative Code. You should preserve this report for future reference."

SUBCHAPTER 14. THERAPEUTIC INSTALLATIONS

7:28–14.1 Scope

(a) This Subchapter covers therapeutic installations used in the healing arts.

(b) The provisions of this Subchapter are in addition to, and not in substitution for, the applicable provisions of Subchapters 1 through 13 of this Chapter.

7:28–14.2 Prohibited use

No registrant shall operate or permit the operation of x-ray equipment used in the healing arts unless the equipment and installation meet the applicable requirements of the provisions of this Subchapter.

7:28–14.3 Therapeutic x-ray installations operated at potentials above 60 kvp

(a) Equipment used in therapeutic x-ray installations operated at potentials above 60 kvp shall be as follows:

1. The tube housing shall be of the therapeutic type.

2. Permanent diaphragms or cones used for collimating the useful beam shall afford the same degree of protection as the housing. Adjustable or removable beam-limiting diaphragms or cones shall transmit not more than five per cent of the useful beam obtained at the maximum kilovoltage and with maximum filter.

3. The filter system shall be so arranged as to minimize the possibility of error in filter selection and alignment. Filters shall be secured in

place to prevent them from dropping out during treatment. The filter slot shall be so constructed that the radiation escaping through it does not produce a dose rate in excess of one rem per hour at one meter.

4. The x-ray tube shall be so mounted that it cannot turn or slide with respect to the aperture. Housing shall be marked so as to permit the accurate reproduction of the target-to-skin distance.

5. Means shall be provided to immobilize the tube housing during stationary portal treatment.

6. Rectifier tubes shall be shielded or located so that no individual is exposed to radiation doses in excess of those specified in Subchapter 6 (Permissible Dose Rates, Radioactive Levels and Concentrations) of this Chapter.

7. A timer shall be provided to terminate the exposure after a preset time regardless of what other exposure limiting devices are present.

8. Lead rubber, lead foil, or any other material used for limiting the field shall transmit not more than five per cent of the useful beam.

9. All therapeutic x-ray producing machines which nominally can operate above 100 kvp and which are purchased after the effective date of this Chapter shall have a beam monitoring device to indicate any change in output due to incorrect filter, milliamperage or kilovoltage. The use of this monitoring devices shall not be a substitute for the requirement of calibration in subsection (c) of this Section.

(b) Structural design, of therapeutic x-ray installations operated at potentials above 60 kvp shall be as follows:

1. Shielding of the therapy room shall be a permanent part of the building. Portable shields shall not be used as a substitute for structural shielding.

2. All wall, floor, and ceiling areas that can be struck by the useful beam, plus a border of one foot, shall be provided with primary protective barriers. All wall, floor, and ceiling areas that because of mechanical or electrical restrictions cannot be struck by the useful beam shall be provided with secondary protective barriers. The radiation levels outside these barriers shall satisfy the requirements of Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

3. Interlocks shall be provided so that when any door to the treatment room is opened the machine will be shut off automatically or the radiation level within the room shall be reduced to a maximum of 10 mr per hour at a distance of one meter in any direction from the target. After such a

shut-off or reduction in output, it shall be possible to restore the machine to full operation only from the control panel.

4. Control apparatus for the x-ray equipment shall have the required protective barrier between it and the treatment area. Access to the treatment area from the control apparatus shall be through an interlocked door.

5. Windows, mirror systems, or closed-circuit television viewing screens used for observing the patient shall be so located that the operator can see the patient and the control panel from the same position.

(c) Conditions of operation of therapeutic x-ray installations operated at potentials above 60 kvp shall be as follows:

1. The radiation field produced by the x-ray machine shall be so calibrated that the dose rate is accurately known for all operating condition used in radiation treatment. Check calibrations shall be made on an annual basis. Recalibrations shall be required after each x-ray tube replacement and after any changes or replacement in the generating apparatus which could effect a change in the dose rate.

2. Whenever any therapeutic x-ray machine equipped with a beam monitoring device is operated above 100 kvp, the beam monitoring device shall be used to indicate any change in output due to incorrect filter, milliamperage or kilovoltage.

3. No person except the patient shall be in the treatment room during exposure.

4. Both the control panel and the patient shall be kept under observation during exposure.

5. Any machine left unattented shall have the control switch turned off and also shall have the power to the control switch disconnected.

6. Personnel monitoring equipment shall be used as required by Section 7.4 (Use of personnel-monitoring equipment) of this Chapter.

7:28-14.4 Therapeutic x-ray installations operated at potentials of 60 kvp and below

(a) Equipment used in therapeutic x-ray installations operated at potentials of 60 kvp and below shall be as follows:

1. Tube housing shall be of the therapeutic type.

2. Permanent diaphragms or cones used for collimating the useful beam shall afford the same degree of protection as the housing.

3. Adjustable or removable beam-limiting diaphragms or cones shall transmit not more than five per cent of the useful beam obtained at the maximum kilovoltage and with maximum filter.

4. The filter system shall be so arranged as to minimize the possibility of error in filter selection or alignment. Filters shall be secured in place to prevent them from dropping out or becoming misaligned during treatment. The filter slot shall be so constructed that the radiation escaping through it does not produce a dose rate in excess of one rem per hour at one meter.

5. For contact therapy, the leakage radiation at the surface of the tube housing shall not exceed 0.1 rem per hour.

6. The x-ray tube shall be so mounted that it cannot turn or slide with respect to the aperture. The housing shall be marked so as to permit the accurate reproduction of the target-to-skin distance.

7. The tube housing shall be mechanically immobilized during stationary portal treatment.

8. A timer shall be used which can be accurately preset to terminate automatically exposures as short as one second.

9. There shall be on the control panel some easily discernible device which will give positive indication that the tube is energized.

10. Lead rubber, lead foil or any other material used for limiting the field shall transmit not more than five per cent of the useful beam.

(b) Permanent structural shielding or portable shields shall be used as necessary to insure that no person other than the patient receives a dose in excess of the limits specified in Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

(c) Conditions of operation of therapeutic x-ray installations operated at potentials of 6 kvp and below shall be as follows:

1. The radiation field produced by the x-ray machine shall be so calibrated that the dose rate is accurately known for all operating conditions used in radiation treatment. Check calibrations shall be made on an annual basis. Recalibration shall be required after each x-ray tube replacement and after any changes or replacement in the generating apparatus which could effect a change in the dose rate.

2. No individual other than the patient shall be permitted in the treatment room during x-ray treatment unless he wears a protective apron of at least ¼ mm lead equivalent.

3. The x-ray tube shall not be hand held during irradiation, except when necessary and then only if the operator wears protective gloves and apron of at least ¼ mm lead equivalent.

4. Apparatus constructed with beryllium or other low-filtration windows shall have a cap of 0.5 mm lead covering the aperture window of the tube housing when the apparatus is not being used.

5. Both the control panel and the patient shall be kept under observation during exposure.

6. Any machine left unattended shall have both the control switch turned off and the power to the control switch disconnected.

7. Personnel monitoring equipment shall be used as required by Section 7.4 (Use of personnel-monitoring equipment) of this Chapter.

7:28–14.5 Teletherapy apparatus utilizing radioactive materials

(a) Teletherapy equipment utilizing radioactive materials shall be as follows:

1. The source housing and collimating devices shall be so constructed that at one meter in any direction from the source in the "off" position, the maximum dose rate shall not exceed ten mr per hour and the average shall not exceed two mr per hour.

2. The leakage radiation shall not exceed 0.1 per cent of the useful beam when both are measured at one meter from the source and with the control mechanism in the "on" position. This limit does not apply to source housings where the leakage radiation at one meter is less than one rem per hour.

3. Adjustable beam-limiting diaphragms shall allow transmission of not more than five per cent of the useful beam dose rate outside the useful beam.

4. In the "on" position, the moving part shall always come to rest with the source and the beam collimating device accurately aligned. If a liquid "on-off" device is used, repeated operation of the device shall not cause a variation of more than five per cent in exposure rate in the "on" position.

5. The control mechanism shall be of a positive design, capable of acting in any position of the housing.

6. Whatever the "on-off" shutter mechanism, that is, solid, liquid, slide, wheels or shutters, the closing device shall be so designed as to return automatically to the "off" position in the event of any breakdown or

interruption of the activating force and shall stay in the "off" position when the force goes on again until reactivated from the control.

7. The equipment, in addition to the automatic closing device, shall be so designed that it can be manually turned off with a minimum risk of exposure. The moving parts shall be so designed that it is highly improbable for projections, breakages, loose screws, dirt or failure of any part to impede the closing of the source.

8. There shall be a warning device at the source housing and on the control panel that plainly indicates whether the apparatus is "on" or "off". This device shall be directly actuated by the moving part that changes the apparatus from the "off" to the "on" position.

9. The controls shall be provided with a timer that automatically terminates the exposure after a preset time.

10. The beam shall be provided with a locking device to prevent unauthorized use.

(b) Structural design of teletherapy apparatus utilizing radioactive materials shall be as follows:

1. Shielding of the therapy room shall be a permanent part of the building.

2. All wall, floor, and ceiling areas that can be struck by the useful beam, plus a border of one foot, shall be provided with primary protective barriers. All wall, floor, and ceiling areas that because of mechanical or electrical restrictions cannot be struck by the useful beam shall be provided with secondary protective barriers. The radiation levels outside these barriers shall satisfy the requirements of Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

3. Interlocks shall be provided so that when any door to the teletherapy room is opened the teletherapy apparatus shall be shut off automatically. After such a shut-off, it shall be possible to restore the apparatus to full operation only from the control panel.

4. Windows, mirror systems, or closed-circuit television viewing screens used for observing the patient shall be so located that the operator can see the patient and the control panel from the same position.

(c) Conditions of operation of teletherapy apparatus utilizing radioactive materials shall be as follows:

1. The output of the teletherapy apparatus shall be calibrated. It shall be recalibrated whenever the source is replaced.

2. No individual, except the patient, shall be in the treatment room during exposure.

3. Both the control panel and the patient shall be kept under observation during exposure.

4. Personnel monitoring equipment shall be used as required by Section 7.4 (Use of personnel-monitoring equipment) of this Chapter.

SUBCHAPTER 15. MEDICAL DIAGNOSTIC X-RAY INSTALLATIONS

7:28–15.1 Scope

(a) This Subchapter covers fluoroscopic and radiographic installations used in all the healing arts, except dentistry. Subchapter 16 (Dental Radiographic Installations) of this Chapter gives the regulations for dental radiographic installations.

(b) The provisions of this Subchapter are in addition to, and not in substitution for the applicable provisions of Subchapters 1 through 13 of this Chapter.

7:28–15.2 Prohibited use

No registrant shall operate or permit the operation of x-ray equipment used in the healing arts unless the equipment and installation meet the applicable requirements of these regulations.

7:28–15.3 Medical fluoroscopic installations

(a) Equipment used in medical fluoroscopic installations shall be as follows:

1. The tube housing shall be of a diagnostic type.

2. The distance from the target to the panel or to the table top shall not be less than 12 inches.

3. A cone shall extend from the tube housing to a point as near as is practical to the panel or table top. Its walls shall provide the same degree of protection as is required of the housing.

4. An adjustable diaphragm system shall be provided on all fluoroscopes, except those with image intensifiers, to restrict the size of the useful beam so that the fluoroscopic screen has an unilluminated border when the diaphragm system is open to the fullest extent and the screen is 15

inches from the table top or panel. Orthodiascopes shall be exempt from the requirements of this Section.

5. The tube mounting and the fluoroscopic screen shall be linked together so that during use the fluoroscopic screen always fully intercepts the useful beam. Orthodiascopes shall be exempt from the requirements of this Section.

6. Adjustable diaphragms or shutters to restrict the size of the useful beam shall provide a minimum of 1.5 mm lead equivalent protection.

7. The total filtration permanently in the useful beam shall be equal to at least 2.5 mm aluminum equivalent, or the half-value layer shall be not less than 2.5 mm aluminum equivalent.

8. The fluoroscopic screen shall be covered with a transparent protective material such that under normal operating conditions the dose rate measured five cm from the viewer's side of the screen shall not be more than 20 mr per hour without a patient and with the screen eight inches from the table top or panel.

9. With apparatus using an image intensifier, a protective shield shall be provided so that the useful beam does not produce a radiation hazard to the operator or other personnel in a fluoroscopic room.

10. A manually reset, cumulative timing device shall be used which will automatically indicate elapsed exposure time and either turn off the apparatus automatically or give an audible signal when the total exposure exceeds a predetermined limit given in one or a series of exposures. The device shall have a mazimum range of five minutes.

11. For routine fluoroscopy, the exposure rate measured at the panel or table top shall not exceed five rems per minute.

12. A bucky slot cover and shielding between patient and flouroscopist shall be used and shall provide protection equivalent to at least 0.5 mm of lead. Such accessory shielding shall not substitute for the wearing of a protective apron as required in subsection (c)(2) of this section.

(b) Permanent structural shielding and/or protective barriers shall be used as necessary to insure that no person other than the patient receives a dose in excess of the limits specified in Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

(c) Operating procedures for medical fluoroscopic installations shall be as follows:

1. Fluoroscopic equipment shall be operated only by authorized instructed individuals.

2. Protective gloves and apron of at least ¼ mm lead equivalent shall be worn by the fluoroscopist during every examination.

3. Only individuals required for the fluoroscopic procedure shall be in the fluoroscopic room during exposure. The exposure of such individuals shall be controlled by the use of shielding and protective clothing as necessary to insure that they are not exposed to radiation doses in excess of those permitted by Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter. They shall use personnel monitoring equipment as required by Section 7.4 (Use of personnel-monitoring equipment) of this Chapter.

4. Orthodiascopes shall be operated so that the viewing screen shall always intercept the useful beam.

7:28-15.4 Medical radiographic installations

(a) Equipment used in medical radiographic installations shall be as follows:

1. The tube housing shall be of a diagnostic type.

2. Diaphragms or cones shall be provided for collimating the useful beam and shall provide the same degree of protection as required of the housing. Except as noted below, after July 1, 1969, all new or used x-ray machines sold or otherwise transferred shall be equipped with adjustable, rectangular collimators fitted with a light beam system for delineating the edges of the collimated x-ray beam. Single purpose machines, such as mass chest x-ray equipment used for adults only, may use a fixed collimator provided it is accurately adjusted for the fixed source-film distance used and that alignment techniques are satisfactory.

3. For voltages greater than 50 kvp, the total filtration permanently in the useful beam shall be not less than 2.5 mm aluminum equivalent, or the half-value layer shall be not less than 2.5 mm aluminum equivalent. For voltages up to 50 kvp the total filtration in the useful beam shall not be less than 0.5 mm of aluminum equivalent; this requirement may be assumed to have been met if a conventional diagnostic tube is employed, but if a beryllium window tube is employed an appropriate added filter is required.

4. An automatic device shall be provided to terminate the exposure after preset time or exposure.

5. The exposure switch shall be a dead-man type and shall be arranged so that it can only be operated when the operator is within a shielded area. The timer switch button when depressed shall not energize the x-ray tube when the timer is in the "off" or "O" position. Exposure switches for "spot-film" devices used in conjunction with fluoroscopic tables shall be

exempted from this shielding requirement, providing the requirements of Section 15.3 (a)5 are satisfied.

(b) Permanent structural shielding and/or protective barriers shall be used as necessary to insure that no person other than the patient receives a dose in excess of the limits specified in Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

(c) Operating proceudres for medical radiographic installations shall be as follows:

1. Only individuals required for the radiographic procedure shall be in the radiographic room during exposure.

2. The exposure of individuals shall be controlled by the use of shielding and protective clothing as necessary to insure that they are not exposed to radiation doses in excess of those permitted by Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter. They shall use personnel monitoring equipment as required by Section 7.4 (Use of personnel monitouins equipment) of this Chapter).

7:28–15.5 Mobile or portable diagnositc equipment

(a) Mobile or portable diaggnostic equipment requirements shall be as follows:

1. All requirements of Section 15.4(a) (Medical radiographic installations) of this Chapter apply except those of paragraph 5.

2. Such equipment shall be provided with collimating cones, or collimating diaphragms and spacer frames, to limit the target-to-skin distance to not less than 12 inches and to limit the size of the useful beam.

3. The exposure control switch shall be of the dead-man type and shall be so arranged that the operator can stand at least six feet from the patient for all exposures. The timer switch button when depressed shall not energize the x-ray tube when the timer is "off" or "O" position.

(b) A unit used routinely in one location shall be considered a permanent installation and shall comply with requirements of Section 15.4(b) (Medical radiographic installations) of this Chapter.

(c) Operating procedures for medical radiographic installations shall be as follows:

1. No employee who is otherwise occupationally exposed in a radiology installation shall be permitted to hold patients during expsoure.

2. A mobile or portable flouroscopic unit may be used only if:

i. Image intensification is used;

ii. Operation of the machine is impossible without a collimating cone or a diaphragm in place;

iii. The dose rate at the minimum target-to-skin distance does not exceed five rems per minute.

iv. All individuals not required for the fluoroscopic procedure are removed from the room or protected by portable shields; and

v. The exposure of individuals required for the fluoroscopic procedure is controlled by the use of shielding and protective clothing as necessary to insure that they are not exposed to radiation doses in excess of those permitted by Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

3. Personnel monitoring equipment shall be used by all operating personnel.

4. A collimating cone, or a diaphragm and spacer frame, shall be used in all exposures to limit the size of the useful beam and to insure a target-to-skin distance of not less than 12 inches.

7:28–15.6 Chest photofluorographic installations

(a) Equipment used in chest photofluorographic installations shall be as follows:

1. All provisions of Section 15.4(a) (Medical radiographic installations) of this Chapter apply.

2. A collimator shall restrict the useful beam to the area of the fluorographic screen.

3. All chest photofluorographic machines purchased after the effective date of this Chapter shall have the fluorographic screen mechanically linked to the tube housing so that the fluorographic screen always intercepts the useful beam.

(b) Structural shielding for chest photofluorographic installations shall be as follows:

1. For permanent installations, all provisions of Section 15.4(b) (Medical radiographic installations) of this Chapter apply.

2. For permanent installations, a primary protective barrier shall be provided wherever the useful beam can strike. If the apparatus is so designed that the useful beam can strike only the fluoroscopic screen, this barrier may be placed around the hood and camera or immediately behind the camera, thus obviating the need for primary protective barriers elsewhere.

3. For permanent installations, secondary protective barriers shall be provided in those walls not having primary protective barriers.

4. For movable installations, structural shielding and/or protective barriers shall be used as necessary to insure that no individual other than the patient shall receive a dose in excess of the limit specified in Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

(c) Operating procedures for chest photofluorographic installation shall be as follows:

1. Operating procedures shall be established so that no individual other than the patient shall receive a dose in excess of the limit specified in Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

2. Personnel monitoring equipment shall be used as required by Section 7.4 (Use of personnel monitoring equipment) of this Chapter.

7:28–15.7 Fluoroscopic shoe fitting machines

No person shall operate, permit to be operated, maintain or display any fluoroscopic shoe fitting machine.

SUBCHAPTER 16. DENTAL RADIOGRAPHIC INSTALLATIONS

7:28–16.1 Scope

(a) This Subchapter covers dental radiographic installations.

(b) Provisions of this Subchapter are in addition to and not in substitution for the applicable provisions of Subchapter 1 through 13 of this Chapter.

7:28–16.2 Prohibited use

No registrant shall operate or permit the operation of x-ray equipment use in the practice of dentistry unless the equipment and installation meet the applicable requirements of these regulations.

7:28–16.3 Equipment

(a) Equipment used in dental radiographic installations shall be as follows:

1. The tubing housing shall be of a diagnostic type.

2. Diaphragms or cones shall be used for collimating the useful beam and shall provide the same degree of protection as the housing. For intraoral radiography, the diameter of the useful beam at the end of the cone in contact with the patient shall be no greater than 2.75 inches. All new and used machines purchased after July 1, 1969, shall use only open-end cones.

3. A cone or spacer frame shall provide a target-to-skin distance of not less than seven inches with apparatus operating above 50 kvp or not less than four inches with apparatus operating at or below 50 kvp.

4. The total filtration permanently in the useful beam shall be not less than:

KVP	Equivalent to mm Aluminum
<70	1.5
70 to 90	2.0
>90	2.5

These requirements shall be assumed to have been met if the half-value layers are not less than the aluminum equivalents listed in the table.

5. The exposure control switch shall be of the dead-man type. A device shall be provided to terminate the exposure after a preset time or exposure. The timer switch button when depressed shall not energize the x-ray tube when the timer is in the "off" position.

6. The control switch shall be so located, or shall be provided with a cord sufficiently long, to enable the operator to stand at least six feet from the patient and well out of the path of the useful beam.

7. Those diagnostic tubes which are supplied from a common high or low voltage supply and which have separate control switches at their respective locations shall also have a separate dead-man switch, a separate timer and either a separate tube voltage meter or indicator light at each location. Those diagnostic tubes which are supplied from a common high or low voltage supply and which can be operated only from a common control panel may have only one dead-man switch, timer and tube voltage meter or indicator light.

7:28–16.4 Structural shielding

(a) Permanent structural shielding and/or protective barriers shall be used as necessary to insure that no person other than the patient being x-rayed receives a dose in excess of the limit specified in Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

(b) When dental x-ray units are installed in adjacent rooms, or adjacent areas of the same room, protective barriers shall be provided between the rooms or areas when necessary to comply with Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

7:28–16.5 Operating procedures

(a) Operating procedures for dental radiographic installations shall be as follows:

1. No individual shall be in the path of the useful beam except the patient being x-rayed.

2. During each exposure, the operator shall be at least six feet from the patient or shall be behind a protective barrier.

3. The film shall not be held by the dentist or assistant during any exposure.

4. Fluoroscopy shall not be used in dental examinations.

5. Neither the tube housing nor the pointer cone shall be hand held during exposures.

6. Personnel monitoring equipment shall be used as required by Section 7.4 (Use of personnel-monitoring equipment) of this Chapter

SUBCHAPTER 17. INDUSTRIAL AND NONMEDICAL RADIOGRAPHY

7:28–17.1 Scope

(a) The regulations in this Subchapter establish radiation-safety requirements for persons utilizing sealed sources, radiographic-exposure devices or radiation-producing machines for industrial and nonmedical radiography.

(b) The requirements of this Subchapter are in addition to the requirements of Subchapter 1 through 13 of this Chapter.

(c) This Subchapter does not apply to radiography in any of the healing arts.

7:28–17.2 Registration and licensing requirements

(a) All owners of radiation-producing machines, and all owners of sealed sources or radiographic exposure devices utilizing radiation sources not subject to specific State license requirements, must register them in accordance with the requirements of Subchapter 3 (Registration) of this Chapter.

(b) The possession or use of sealed sources or radiographic exposure devices, either of which utilize radioactive materials specified in Section 4.2 (Requirements) of this Chapter, are subject to the licensing requirements of Subchapter 4 (Licensing) of this Chapter.

7:28–17.3 Equipment control

(a) The permissible levels of radiation from radiographic exposure devices and storage containers shall be as follows:

1. Radiographic exposure devices, measuring less than four inches from the sealed source storage position to any exterior surface of the device, shall not produce a radiation level in excess of 50 milliroentgens per hour hour at least six inches from any exterior surface of the device.

2. Radiographic exposure devices measuring a minimum of four inches from the sealed source storage position to any exterior surface of the device, and all storage containers for sealed sources or for radiographic exposure devices, shall not produce a radiation level in excess of 200 milliroentgens per hour at any exterior surface, and 10 milliroentgens per hour at one meter from any exterior surface.

3. The radiation levels specified in paragraphs 1 and 2 of this subsection are with the sealed source in the shielded, or , "off", position.

(b) Each radiation-producing machine shall be provided with a lock designed to prevent unauthorized use of the equipment.

(c) Each radiograph exposure device and each storage container shall be provided with a lock or outer locked container designed to prevent unauthorized or accidental removal of a sealed source or its change from a shielded to an unshielded position. All radiation-producing machines, radiographic exposure devices and storage containers shall be kept locked at all times except when under the direct surveillance of a radiographer or of a

radiographer's assistant or as provided in Section 17.5(a) (Precautionary procedures in radiographic operations) of this Chapter.

(d) Locked radiographic exposure devices and storage containers shall be physically secure to prevent tampering or removal by unauthorized personnel.

(e) The owner shall maintain sufficient calibrated and operable radiation-survey instruments to make physical radiation surveys as required by Section 17.5(c) (Precautionay procedures in radiographic operations) of this Chapter and by Subchapter 7 (Radiation Surveys and Personnel Monitoring) of this Chapter.

1. Calibration of each radiation-survey instrument shall be checked at intervals not to exceed three months and the instrument shall be recalibrated after each servicing involving other than battery replacement.

2. Records shall be maintained of the latest date of calibration and of the dates of succeeding checks.

3. The instrumentation shall have a range such that two milliroentgens per hour through one roentgen per hour can be measured to a precision of plus or minus 20 per cent.

(f) The replacement of any sealed source fastened to or contained in radiographic exposure device and leak testing, repair, tagging, opening or any other modification of any sealed source shall be performed only by persons specifically authorized by the Department, a Federal agency or any other state.

(g) Sealed sources are to be leak tested under the following conditions and requirements:

1. Each sealed source shall be tested for leakage at intervals not to exceed six months. In the absence of a certificate from a transferor that a test has been made within the six months prior to the transfer, the sealed source shall not be put into use until tested.

2. The leak test shall be capable of detecting the presence of 0.005 microcuries of removable contamination on the sealed source. A test made at the nearest accessible point to the sealed source storage position may be an acceptable leak test.

3. Leak tests shall be carried out only by individuals and by procedures both of which require prior approval by the Department. Approval will be based upon a description of the following:

i. Instrumentation to be used;

ii. Method of performing test including points on equipment to be tested; and

iii. Pertinent experience of person who will perform the test.

4. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Department.

(h) Requirements regarding the leaking sources shall be as follows:

1. Any test conducted pursuant to subsection (f) of this Section which reveals the presence of 0.005 microcuries or more of removable radioactive material shall be considered evidence that the sealed source is leaking.

2. The owner shall immediately withdraw the equipment involved from use and shall cause it to be decontaminated and repaired in accordance with subsection (e) of this Section, or to be disposed of in accordance with Subchapter 11 (Disposal of Radioactive Materials) of this Chapter.

3. Within five days after obtaining results of the test, a report shall be filed with the Department describing the equipment involved, the test results, and the corrective action taken.

(i) A sealed source which is not fastened to or contained in a radiographic-exposure device shall have permanently attached to it a durable tag at least one inch square, bearing the prescribed radiation caution symbol in conventional colors, magenta or purple on a yellow background, and at least the instructions: "Danger-Radioactive Material-Do Not Handle-Notify Civil Authorities if Found."

(j) Each owner shall conduct a quarterly physical inventory to account for all sealed sources received and possessed. The records of the inventories shall be maintained for inspection by the Department, and shall include the quantities and kinds of radioactive materials, location of sealed sources, and the date of the inventory.

(k) Each owner shall maintain current logs, which shall be kept available for inspection by the Department at the address specified in the license, showing for each radiation source the following information:

1. A description, or make and model number of the radiation-producing machine, or of the radiographic exposure device or storage container in which the sealed source is located;

2. The identity of the radiographer to whom assigned; and

3. The plant or site where used and dates of use.

7:28–17.4 Personal radiation safety requirements for radiographers

(a) The owner shall not permit any person to act as a radiographer until such person:

1. Has been instructed in the subjects outlined in subsection (b) of this Section, and has demonstrated understanding of those subjects;

2. Has received copies of and instructions in the applicable sections of this Chapter and the owner's operating and emergency procedures, and demonstrated an understanding of this Chapter and the procedures; and

3. Has demonstrated competence to use the radiation-producing machines, radiographic exposure devices, sealed sources, related handling tools and survey instruments which will be employed in his assignment.

(b) The outline of the course for radiographer's training is as follows:

1. Fundamentals of radiation safety:
   i. Characteristics of gamma and x-radiation;
   ii. Units of radiation dose and quantity; of radioactivity;
   iii. Hazards of excessive exposure to radiation;
   iv. Levels of radiation from radiation-producing machines and radioactive materials;
   v. Methods of controlling radiation dose:
      (1) Working time;
      (2) Working distances;
      (3) Shielding.
2. Radiation detection instrumentation to be used:
   i. Use of radiation survey instruments:
      (1) Operation;
      (2) Calibration;
      (3) Limitations.
   ii. Survey techniques;
   iii. Use of personnel-monitoring equipment:
      (1) Film badges;
      (2) Pocket dosimeters;
      (3) Pocket chambers.
3. Radiographic equipment to be used:

   i. Radiation-producing machines;
   ii. Radiographic exposure devices;
   iii. Storage containers;
   iv. Remote handling equipment.
4. The requirements of pertinent Federal and State regulations;
5. The owner's written operating and emergency procedures.

(c) The owner shall not permit any person to act as a radiographer's assistant until such person:

1. Has received copies of and instructions in the owner's operating and emergency procedures, and has demonstrated an understanding of the procedures; and

2. Has demonstrated competence to use under the personal supervision of the radiographer the radiation-producing machines, radiographic exposure device, sealed sources, related handling tools and radiation-survey instruments which will be employed in his assignment.

(d) The owner shall draw up written operating and emergency procedures, which shall include instructions in at least the following:

1. The handling and use of radiation-producing machines, sealed sources and radiographic exposure devices to be employed such that no person is likely to be exposed to radiation doses in excess of the limits established in Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter;

2. Methods and occasions for conducting radiation surveys;

3. Methods for controlling access to radiographic areas;

4. Methods and occasions for locking and securing radiation-producing machines, radiographic exposure devices, storage containers and sealed sources;

5. Personnel monitoring and the use of personnel-monitoring equipment;

6. Transporting sealed sources to field locations, including packing of radiographic-exposure devices and storage containers in the vehicles, posting of vehicles and control of the sealed sources during transportation;

7. Minimizing exposure of persons in the event of an accident;

8. The procedure for notifying proper persons in the event of an accident; and

9. Maintenance of records.

(e) The owner shall not permit any person to act as a radiographer or as a radiographer's assistant unless, at all times during radiographic operations, each such person shall wear a film badge and either a pocket dosimeter or pocket chamber.

1. Pocket dosimeters and pocket chambers shall be capable of measuring doses from zero to at least 200 millroentgens.

2. Pocket dosimeters and pocket chambers shall be read and doses recorded daily.

3. A film badge shall be ssigned to and worn by only one person.

4. A film badge shall be immediately processed if a pocket chamber or pocket dosimeter is discharged beyond its range.

5. The film badge reports received from the film badge processor and records of pocket dosimeter and pocket chamber readings shall be maintained for inspection by the Department.

7:28–17.5 Precautionary procedures in radiographic operations

(a) During each radiographic operation the radiographic or radiographer's assistant shall maintain a direct surveillance of the operation to protect against unauthorized entry into a high radiation area, as defined in Section 1.4 (Definitions) of this Chapter except as follows:

1. Where the high radiation area is equipped with a control device which shall either cause the level of radiation to be reduced below that at which an individual might receive a dose of 100 milirems in one hour upon entry into the area, or shall energize a conspicuous visible or audible alarm signal in such a manner that the individual entering and the owner or the supervisor of the activity are made aware of the entry; or

2. Where the high radiation area is locked to protect against unauthorized or accidental entry.

(b) Notwithstanding any provisions in Section 10.8 (Exceptions from posting and labeling requirements) of this Chapter, areas in which radiography is being performed shall be conspicuously posted as required by Sections 10.2 (Radiation areas) and 10.3 (High radiation areas) of this Chapter.

(c) No radiographic operation shall be conducted unless calibrated and operable radiation-survey instrumentation as described in Section 17.3(d) (Equipment Control) of this Chapter is available and used at each site where radiographic exposures are made. In addition to the requirements of Subchapter 7 (Radiation Surveys and Personnel Monitoring) of this Chapter, radiation surveys shall be made and recorded as follows:

1. Physical radiation surveys shall be made as necessary during radiographic exposures to determine compliance with Subchapter 6 (Permissible Dose Rates, Radiation Levels and Concentrations) of this Chapter.

2. A physical radiation survey shall be made after each radiographic exposure employing a sealed source to determine that the sealed source has been returned to its shielded condition.

3. After radiographic operations employing a sealed source or sources, a physical radiation survey shall be made to determine that each sealed source is in its shielded condition prior to securing the radiographic exposure device and storage container as specified in Section 17.3(b) and (c) (Equipment control) of this Chapter.

4. Clear and legible records shall be kept of the surveys required by paragraphs 1 and 3 of this subsection, and maintained for inspection by the Department.

SUBCHAPTER 18. MAJOR NUCLEAR FACILITIES

7:28–18.1 Scope

(a) The special requirements of this Subchapter shall apply to major nuclear facilities including nuclear reactors, nuclear fuel fabrication plants, nuclear fuel reprocessing plants, and nuclear waste handling or disposal facilities.

(b) These requirements are in addition to the requirements of other applicable Sections of this Chapter.

(c) The intent of this Section is to insure that individuals outside of these facilities receive no radiation exposures from environmental or direct radiation that are in excess of the limits of Sections 6.1 (Exposure of individuals in controlled areas) and 6.2 (Radiation levels outside controlled areas) of this Chapter.

7:28–18.2 Facility description and required monitoring program

(a) Any person desiring to construct a major nuclear facility within this State shall submit a general description of the proposed facility with a discussion of probable and maximum potential radioactive discharges. This description shall be submitted to the Department for evaluation, as early as possible, but not less than six months prior to the start of construction, and shall include the following:

1. A general description of the proposed facility;

2. The nature of and the proposed rates of discharge of radioactive contaminants to the environment and/or the nature of and amounts of radioactive materials subject to temporary or permanent storage;

3. The proposed methods of limiting the discharge of radioactive contaminants to the atmosphere;

4. The proposed methods of limiting the discharge of radioactive contaminants to ground or surface waters;

5. The proposed methods of disposal of radioactive or radioactively contaminated materials; and

6. Preliminary description of the proposed radiological monitoring program.

(b) As used in this Section, the term "construction" includes pouring the foundation for, or the installation of, any portion of the permanent facility on the site, but does not include the following:

1. Site exploration, site excavation, preparation of the site for construction of the facility, including the driving of piles, and construction of roadways, railroad spurs, and transmission lines;

2. Procurement or manufacture of components of the facility; or

3. Construction of non-nuclear facilities (such as turbo-generators and turbine buildings), and temporary buildings (such as construction equipment storage sheds) for use in connection with the construction of the facility.

(c) Any person desiring to operate a major nuclear facility within this State shall develop an adequate program of radiological monitoring consistent with the hazard from actual or potential discharges. The proposed program shall be submitted to the Department for evaluation as to its adequacy as early as possible but at least six months prior to the start of operation. The proposed radiological monitoring program shall include revised statements of the information required in subsections (a) and (b) of this Section, and it shall also include:

1. An analysis of the ability of the in-facility effluent monitoring system to measure the quantities and kinds of radioactive materials discharged under normal and under accident conditions;

2. An analysis of the ability to predict the effect of such releases on environmental contamination and radiation levels; and

3. A description of the off-site environmental monitoring system, if any, with the kinds of instruments, their sensitivity, and use.

7:28–18.3 Operation

(a) The owner of an existing major nuclear facility shall submit the information required in 18.2(c) (Facility description and required monitoring program) of this Chapter within one month of March 1, 1969, if he has not already done the effective equivalent of this.

(b) Operation of a major nuclear facility and its monitoring program shall be consistent with all provisions of this Chapter.

7:28–18.4 Emergency plans

The owner of every major nuclear facility shall make emergency operational plans in accordance with Section 1.5 (Emergency precautions) of this Chapter. These plans shall be submitted to the Department prior to the start of operation.

7:28–18.5 Radiation incidents

The owner of every major nuclear facility shall report any radiation incident in accordance with Subchapter 13 (Reports of Thefts and Radiation Incidents) of this Chapter.

SUBCHAPTER 19. EXCESSIVE EXPOSURE TO IONIZING RADIATION

Authority

Unless otherwise expressly noted, all provisions of this Subchapter 19 were adopted by the Department of Environmental Protection pursuant to authority delegated at N.J.S.A. 45:25-5 and were filed and became effective July 17, 1972 as R.1972, d.102. See: 4 N.J.R. 4 (c).

7:28–19.1 Purpose and responsibility

(a) The purpose of these rules and regulations is to prohibit and/or prevent harmful effects of excessive and improper exposure to ionizing radiation as set forth in N.J.S.A. 45:25–1 *et seq.*

(b) Any person owning, using or handling sources of x-ray radiation, directly or indirectly, shall be responsible for compliance with provisions of these rules and regulations.

7:28–19.2 Definitions

The following words and terms, when used in this Subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Chest x-ray technician" means a person, other than a licensed practitioner, who practices x-ray technology and whose application of x-rays on human beings is limited to the Thoracic area for routine diagnostic purposes. For the purposes of this definition "routine" means PA, AP, Oblique and Lateral views of the chest and shall exclude Bronchograms, Angiograms, Cardiac Catheterization procedures, Tomography and the like.

"Dental x-ray technician" means a person, other than a licensed practitioner, who practices x-ray technology and whose application of x-rays on human beings is limited to intraoral radiography for diagnostic purposes.

"Direct supervision" when applied to students during their first 12 months of training means persons qualifed by Section 3.1 (Responsibility for regestering) of this Chapter shall be in the Department or any other area where x-ray examinations or x-ray therapy are being provided. In the second 12 months of training, the degree of direct supervision shall conform to the curriculum guidelines and criteria established by the Board under its inspection policies.

"Student" means any person who is enrolled for any course coming under Title 45:25–1 *et seq.* or these rules and regulations.

"X-ray technician" means a person, other than a licensed practitioner, who uses x-rays on human beings and whose application of radiation on human beings and whose application of radiation on human beings is not limited.

"X-ray therapy technician" means a person, other than a licensed practitioner, who uses x rays on human beings as an x-ray technician and whose application of radiation on human beings is limited to therapeutic purposes.

"X-ray technology" means the use of x-rays or x-ray producing equipment on human beings for diagnostic or therapeutic purposes under the supervision of a licensed practitioner.

7:28–19.3 Unethical conduct

(a) Unethical conduct shall include, but not be limited to:

1. Engaging in the practice of x-ray technology while in an intoxicated condition or under the influence of narcotic or any drugs which impair consciousness, judgment or behavior;

2. Immoral conduct while engaged in the practice of x-ray technology or immoral behavior indicating an unfitness to practice x-ray technology;

3. Willful falsification of records, or destruction or theft of property or records relating to the practice of x-ray technology;

4. Failure to exercise due regard for the safety of life or health of the patient;

5. Unauthorized disclosure of information relating to a patient or his records;

6. Discrimination in the practice of x-ray technology against any person on account of race, religion, creed, color or national origin.

7:28–19.4 Use of x-ray by students

(a) Students enrolled in and attending a school or college of medicine, osteopathy, dentistry, podiatry, chiropractic, x-ray technology or courses sponsored by those named and approved by the New Jersey X-Ray Technician Board of Examiners may apply radiation to a human being, while under the direct supervision of a licensed physician, osteopath, dentist, podiatrist, chiropractor, or certified x-ray technician, provided the school or college has been approved by the Board as maintaining a satisfactory standard.

(b) Students may apply radiation to a human being, for necessary diagnostic purposes only, and only at the clinical facilities of such school or college for the purpose of clinical experience in the use of x-ray equipment. They shall not be assigned to excessive night or weekend experience, nor otherwise be required to apply radiation, except under adequate supervision and then only when they derive sufficient educational benefit from such service.

(c) Students shall not be assigned, unassisted, to night or weekend experience during their first 12 months of training. Students assigned, after 12 months of their training course, to night or weekend experience shall be under adequate supervision in accordance with the curriculum guidelines and criteria of the Board's inspection policy and shall be given compensatory time off not in conflict with scheduled class sessions.

(d) Students enrolled in an approved school of x-ray technology in New Jersey shall not be required to be in attendance at the school for more than 40 hours per week during the first 12 months including night or weekend experience. In the second 12 months of training any combination of classroom work and/or clinical experience including night and/or weekend

duty shall not total more than 48 hours per week averaged over any two-week period.

7:28–19.5 Practice of x-ray technology and x-ray therapy technology

(a) The practice of x-ray technology shall include, but not be limited to, measuring and positioning patients, selecting and setting up exposure factors on x-ray equipment and making x-ray exposures. It shall not be only the developing of x-ray film, preparing developing solutions, assisting patients into proper attire or onto the x-ray table or similar duties usually performed by a darkroom technician, attendant or aide.

(b) The practice of x-ray therapy technology shall include setting up the treatment position, delivering the required daily dose prescribed by the physician, certifying the record of the technical details of the treatment, selecting the required filter and treatment distance, making beam directional shells and molds, using diagnostic x-ray equipment for tumor localization, assisting the physicist in calibration procedure, and assisting in treatment planning procedures. It shall not include taking x-ray films for diagnostic purposes. X-ray therapy shall be defined to include cobalt teletherapy and other forms of Gamma, Beta, or high energy teletherapy, as well as x-ray therapy.

7:28–19.6 Supervision by a licensed practitioner

(a) Supervision of a certified x-ray technician by a licensed practitioner shall require that such licensed practitioner, acting within the limits specified in the laws under which the practitioner is licensed, shall determine that an x-ray exposure of a patient should be made and the part or parts of that patient's body which should be exposed, before a certified x-ray technician may apply x-rays to a human being. Such supervision shall also require that only a licensed practitioner shall receive exposed and processed x-ray film for the purpose of diagnostic interpretation.

(b) Supervision by a licensed practitioner shall not require that a licensed practitioner oversee the certified x-ray technician in the scheduling of radiographic examinations, in the measuring and positioning of patients, in the operation of x-ray equipment, or in the production and processing of radiographs.

(c) Nothing in this Section shall be construed to apply to students whose use of x-rays is governed under a previous Section of this part.

7:28–19.7 Students

(a) Candidates for admission shall satisfy the following minimum requirements:

1. Be of good moral character; and

2. Have successfully completed a four-year course of study in a secondary school approved by the State Board of Education or passed an approved equivalency test.

(b) All candidates for admission shall be required to submit a formal application. Candidates' high school and other credentials shall be obtained prior to selection. For accepted students these shall be kept on file at the sponsoring institution.

(c) A sponsoring institution shall report in writing to the Department the name and address of each new student enrolled within 30 days and each student who has successfully completed the course of study within 30 days.

(d) A sponsoring institution shall so limit the number of students enrolled that the ratio of students to full time certified x-ray technicians, certified x-ray therapy technicians, or certified chest x-ray technicians engaged in clinical instruction, to diagnostic or therapeutic units and to workload at the clinical facilities shall be suitable.

(e) All students shall be provided with a personal radiation monitoring service, such as dosimeter or badge, during their period of attendance. Student exposure to radiation shall be within the occupational limits prescribed by Section 7 of the New Jersey Radiation Protection Code. Students shall routinely be informed of their most recent exposure readings and an attempt shall be made to find the cause and prevent recurrence of exposure which is deemed to be unnecessary. Students shall not be permitted to be in the primary beam to hold patients during exposure, remain unnecessarily or unprotected in the x-ray room outside the control booth during exposure, or engaged in any other practices likely to result in a continuous and/or excessive exposure to radiation.

(f) A sponsoring institution shall issue to each student who satisfactorily completes the course of study a formal certificate.

(g) A sponsoring institution shall issue to each candidate prior to admission a course catalog, bulletin, or other written statement which shall be dated, describe the curriculum as a whole and the detailed course offered, list the faculty members with information regarding their qualifications, and inform each candidate of the amount and terms for payment of any tuition or other fees or expenses to be incurred. The policies relating to refund of fees, hours of attendance, vacation, holidays, absence, probation, uniforms,

laundry, meals, stipends, rooms, transportation, and all requirements for satisfactory completion of the course of study shall be set forth clearly.

(h) All students shall have on them at all times while undergoing classroom or clinical training readily identifiable uniform marking or coloration or identification name plates indicative that they are students and not certified x-ray technicians. Inasmuch as schools differ, a variety of identification of students as same will be allowed, provided, however, that each school adopt and use a standard method of student identification approved by the Board of Examiners and registered with the Board.

7:28–19.8 Curriculum and instruction

(a) The content of the curriculum shall provide for the acquisition of knowledge, skills, and attitudes as are required to qualify in the licensing examination and to assure competency for employment as an x-ray technician, chest x-ray technician, or dental x-ray technician and therapy x-ray technician.

(b) The Department shall issue and make available to all interested persons sets of "Curriculum Standards" for courses of study in x-ray technology, x-ray therapy technology, dental x-ray technology and chest x-ray technology to be used as guides in registration.

(c) The "Curriculum Standards" shall include:

1. The minimum number of theory clock-hours of classroom work which shall be devoted to each of the subjects required;

2. A description of major subject divisions, with recommended clock-hours of classroom work for each; and

3. A listing of elective subjects which may be made available to students.

(d) The sponsoring institution shall prepare in satisfactory written form and make use of a detailed curriculum, a course outline for each required subject, and adequate lesson plans for classroom instruction. These materials shall be on file at the sponsoring institution and shall be accessible to any authorized officer, employee or representative of the Department.

(e) The sponsoring institution shall schedule classroom sessions in advance and give students sufficient notice thereof.

SUBCHAPTER 20. (RESERVED)

SUBCHAPTER 21. ANALYTICAL X-RAY INSTALLATIONS

Authority

Unless otherwise expressly noted, all provisions of this subchapter were adopted pursuant to authority of N.J.S.A. 13:1D-1 et seq. and 26:2D-1 et seq. and were filed on February 15, 1979, as R.1979 d.64 to become effective on May 1, 1979. See: 10 N.J.R. 321(a), 11 N.J.R. 123(a).

7:28-21.1 Scope

(a) This subchapter applies to installations using analytical x-ray equipment and establishes requirements for their use.

(b) The provisions of this subchapter are in addition to, and not in substitution for, the other applicable provisions of this chapter.

7:28-21.2 Definitions

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Analytical x-ray equipment" means any device or combination of devices used to determine the microscopic structure or composition of material utilizing x-rays, including but not limited to x-ray diffraction, x-ray spectroscopy, x-ray fluorescence, or fluorescence x-ray spectroscopy equipment.

"Enclosed beam x-ray system" means analytical x-ray equipment in which all possible x-ray paths are fully enclosed according to the requirements of section 5 of this subchapter, so that any part of the body cannot enter the enclosure.

"Fail-safe characteristics" means that all failures of warning and safety systems that can reasonably be anticipated will cause the equipment to fail in a mode such that personnel are safe from exposure to radiation.

"Open beam x-ray system" means analytical x-ray equipment other than enclosed beam x-ray system.

"Safety interlock" means a device or system of devices intended to prevent either the generation of x-rays or the emergence of the primary beam from the tube housing.

"X-ray accessory apparatus" means any portion of an analytical x-ray installation which is external to the x-ray tube housing and into which an x-ray beam is directed for making x-ray measurements or for other uses.

7:28-21.3 General equipment requirements

(a) No person shall cause, suffer, allow or permit the possession or use of any analytical x-ray equipment unless it is equipped with the following:

1. A clearly visible label bearing the conventional radiation symbol and the words: "CAUTION: THIS EQUIPMENT PRODUCES X-RAYS WHEN ENERGIZED - TO BE OPERATED ONLY BY AUTHORIZED PERSONNEL" or other words having similar meaning which shall be attached near any switch which energizes an x-ray tube.

2. A clearly visible label bearing the conventional radiation symbol and the words: "CAUTION: HIGH INTENSITY X-RAY BEAM" or other words having similar meaning which shall be located in a conspicuous location near the x-ray tube housing.

3. A clearly visible warning light with fail-safe characteristics labeled with the words: "X-RAY ON" or other words having similar meaning which shall be located near any switch that energizes an x-ray tube and shall be illuminated only when the tube is energized. The provisions of this paragraph shall be effective February 1, 1980.

4. A clearly visible warning light or indicator with fail-safe characteristics which shall indicate when the x-ray tube is producing x-rays or the port of the radioactive source is open. The warning light or indicator shall be located in a conspicuous position near the x-ray tube, and shall be clearly visible to any person aligning or adjusting the x-ray accessory equipment. The provisions of this paragraph shall be effective February 1, 1980.

5. A clearly visible label bearing the conventional radiation symbol and the words: "CAUTION: THIS EQUIPMENT CONTAINS RADIOACTIVE MATERIAL - TO BE OPERATED ONLY BY QUALIFIED PERSONNEL" or other words having similar meaning which shall be attached to any switch which energizes analytical x-ray equipment which contains a radioactive source.

6. A clearly visible label which shall be attached to each radiation source housing that contains a radioactive source. The label shall include the following information:

i. The conventional radiation symbol; and
ii. The type of radioactive material; and
iii. The activity in curies or millicuries; and
iv. The date of measurement of activity.

(b) No person shall cause, suffer, allow or permit the possession or use of any analytical x-ray equipment unless such operation is in accordance with the following procedures and within the following dose rates:

1. Written operating and alignment procedures provided by the manufacturer of the x-ray system, or by the person in charge of use of the system if the radiation source housing and x-ray accessory apparatus are not compatible components supplied by the same manufacturer.

2. Written operating procedures shall be such that a qualified operator following instructions will not receive in any one hour a dose equivalent in excess of 37.5 mrem to the hands and forearms or 2.5 mrem to the whole body,

gonads, blood-forming organs or lens of the eye.

3. Alignment procedures shall be such that a qualified worker aware of the radiation hazards will not receive in any one hour a dose equivalent in excess of 37.5 mrem to the hands and forearms or 2.5 mrem to the whole body, gonads, blood-forming organs, or lens of the eye while following these instructions. If either of these dose rates is likely to be exceeded, a definite warning shall be included in the alignment instructions.

4. The dose due to unwanted radiation from components such as high voltage rectifiers shall not exceed 10 mrem in a week in any accessible region 5 cm from the outside surface of the generator cabinet. Where an individual may be in the vicinity of the equipment while it is operating for as long as 40 hours per week, the dose rate shall not exceed 0.25 mrem/hr.

5. The x-ray accessory apparatus shall include a beam trap or other barrier with sufficient shielding so that the dose rate due to the transmitted primary beam does not exceed 0.25 mrem/hr under normal operating conditions. In the presence of scattered radiation this requirement shall be considered met for x-ray tube sources if the inherent shielding of the trap or barrier is at least equivalent to the thickness of lead specified in the following table for the maximum rated anode current and potential. In the case of isotope sources that required barrier thickness shall be determined by a qualified expert.

Thickness of lead Required for a Primary
Beam Barrier Located 5 cm from the Focal Spot

Anode Current (ma)	Thickness of lead (mm) 50 kVp	70 kVp	100 kVp
20	1.5	5.6	7.7
40	1.6	5.8	7.9
80	1.6	5.9	-
160	1.7	-	-

7:28-21.4 Additional equipment requirements for open beam x-ray systems

(a) No person shall cause, suffer, allow or permit the possession or use of any open beam analytical x-ray equipment unless it is equipped with the following in addition to the requirements of section 3 of this subchapter:

1. A clearly visible warning light or indicator which shall be located near each individual x-ray tube shutter and shall indicate when the shutter is open.

2. A suitable barrier to clearly delineate the boundary between the radiation area and the controlled area.

3. A system barrier surrounding each radiation area with sufficient inherent shielding so that the dose equivalent received by individuals in the surrounding controlled area does not exceed five mrem in any one hour or 100 mrem in any five consecutive days.

4. A beam shutter for each port of the radiation source housing. Such beam shutter shall be interlocked with the x-ray accessory apparatus coupling, or collimator, in such a way that the port will be open only when the collimator or coupling is in place. Shutters at unused ports shall be secured to prevent casual opening.

5. A guard or interlock which prevents entry of any part of the body into the primary beam path.

6. The provisions of paragraphs 3, 4 and 5 of this subsection shall apply to new open beam analytical x-ray equipment after February 1, 1980. Open beam analytical x-ray equipment in use prior to February 1, 1980 shall be exempt from the provisions of paragraphs 3, 4 and 5 unless such equipment is sold, leased, loaned or otherwise transferred from one user to another whether gratuitously or for consideration.

(b) No person shall cause, suffer, allow or permit the possession or use of any open beam analytical x-ray equipment unless it is operated in accordance with the following procedures and within the following dose rates:

1. The x-ray generator, the control panel and all other parts of the analytical x-ray system, except the x-ray tube housing, shall be so constructed that with all the shutters closed, the stray radiation measured at a distance of five centimeters from its surface is not capable of producing a dose in excess of 0.25 millirem in one hour at any specified tube rating.

2. The x-ray tube housing shall be so constructed that with all shutters closed, the leakage radiation measured at a distance of 5 centimeters from its surface is not capable of producing a dose in excess of 2.5 millirem in one hour at any specified tube rating.

3. Radiation exposure levels in the vicinity of controls and adjustments of the x-ray accessory apparatus used during routine operation shall not exceed 37.5 mrem/hr to the hands or 2.5 mrem/hr to the whole body, gonads, blood-forming organs, or lens of the eye.

7:28-21.5 Additional equipment requirements for enclosed beam X-ray systems

(a) No person shall cause, suffer, allow or permit the possession or use of any enclosed beam analytical x-ray equipment unless it is equipped with the following:

1. A sufficient number of safety interlocks so that the opening of any section of the enclosure during normal operation, or routine alignment, or routine maintenance will prevent either the generation of x-rays or the

emergence of the primary beam from any x-ray tube housing port.

2. A chamber or coupled chambers to enclose the radiation source, sample, detector and analyzing crystal. Any such chamber shall be constructed so that it can not be entered by any part of the body during normal operation. The provisions of this paragraph shall be effective February 1, 1980.

3. A sample chamber closure which shall be interlocked with either the x-ray tube high voltage supply or with a shutter in the primary beam so that no x-ray beam can enter the sample chamber while it is open. Such interlock shall be of fail-safe design. The provisions of this paragraph shall be effective February 1, 1980.

(b) No person shall cause, suffer, allow or permit the possession or use of any enclosed beam analytical x-ray equipment unless it is constructed in such manner as to limit the leakage x-rays at a distance of 5 centimeters from any accessible surface during normal operation to less than 0.25 millirem in one hour at any specified tube rating.

7:28-21.6 Operating procedures

(a) No person shall cause, suffer, allow or permit the possession or use of any analytical x-ray equipment unless it is operated in accordance with the following procedures:

1. All safety devices, including but not limited to, warning lights, warning indicators, and safety interlocks as required by this subchapter shall be maintained in a fully functional operating condition. These safety devices shall be tested for proper functioning as recommended the manufacturer or once every six months and records kept of all such testing.

2. All safety devices, including but not limited to, warning lights, warning indicators, and safety interlocks originally provided at the time of the installation of the analytical x-ray equipment, but not otherwise specified by this subchapter, shall be maintained in a fully functional operating condition. An exemption may be made, subject to the approval by the Department, when the operational procedures prohibit the normal functioning of these safety devices. Records of these exemptions shall be kept.

3. In addition to and not in substitution for the applicable requirements of subchapter 7 (Radiation Surveys and Personnel Monitoring) of this chapter, all personnel operating, repairing and aligning analytical x-ray equipment shall be provided with appropriate finger or wrist personnel monitoring equipment. The reported dose equivalent shall be recorded on Form BRP-26, "Current Occupational External Radiation Exposure," or on a clear and legible form containing all the information required on BRP-26. This reported dose equivalent shall be clearly identified as resulting from exposure to analytical x-rays.

4. A radiation survey shall be made before a new installation is placed in routine operation and whenever changes are made that could adversely affect radiation protection, as required by subchapter 7 (Radiation Surveys and Personnel Monitoring). Records shall be maintained showing the results of such surveys as required by subchapter 8 (Records) of this chapter.

SUBCHAPTER 22. (RESERVED)

SUBCHAPTER 23. (RESERVED)

SUBCHAPTER 24. NUCLEAR MEDICINE TECHNOLOGY

Authority

Unless otherwise expressly noted, all provisions of this subchapter were adopted pursuant to authority of N.J.S.A. 26:2D-1 et seq. and were filed on March 20, 1978, as R.1978 d.101 to become effective on January 1, 1980. See: 9 N.J.R. 213(b), 10 N.J.R. 146(c).

7:28-24.1 Scope

The regulations in this subchapter establish radiation safety requirements for persons administering radiopharmaceuticals to humans for diagnostic or therapeutic purposes or performing diagnostic or therapeutic procedures requiring administration of radiopharmaceuticals or radioactive substances to humans. This subchapter shall not be construed to in any way confer authority upon nuclear medicine technologists to utilize sealed sources for purposes of radiotherapy.

7:28-24.2 Definitions

The following words and terms, when used in this subchapter, shall have the following meanings unless the context clearly indicates otherwise.

"Act" means the Radiation Protection Act P.L. 1958, Chapter 116 as amended (N.J.S.A. 26:2D-1 et seq.).

"Approved school" means a school of nuclear medicine technology approved pursuant to this subchapter included on a list published by the department.

"Certificate" means a written authorization issued by the department pursuant to this subchapter.

"Direct supervision" means, for purposes of this subchapter, physical presence by the supervising physician or certified nuclear medicine technologist, in the room where a procedure is being performed, for a sufficient period of time to prevent unnecessary radiation to the patient.

"Licensee" means any person who is licensed or recognized by the department pursuant to this chapter and the act.

"Nuclear medicine technologist" means a person who performs technical procedures in the utilization of radionuclides or radiopharmaceuticals administered to humans.

"Physician" means an individual who upon having satisified the requirements of the New Jersey State Board of Medical Examiners, has been issued a plenary license to practice medicine and surgery in this State.

"Radionuclide" means a radioactive element or a radioactive isotope.

"Radiopharmaceutical" means a radionuclide or radioactive compound designed and prepared for organ or body system administration.

Note: Definitions for other terms used in this subchapter may be found in subchapter 1 of this chapter.

7:28-24.3 Use of radionuclides and radiopharmaceuticals

(a) No owner or licensee shall cause, suffer, allow or permit any person to act as a nuclear medicine technologist unless such person has been issued a certificate as provided for by this subchapter.

(b) No person shall cause, suffer, allow or permit the use or application of radionuclides or radiopharmaceuticals or otherwise engage in the practice of nuclear medicine technology without having first satisfied the certification requirements of this subchapter.

(c) The certification requirements of this subchapter shall not apply to a hospital resident or intern who is specializing in nuclear medicine or to students enrolled in and attending a school or college of medicine, osteopathy or nuclear medicine technology provided such students are acting under the direct supervision of a physician or a certified nuclear medicine technologist responsible to such physician.

(d) The certification requirements of this subchapter shall not apply to hospital residents or interns involved in nuclear medicine procedures but not specializing therein provided that they are acting under the direct supervision of a physician or a certified nuclear medicine technologist responsible to such physician under special circumstances.

7:28-24.4 Examination requirements

(a) In order to be eligible for admission to a certification examination, an applicant must:

1. Have satisfactorily completed a course of study in an approved school; or

2. For a period of three years from the effective date of this subchapter become qualified in accordance with section 10 of this subchapter.

7:28-24.5 Certification requirements

(a) In order to become certified, an applicant shall be required to pass the certification examination given pursuant to this subchapter, which may be written and, when deemed necessary by the department, may include

proficiency testing. The department may waive the examination requirements for any applicant who has demonstrated competency by passing a national registry examination. All certification examinations must be approved by the commission.

(b) A fee may be charged for each examination. The examination fee shall not be refunded. Application for the examinations shall be made on a form supplied by the department which shall be filed, along with the examination fee, with the department no leter than midnight of the closing date for the examination.

(c) An applicant who fails to receive a passing grade on the initial examination will be permitted to retake the examination. If the examination is failed twice, evidence of formal study in an approved continuing education program, will be required before the applicant may again take the examination. The examination must be passed within three years of the first examination.

(d) Certificates issued by the department pursuant to this subchapter shall be displayed prominently in the work area utilized by the certified nuclear medicine technologist.

7:28-24.6 Recertification requirements

(a) Certificates issued pursuant to this subchapter shall be renewable every six years after the initial certification.

(b) In order to become recertified, a nuclear medicine technologist must submit written evidence of formal study in a continuing education program, approved by the commission.

(c) In lieu of satisfactorily completion of a continuing education program, a recertification examination may be taken. A nuclear medicine technologist who fails to receive a passing grade on the recertification examination may retake the examination. If the recertification examination is failed twice, evidence of formal study in an approved continuing education program, will be required before the nuclear medicine technologist may again take the examination. The recertification examination must be passed within three years of the expiration of certification.

7:28-24.7 Limited certification

(a) Any certification issued pursuant to this subchapter may be conditional, as the department deems appropriate, including, but not limited to, a condition limiting the scope of the nuclear medicine practice authorized by such certificate.

(b) The department may issue temporary certifications to graduates of approved schools or to persons whose applications have been approved by the commission pursuant to section 10 of this subchapter.

(c) No person shall cause, suffer, allow or permit the breach of any condition of any certification issued pursuant to this subchapter.

7:28-24.8 School approval

(a) The commission may approve a school of nuclear medicine technology if it meets the essentials or equivalent of an accredited education program as established by the American Medical Association Council on Medical Education in collaboration with the Society of Nuclear Medicine, The American Society of Radiologic Technologists, American Society of Clinical Pathologists, and other collaboratory organizations.

(b) A school of nuclear medicine technology, in order to become an approved school, must apply to the department in writing on forms provided by the department. All such applications will be reviewed by the commission prior to final approval. A temporary approval may be issued by the department while an application is underr review.

7:28-24.9 School curriculum and requirements

(a) An approved school must offer the following curriculum, as a minimum, for nuclear medicine technologists:

1. Basic anatomy, physiology, and pathology;
2. Intravenous injections and radiopharmaceutical toxicology;
3. Radiation physics and mathematics;
4. Instrumentation;
5. Radiation biology;
6. Radiation protection and radiation protection standards and codes;
7. Laboratory procedures and techniques (in vivo and vitro);
8. Clinical application of radionuclides, diagnostic and therapeutic;
9. Records and administrative procedures;
10. Medical ethics.

(b) In order to maintain approval, a school must:

1. Report in writing to the department the name and address of each new student enrolled within 30 days of such enrollment and (within 30 days the name and address of) each student who has successfully completed the course of study.

2. Limit the number of students enrolled so that the ratio of students to full time certified nuclear medicine technologists, to scanning equipment and to workload at the clinical facilities shall be reasonable.

3. Provide all students with a personal radiation monitoring service, such as dosimeter or badge, during their period of attendance. Student exposure to radiation shall not exceed the occupational limits prescribed by this chapter. Students shall routinely be informed of their most recent exposure readings and an attempt shall be made to find the cause and prevent recurrence of exposure which is deemed to be unnecessary.

4. Issue to each candidate prior to admission a course catalog, bulletin, or other written statement which shall be dated, and include a description of the

curriculum as a whole and the detailed courses offered, a listing of the faculty members with information regarding their qualifications, and information concerning amounts and terms for payment of any tuition or other fees or expenses to be incurred.

5. Insure that all students have on their person at all times while undergoing classroom or clinical training a readily identifiable iniform marking or coloration or identification name plates which indicates that they are students and not certified nuclear medicine technologist.

6. Must not assign students excessive night or weekend experence. All night and weekend experience must be assigned only under adequate supervision and when sufficient education benefit may be derived from such service. Students shall not be assigned unsupervised night or weekend experience during their entire period of training.

7:28-24.10 Consideration of experience or training in lieu of attendance at an approved school

(a) Any person who believes he is qualified for certification pursuant to this subchapter based on training and/or experience in lieu of attendance at an approved school, may apply to the department for approval to take the certification examination. The department will submit all applications to the commission for review prior to approval.

(b) Admission to certification examination pursuant to subsection (a) of this section shall be permitted for a period of three years only from the effective date of this subchapter.

(c) Minimum requirements for consideration under this section shall include:

1. High school diploma or equivalent;
2. Two years of experience as a nuclear medicine technologist.

7:28-24.11 Nuclear medicine records

(a) A licensee, owner or registrant shall be responsible for recording such information as may be required as a condition of registration or licensing pursuant to this chapter. Such information may include, but is not limited to, the name of nuclear medicine technologist utilizing radionuclides or radiopharmaceuticals.

(b) A nuclear medicine technologist shall be responsible for recording the radionuclide or radiopharmaceutical dose he or she administers, and recording his name.

7:28-24.12 Revocation; penalties

(a) The department, in addition to any penalties authorized by the Act, may deny, suspend or revoke an application or certificate of a nuclear medicine

technologist when the applicant or certified nuclear medicine technologist has:

1. Falsified or made misleading statements in the application for certification;
2. Has altered his certification;
3. Failed to keep or falsified any required records;
4. Failed to comply with any provision of the Act or any rules or regulations promulgated thereunder.

(b) The reasons for denial, suspension, revocation set forth in subsection (a) of this section shall be considered violation of these rules and act in addition to constituting grounds for denial, suspension or revocation.

7:28-24.13 Registration and licensing requirements

(a) The possession and use of radiopharmaceuticals are subject to the licensing requirements of subchapter 4 (Licensing) of this chapter.

(b) All owners of radiopharmaceuticals not subject to specific State licensing requirements, must register them in accordance with the requirements of subchapter 3 (Registration) of this chapter.

7:28-24.14 Responsibility of physician

(a) Only a physician who has lawfully obtained a Federal or New Jersey State license as per subchapter 4 of this chapter, or is authorized under such a license, to own or possess or use radioactive substances, shall prescribe dosage, administer, or shall arrange for the administration of said substances to a human being or irradiate, or arrange for the irradiation of human beings by said substances.

(b) Any physician who arranges for the intentional human administration of, or irradiation by, radioactive substances shall be responsible for determining that only a certified nuclear medicine technologist or another qualified physician administers said radioactive substances.

(c) In addition, the physician must signify that he personally attests to the competency of the nuclear medicine technologist and must assume full responsibility for the intravenous injections by said technologist.

(d) A nuclear medicine technologist shall not apply or administer therapeutic doses of radionuclides or radiopharmaceuticals in any form to patients, although the actual material may be measured and prepared by the nuclear medicine technologist under the direction of a physician. The physician must personnally determine the dose and administer the material to the patient.

(e) Only a physician who has lawfully obtained a Federal or New Jersey State license as per subchapter 4 of this chapter or who is authorized under such a license to own or possess or use radioactive substances, shall be permitted to supervise a nuclear medicine technologist. Such supervision shall require that such physician, acting within the limits specified in the laws under which he is

authorized to use radioactive substances, shall determine that the administration of a radionuclide to a patient is appropriate and shall determine which radionuclide and what dosage level shall be used before such material is administered to the patient by the certified nuclear medicine technologist. Such supervision shall also require that only a physician shall receive the images and results of the examination performed after the administration of the radiopharmaceutical for the purpose of diagnostic interpretation. Such supervision shall not require that he oversee the certified nuclear medicine technologist in the measurement of doses, positioning of patients, operation of nuclear medicine instrumentation, injection of radionuclides or production and processing of images or test data.

7:28-24.15 Fees

(a) Any person who submits an application for certification, recertification or renewal of certification to the Department shall include as an integral part of said application a service fee.

(b) Each application or registration for the initial certification examination, renewal or certification by an annual certification registration or recertification shall be accompanied by the following fee:

1. Certification Examination or Application Review for either Unlimited or Limited Certification $40.00;
2. Renewal of Certification by annual certification registrations of either Limited or Unlimited Certifications $20.00;
3. Recertification Examination $40.00;
4. Temporary Certificates for 450 days $20.00;
5. Temporary Certificates for 120 days . . . . . $20.00.

(c) The fees accompanying the application or annual registration renewal shall be in the form of a certified check or money order made payable to the State of New Jersey.

1. The fees submitted to the Department are not refundable.
2. The applications or registrations and the fees accompanying them shall be mailed to:

   New Jersey State
   Department of Environmental Protection
   Bureau of Collections and Licensing
   Post Office Box 1390
   Trenton, New Jersey 08625

(d) The waiving of the written examination of any applicant whom the Commission on Radiation Protection has deemed competent will not result in any reduction of the fee for the certification examination or recertification examination.

(e) The certification issued pursuant to this subchapter shall be validated on an annual term commencing with January 1 of the year for which it is issued and expiring 12:00, Midnight, December 31, of the same year.

7:28-24.16 Unethical conduct

(a) No nuclear medicine technologist or student shall engage in any unethical conduct. Such conduct may include, but is not limited to:

1. Engaging in the practice of nuclear medicine technology while in an intoxicated state or under the influence of narcotic or any drugs which impair consciousness, judgement or behavior.
2. Willful falsification of records, or destruction or theft of property or records relating to the practice of nuclear medicine technology;
3. Failure to exercise due regard for the safety of life or health of the patient;
4. Unauthorized disclosure of information relating to a patient or a patient's records;
5. Discrimination in the practice of nuclear medicine technology against any person on account of race, religion, color or national origin.

7:28-24.17 Guidelines

The department may, from time to time, publish guideline and/or procedural rules to explain and implement the various provisions of this subchapter.

SUBCHAPTER 25. RADIATION LABORATORY FEE SCHEDULE

AUTHORITY

Unless otherwise expressly noted, all provisions of this subchapter were adopted pursuant to authority of N.J.S.A. 26:20-1 et seq. and were filed and became effective on February 8, 1978, as R. 1978 d. 47. See: 9 N.J.R. 560(a), 10 N.J.R. 101(b).

7:28-25.1 Definitions

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Gross alpha particle activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

"Gross beta particle activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

"Person" includes an individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, municipality, any state, or other legal entity; and any legal successor, representative agent, or agency of the foregoing.

"Public water supply system" means a municipally or privately owned system comprising structures which, operating alone or with other structures, result in the derivation, conveyance (or transmission) or distribution of water for potable or domestic purposes to consumers in 20 or more dwellings or properties; this definition does not include a public water treatment plant.

7:28-25.2 Fee schedule for monitoring public water systems for radioactivity

(a) The fee schedule for the monitoring for radioactivity is as follows:

Analysis	Fee/Analysis
Gross alpha particle activity	$25.00
Gross beta particle activity	25.00
Gross alpha and beta particle activity	35.00
Radium 226 or 228	40.00
Strontium	40.00
Tritium	40.00
Iodine 131	40.00
Cesium 134 and 137	40.00

7:28-25.3 Terms and conditions of radiation monitoring by the State radiation protection laboratory

(a) Any person wishing to utilize the State radiation protection laboratory for the purpose of monitoring a public water supply system should apply, in writing, to that laboratory for permission to have samples delivered in accordance with a time schedule established by the laboratory. No samples shall be delivered without prior approval from the laboratory.

(b) Fees shall be determined in accordance with the fee schedule set forth in section 2 of this subchapter. Payment to be made by certified check, made payable to the Bureau of Radiation Protection, shall become due immediately upon the receipt of an invoice from the State radiation protection laboratory.

ASSEMBLY, No. 256

STATE OF NEW JERSEY

PRE-FILED FOR INTRODUCTION IN THE 1980 SESSION

By Assemblymen OTLOWSKI and KARCHER

AN ACT to create a New Jersey Hazardous Waste Disposal Authority, defining its powers and duties in connection with the effective regulation and efficient disposal of hazardous wastes, and making an appropriation therefor.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. This act shall be known and may be cited as the "New Jersey Hazardous Waste Disposal Act."

2. The Legislature finds and declares:

a. The collection, storage and disposal of hazardous waste is a matter of grave concern to all citizens and is an activity thoroughly affected with the public interest;

b. The health, safety and welfare of the people of this State require efficient and reasonable hazardous waste collection, storage and disposal service and these endeavors require implementation by State operation or State supervision to achieve these goals;

c. Private industry is to be utilized to the maximum extent practicable and feasible to perform planning, design, management, construction, operation and maintenance functions related to hazardous waste collection, storage and disposal;

d. Long-term negotiated contracts between the State and private persons and industries may be utilized as an incentive for the development of industrial and commercial enterprise based on hazardous waste collection, storage and disposal within the State.

3. As used in this act:

a. "Authority" means the New Jersey Hazardous Waste Disposal Authority created and established pursuant to this act or any board, body, commission, department, officer, agency or other successor thereto;

b. "State hazardous waste management plan" means the administrative plan developed by the Commissioner of Environmental Protection for hazardous waste disposal;

c. "Waste management services" means actions taken to effectuate the receipt, storage, transportation and processing for ultimate disposal of hazardous waste by the authority or by any person or persons acting under contract with the authority, pursuant to the provisions of this act;

d. "Hazardous waste" means any waste or combination of waste which poses a present or potential threat to human health, living organisms or the environment. "Hazardous waste" shall include, but not be limited to, waste material that is toxic, corrosive, irritating, sensitizing, radioactive, biologically infectious, explosive, or flammable, whether solid or liquid, including chemical wastes, leachates, and pesticides;

e. "Hazardous waste facility" means any hazardous waste disposal area, plant or other facility the purpose of which is the processing, storage or disposal of hazardous waste including loading and transportation facilities or equipment used in connection with the processing of hazardous wastes;

f. "Hazardous waste disposal area" means a location utilized for ultimate disposal or hazardous wastes;

g. "Bonds" means bonds or other obligations of the authority issued pursuant to the provisions of this act;

h. "Revenues" means moneys or income received by the authority in whatever form, including but not limted to fees; charges; lease payments; interest payments on investments; payments due and owing on account of any instrument, contract or agreement between the authority and any municipality, region, State agency or person; gifts; grants; bestowals; or, any other moneys or payments to which the authority is entitled under the provisions of this act or any other law, or of any agreement, contract or indenture of the authority;

i. "Waste management project" or "project" means any hazardous waste disposal area, plant, works, system, facility or component of a facility, equipment, machinery or other element of a facility which the authority is authorized to plan, design, finance, construct, manage, operate or maintain under the provisions of this act, including real estate and improvements thereto and the extension or provision of utilities and other appurtenant facilities deemed necessary by the authority for the operation of a project or portion of a project, including all property rights, easements and interests required;

j. "Cost" means the cost or fair market value, as determined by the authority, of construction, lands, property rights, utility extensions, disposal facilities, access roads, easements, franchises,

financing charges, interest, engineering and legal services, plans, specifications, surveys, cost estimates, studies, transportation and other expenses necessary or incidental to the design, development, construction, financing, management and operation and maintenance of a waste management project, and such other costs or expenses of the authority, including administrative and operating costs, research and development, and operating capital, including fees, charges, loans, insurances, and the expense of purchasing real and personal property, including waste management projects.

4. a. There is hereby established in, but not of, the Department of Environmental Protection a public body corporate and politic, with corporate succession, to be known as the "New Jersey Hazardous Waste Disposal Authority." The authority is hereby constituted as an instrumentality of the State exercising public and essential governmental functions, and the exercise by the authority of the powers conferred by this act shall be deemed and held to be an essential governmental function of the State.

b. The authority shall consist of the Commissioner of Health, the Commissioner of Environmental Protection, the Commissioner of Energy, and the State Treasurer, who shall be members ex officio, and three members appointed by the Governor for terms of 3 years, provided that the members of the authority (other than the ex-officio members) first appointed by the Governor shall serve for terms of 1 year, 2 years, and 3 years respectively. Each member shall hold office for the term of his appointment and until his successor shall have been appointed and qualified. A member shall be eligible for reappointment. Any vacancy in the membership occurring other than by expiration of term shall be filled in the same manner as the original appointment but for the unexpired term only.

c. Each appointed member may be removed from office by the Governor, for cause, after a public hearing, and may be suspended by the Governor pending the completion of such hearing. Each member before entering upon his duties shall take and subscribe an oath to perform the duties of his office faithfully, impartially and justly to the best of his ability. A record of such oaths shall be filed in the office of the Secretary of State.

d. The Commissioner of Environmental Protection shall be the chairman of the authority. The members of the authority shall elect from their remaining number a vice chairman and a treasurer thereof. The authority shall employ an executive director who shall be its secretary and chief executive officer. The powers of the authority shall be vested in the members thereof in office from

time to time and four members of the authority shall constitute a quorum at any meeting thereof. Action may be taken and motions and resolutions adopted by the authority at any meeting thereof by the affirmative vote of at least four members of the authority. No vacancy in the membership of the authority shall impair the right of a quorum of the members to exercise all the powers and perform all the duties of the authority.

e. Each member of the authority shall execute a bond to be conditioned upon the faithful performance of the duties of such member in such form and amount as may be prescribed by the Comptroller of the Treasury. Such bonds shall be filed in the office of the Secretary of State. At all times thereafter the members and treasurer of the authority shall maintain such bonds in full force and effect. All costs of such bonds shall be borne by the authority.

f. The members of the authority shall serve without compensation, but the authority shall reimburse its members for actual expenses necessarily incurred in the discharge of their duties. Notwithstanding the provisions of any other law, no officer or employee of the State shall be deemed to have forfeited or shall forfeit his office or employment or any benefits or emoluments thereof by reason of his acceptance of the office of ex-officio member of the authority or his services therein.

g. Each ex-officio member of the authority may designate an officer or employee of his department to represent him at meetings of the authority, and each such designee may lawfully vote and otherwise act on behalf of the member for whom he constitutes the designee. Any such designation shall be in writing delivered to the authority and shall continue in effect until revoked or amended by writing delivered to the authority.

h. The authority may be dissolved by act of the Legislature on condition that the authority has no debts or obligations outstanding or that provision has been made for the payment or retirement of such debts or obligations. Upon dissolution of the authority all property, funds and assets thereof shall be vested in the State.

i. A true copy of the minutes of every meeting of the authority shall be forthwith delivered by and under the certification of the secretary thereof to the Governor. No action taken at such meeting by the authority shall have force or effect until 10 days, Saturdays, Sundays, and public holidays excepted, after such copy of the minutes shall have been so delivered unless during such 10-day period the Governor shall approve the same in which case such action shall become effective upon such approval. If, in said

10-day period, the Governor returns such copy of the minutes with veto of any action taken by the authority or any member thereof at such meeting, such action shall be null and void and of no effect. The powers conferred in this paragraph (i) upon the Governor shall be exercised with due regard for the rights of the holders of bonds and notes of the authority at any time outstanding, and nothing in, or done pursuant to, this paragraph (i) shall in any way limit, restrict or alter the obligation or powers of the authority or any representative or officer of the authority to carry out and perform in every detail each and every covenant, agreement or contract at any time made or entered into by or on behalf of the authority with respect to its bonds or notes or for the benefit, protection or security of the holders thereof.

j. On or before March 31 in each year, the authority shall make an annual report of its activities for the preceding calendar year to the Governor and the Legislature. Each such report shall set forth a complete operating and financial statement covering the authority's operations during the year. The authority shall cause an audit of its books and accounts to be made at least once in each year by certified public accountants and cause a copy thereof to be filed with the Secretary of State and the Comptroller of the Treasury.

k. The Comptroller of the Treasury and his legally authorized representatives are hereby authorized and empowered from time to time to examine the accounts, books and records of the authority, including its receipts, disbursements, contracts, sinking funds, investments and any other matters relating thereto and to its financial standing.

l. No member, officer, employee or agent of the authority shall be interested, either directly or indirectly, in any project or in any contract, sale, purchase, lease or transfer of real or personal property to which the authority is a party.

5. The authority shall have the following powers:

a. To adopt bylaws for the regulation of its affairs and the conduct of its business;

b. To adopt and have a seal and to alter the same at pleasure;

c. To sue and be sued;

d. To acquire in the name of the authority by purchase or otherwise, on such terms and conditions and such manner as it may deem proper, or by the exercise of the power of eminent domain in the manner provided by the Eminent Domain Act of 1971, P. L. 1971, c. 361 (C. 20:3–1 et seq.), any lands or interests therein or other property which it may determine is reasonably necessary

for any project; provided, however, that the authority shall not take by exercise of the power of eminent domain any real property except upon consent thereto given by resolution of the governing body of the municipality in which such real property is located;

e. To enter into contracts with a person upon such terms and conditions as the authority shall determine to be reasonable, including but not limited to reimbursement for the planning, designing, financing, construction, reconstruction, improvement, equipping, furnishing, operation and maintenance of the project and to pay or compromise any claims arising therefrom;

f. To establish and maintain reserve and insurance funds with respect to the financing of the project;

g. To sell, convey or lease to any person all or any portion of a project, for such consideration and upon such terms as the authority may determine to be reasonable;

h. To mortgage, pledge or assign or otherwise encumber all or any portion of a project or revenues whenever it shall find such action to be in furtherance of the purposes of this act;

i. To grant options to purchase or renew a lease for any of its projects on such terms as the authority may determine to be reasonable;

j. To contract for and to accept any gifts or grants or loans of funds or property or financial or other aid in any form from the United States of Amercia or any agency or instrumentality thereof, or from the State or any agency, instrumentality or political subdivision thereof, or from any other source and to comply, subject to the provisions of the act, with the terms and conditions thereof;

k. In connection with any application for assistance under this act or commitments therefor, to require and collect such fees and charges as the authority shall determine to be reasonable;

l. To adopt, amend and repeal regulations to carry out the provisions of this act;

m. To acquire, purchase, manage and operate, hold and dispose of real and personal property or interests therein, take assignments of rentals and leases and make and enter into all contracts, leases, agreements and arrangements necessary or incidental to the performance of its duties;

n. To purchase, acquire and take assignments of notes, mortgages and other forms of security and evidences of indebtedness;

o. To purchase, acquire, attach, seize, accept or take title to any project by conveyance or, by foreclosure, and sell, lease, manage or operate any project for a use specified in this act;

p. To borrow money and to issue bonds of the authority and to provide for the rights of the holders thereof as provided in this act;

q. To extend credit or make loans to any person for the planning, designing, acquiring, constructing, reconstructing, improving, equipping and furnishing of a project which credits or loans may be secured by loan and security agreements, mortgages, leases, and any other instruments, upon such terms and conditions as the authority shall deem reasonable, including provision for the establishment and maintenance of reserve and insurance funds, and to require the inclusion in any mortgage, lease, contract, loan and security agreement or other instrument, such provisions for the construction, use, operation and maintenance and financing of a project as the authority may deem necessary or desirable;

r. To employ consulting engineers, architects, attorneys, real estate counselors, appraisers, and such other consultants and employees as may be required in the judgment of the authority to carry out the purposes of the act, and to fix and pay their compensation from funds available to the authority therefor, all without regard to the provisions of Title 11, Civil Service, of the Revised Statutes;

s. To do and perform any acts and things authorized by this act under, through or by means of its own officers, agents and employees, or by contracts with any person; and

t. To procure insurance against any losses in connection with its property, operations or assets in such amounts and from such insurers as it deems desirable.

u. To do any and all things necessary or convenient to carry out its purposes and exercise the powers given and granted in the act.

6. The Department of Environmental Protection shall, in addition to such other powers as it may possess by law:

a. Undertake a program of research and development for the purpose of determining the most efficient, sanitary and economical way of collecting, storing and disposing hazardous waste.

b. Formulate, promulgate, amend and repeal codes, rules and regulations concerning hazardous waste collection and hazardous waste disposal activities. Such codes, rules and regulations shall establish the procedures relating to the preparation and submission of environmental impact statements prior to the construction, acquisition, or operation of any hazardous waste facility, and shall establish standards for the construction and operation of hazardous waste facilities, which standards shall include, but not be limited to, provisions requiring: the maintenance of ground water quality monitoring wells to check water pollution; periodic monitoring of

water quality by chemical analysis; measures to monitor methane gas production at sanitary landfills; plans for erosion control; revegetation procedures and plans for the maintenance, upkeep, and reuse of any sanitary landfill site; adequate cover material; safety measures; rodent, insect, bird, dust, fire and odor control programs; and such other measures as shall be deemed necessary to protect the public health and safety and the natural environment.

All codes, rules and regulations heretofore adopted by the Public Health Council relating to refuse disposal shall continue in full force and effect and be enforceable by the department, subject to its power as herein provided to amend or repeal the same.

c. Develop, formulate, promulgate and review for the purpose of revising or updating not less than once every 2 years, a Statewide hazardous waste management plan. In the development and formulation of the Statewide hazardous waste management plan the department shall consult with relevant agencies and instrumentalities of the Federal Government, and the objectives, criteria and standards provided by said plan shall conform, to the extent practicable, or as may be required, to the provisions of any Federal law concerning such objectives, criteria and standards.

d. Make an annual report to the Governor and the Legislature evaluating the operation of this act, including any recommendations deemed necessary by the department to better effectuate the purposes hereof.

7. The authority shall also have the power to:

a. Charge reasonable fees for the services it performs and waive, suspend, reduce or otherwise modify such fees, provided such user fees shall apply uniformly within each municipality to all users who are provided with waste management services with respect to a given type or category of wastes, in accordance with criteria established by the authority, and provided further no change may be made in user fees without at least 60 days prior notice to the users affected thereby;

b. Make short and long range plans, consistent with the provisions of the State hazardous waste management plan, for the processing and transportation of hazardous wastes by authority-owned facilities;

c. Design or provide for the design of hazardous waste management facilities including design for the alteration, reconstruction, improvement, enlargement or extension of existing facilities;

d. Construct, erect, build, acquire, alter, reconstruct, improve, enlarge or extend waste management projects including provision for the inspection and supervision thereof and the engineering,

architectural, legal, fiscal and economic investigations and studies, surveys, designs, plans, working drawings, specifications, procedures and any other actions incidental thereto;

e. Own, operate and maintain waste management projects and make provision for their management;

f. Contract with municipal and regional authorities and State agencies to provide waste management services and to plan, design, construct, manage, operate and maintain hazardous waste disposal and processing facilities on their behalf;

g. Design and construct improvements or alterations on properties which it owns or which it operates by contract on behalf of municipal or regional authorities, including the restoration of terminated dumps and landfills to beneficial public or private use;

h. Contract for the construction of hazardous waste facilities with private persons or firms, or consortiums of such persons or firms, pursuant to applicable provisions of this act, the requirements of applicable regulations and the State hazardous waste management plan and in accordance with such specifications, terms and conditions as the authority may deem necessary or advisable.

8. The purposes of the authority shall be:

a. The planning, design, construction, financing, management, ownership, operation and maintenance of projects for hazardous waste disposal facilities and all related hazardous waste reception, storage, transportation and wastehandling and general support facilities considered by the authority to be necessary, desirable, convenient or appropriate in carrying out the provisions of the State hazardous waste management plan and in establishing, managing and operating solid waste disposal;

b. The provision of hazardous waste management services to municipalities, regions and persons within the State by receiving hazardous wastes at authority facilities, pursuant to contracts between the authority and such municipalities, regions and persons; and the production from such services of revenues sufficient to provide for the support of the authority and its operations on a self-sustaining basis, with due allowance for the redistribution of any surplus revenues to reduce the costs of authority services to the users thereof.

c. The utilization, through contractual arrangements, of private industry for implementation of some or all of the requirements of the State hazardous waste management plan, to the maximum extent practicable and feasible, and for such other activities as may be considered necessary, desirable or convenient by the authority; and,

e. Assistance in the development of industries and commercial enterprises within the State of New Jersey based upon hazardous waste collection, storage and disposal. These purposes shall be considered to be operating responsibilities of the authority, in accordance with the State hazardous waste management plan, and are to be considered in all respects public purposes. It is the intention of this act that the authority shall be granted all powers necessary to fulfill these purposes and to carry out its assigned responsibilities and that the provisions of the act, itself, are to be construed liberally in furtherance of this intention.

9. The authority shall utilize private industry to the maximum extent practicable and feasible, by contract, to carry out the business, design, operating, management, marketing, planning and research and development functions of the authority. The authority is hereby empowered to enter into long-term contracts with private persons for the performance of any such functions of the authority which, in the opinion of the authority, can desirably and conveniently be carried out by a private person under contract provided any such contract shall contain such terms and conditions as will enable the authority to retain overall supervision and control of the business, design, operating, management, transportation, marketing, planning and research and development functions to be carried out or to be performed by such private persons pursuant to such contract. Such contracts may be entered into either on a negotiated or an open-bid basis, and the authority in its discretion may select the type of contract it deems most prudent to utilize, considering the scope of work, the management complexities associated therewith, the extent of current and future technological development requirements and the best interests of the State. Whenever a long-term contract is entered into on other than an open-bid basis, or, whenever any such contract exceeds a period of over 5 years in duration, or, whenever any contract is entered into for which the annual consideration is greater than $50,000.00, such contract shall be approved by a two-thirds vote of the authority's full board of directors. The terms and conditions of such contracts shall be determined by the authority, as shall the fees or other similar compensation to be paid to such persons for such contracts. The contracts entered into by the authority shall not be subject to the approval of any other State department, office or agency. However, copies of all contracts of the authority shall be filed with the State Treasurer and shall be maintained by them and by the authority as public records, subject to the proprietary rights of any party to the contract.

10. a. The authority shall establish and maintain a special fund called the "hazardous waste disposal fund" into which shall be deposited such moneys (1) as shall be appropriated by the State for the purpose of such fund; (2) if the authority so determines in any resolution authorizing any particular bonds, as shall be received by the authority from the sale of such bonds as provided by law; (3) as shall be received by the authority from the repayment of loans made pursuant to this act; (4) any other moneys or funds of the authority which it determines to deposit therein. Moneys at any time in the fund may be used by the authority for any purpose of this act, including but not limited to payment of administrative expenses incurred by the authority in the performance of its duties, subject only to any agreements with the holders of particular bonds or notes.

b. The authority may, in any resolution authorizing the issuance of bonds or notes, create or authorize the creation within said fund of special funds to be held in pledge or otherwise for payment or redemption of such bonds or notes, reserves or other purposes and to covenant as to use and disposition of the moneys held in such funds.

c. Moneys at any time in the fund may be used to guarantee loans made to project applicants by persons.

d. Moneys at any time in the fund may be invested in any direct obligations of, or obligations as to which the principal and interest thereof is guaranteed by, the United States of America or such other obligations as the authority may approve.

11. For the purpose of providing funds (a) to pay all or any part of the cost of any project or projects, (b) to make loans in accordance with the provisions of this act, and (c) for the funding or refunding any bonds, the authority shall have the power to authorize or provide for the issuance of bonds pursuant to this act.

12. By resolution, the authority shall have power to incur indebtedness, borow money and issue its bonds for the purposes stated in section 8 hereof. Except as may otherwise be expressly provided by the authority, every issue of its bonds shall be general obligations of the authority payable from any revenues or moneys of the authority, subject only to any agreements with the holders of particular bonds or notes pledging any particular revenues or moneys. Such bonds shall be authorized by resolution and may be issued in one or more series and shall bear such date or dates, mature at such time or times not exceeding 40 years from the date thereof, bear interest at a rate or rates, be in such denomination or denominations, be in such form, either coupon or registered,

carry such conversion or registration privileges, have such rank or priority, be executed in such manner, be payable from such sources in such medium of payment at such place or places within or without the State, and be subject to such terms of redemption (with or without premium) as such resolution may provide. Bonds of the authority may be sold by the authority at public or private sale at such price or prices as the authority shall determine.

13. Any provision of any law to the contrary notwithstanding, any bond or other obligation issued pursuant to this act shall be fully negotiable within the meaning and for all purposes of Title 12A, Commercial Transactions, of the New Jersey Statutes, and each holder or owner of such a bond or other obligation, or of any coupon appurtenant thereto, by accepting such bond or coupon shall be conclusively deemed to have agreed that such bond, obligation or coupon is and shall be fully negotiable within the meaning and for all purposes of said Title 12A.

14. In order to secure the payment of such bonds and in addition to its other powers, the authority shall have power by resolution to covenant and agree with the several holders of such bonds, as to:

a. The custody, security, use, expenditure or application of the proceeds of the bonds;

b. The use, regulation, operation, maintenance, insurance or disposition of all or any part of any project or projects;

c. Payment of the principal of or interest on the bonds, or any other obligations, and the sources and methods thereof, the rank or priority of any such bonds or obligations as to any lien or security, or the acceleration of the maturity of any such bonds or obligations;

d. The use and disposition of any moneys of the authority, including all revenues or other moneys derived or to be derived from any project or projects;

e. Pledging, setting aside, depositing or trusteeing all or any part of the revenues or other moneys of the authority to secure the payment of the principal of or interest on the bonds or any other obligations and the powers and duties of any trustee with regard thereto;

f. The setting aside out of the revenues or other moneys of the authority of reserves and sinking funds, and the source, custody, security, regulation, application and disposition thereof;

g. The rents, fees or other charges for the use of any project or projects, including any parts thereof theretofore constructed or acquired and any parts, replacements or improvements thereof thereafter constructed or acquired, and the fixing, establishment, collection and enforcement of the same;

h. Limitation on the issuance of additional bonds or any other obligations or on the incurrence of indebtedness of the authority;

i. Vesting in a trustee or trustees within or without the State such property, rights, powers and duties in trust as the authority may determine and limiting the rights, duties and powers of such trustee;

j. Payment of costs or expenses incident to the enforcement of the bonds or of the provisions of the resolution or of any covenant or contract with the holders of the bonds;

k. The procedure, if any, by which the terms of any covenant or contract with, or duty to, the holders of bonds may be amended or abrogated, the amount of bonds the holders of which must consent thereto, and the manner in which such consent may be given or evidenced; or

l. Any other matter or course of conduct which, by recital in the resolution, is declared to further secure the payment of the principal of or interest on the bonds.

All such provisions of the resolution and all such covenants and agreements shall constitute valid and legally-binding contracts between the authority and the several holders of the bonds, regardless of the time of issuance of such bonds, and shall be enforceable by any such holder or holders by appropriate action, suit or proceeding in any court of competent jurisidiction, or by proceeding in lieu of prerogative writ.

15. Any pledge of revenues or other moneys made by the authority shall be valid and binding from the time when the pledge is made; the revenues or other moneys so pledged and thereafter received by the authority shall immediately be subject to the lien of such pledge without any physical delivery thereof or further act, and the lien of any such pledge shall be valid and binding as against all parties having claims of any kind in tort, contract or otherwise against the authority, irrespective of whether such parties have notice thereof. Neither the resolution nor any other instrument by which a pledge is created need be filed or recorded except in the records of the authority.

16. Neither the members of the authority nor any person executing bonds issued pursuant to this act shall be liable personally on the bonds by reason of the issuance thereof. Bonds or other obligations issued by the authority pursuant to this act shall not be in any way a debt or liability of the State or of any political subdivision thereof and shall not create or constitute any indebtedness, liability or obligation of the State or of any political subdivision,

either legal, moral or otherwise, and nothing in this act contained shall be construed to authorize the authority to incur any indebtedness on behalf of or in any way to obligate the State or any political subdivision, and all such bonds shall contain on the face thereof a statement to that effect.

17. The exercise of the powers granted by this act shall constitute the performance of an essential governmental function and the authority shall not be required to pay any taxes or assessments upon or in respect of a project, or any property or moneys of the authority, and the authority, its projects, property and moneys and any bonds and notes issued under the provisions of this act, their transfer and the income therefrom, including any profit made on the sale thereof, shall at all times be free from taxation of every kind by the State except for transfer, inheritance and estate taxes and by any political subdivision of the State; provided, that any person occupying a project whether as lessee, vendee or otherwise shall, as long as title thereto shall remain in the authority, pay to the political subdivision in which such project is located a payment in lieu of taxes which shall equal the taxes on real and personal property, including water and sewer service charges or assessments, which such person would have been required to pay had it been the owner of such property during the period for which such payment is made and neither the authority nor its projects, properties, money or bonds and notes shall be obligated, liable or subject to lien of any kind for the enforcement, collection or payment thereof. If and to the extent the proceedings under which the bonds authorized to be issued under the provisions of this act so provide, the authority may agree to cooperate with such person occupying a project, in connection with any administrative or judicial proceedings for determining the validity or amount of such payments and may agree to appoint or designate and reserve the right in and for such person to take all action which the authority may lawfully take in respect of such payments and all matters relating thereto, provided such person shall bear and pay all costs and expenses of the authority thereby incurred at the request of such person or by reason of any such action taken by such person in behalf of the authority. If such person occupying a project has paid the amounts in lieu of taxes required by this section to be paid such person shall not be required to pay any such taxes as to which a payment in lieu thereof has been made to the State or to any political subdivision, any other statute to the contrary notwithstanding.

18. Notwithstanding any restriction contained in any other law, the State and all political subdivisions of this State, their officers, boards, commissioners, departments or other agencies, all banks, bankers, trust companies, savings banks and institutions, building and loan associations, savings and loan associations, investment companies and other persons carrying on a banking or investment business, all insurance companies, insurance associations and other persons carrying on an insurance business, and all executors, administrators, guardians, trustees and other fiduciaries, and all other persons whatsoever who now are or may hereafter be authorized to invest in bonds or other obligations of the State, may properly and legally invest any sinking funds, moneys, or other funds, including capital, belonging to them or within their control in any bonds or notes issued by the authority under the provisions of this act; and said bonds and notes are hereby made securities which may properly and legally be deposited with and received by any State or municipal officers or agency of the State for any purpose for which the deposit of bonds or other obligations of the State is now or may hereafter be authorized by law.

19. All banks, bankers, trust companies, savings banks, investment companies and other persons carrying on a banking business are hereby authorized to give to the authority a good and sufficient undertaking with such sureties as shall be approved by the authority to the effect that such bank or banking institution as hereinbefore described shall faithfully keep and pay over to the order of or upon the warrant of the authority or its authorized agent all such funds as may be deposited with it by the authority and agreed interest thereon, at such times or upon such demands as may be agreed with the authority or in lieu of such sureties, deposit with the authority or its authorized agent or any trustee therefor or for the holders of any bonds, as collateral, such securities as the authority may approve. The deposits of the authority may be evidenced by a depository collateral agreement in such form and upon such terms and conditions as may be agreed upon by the authority and such bank or banking institution.

20. The foregoing sections of this act shall be deemed to provide a complete method for the doing of things authorized thereby and shall be regarded as not in conflict with, or as restrictive of, powers conferred by any other laws, and the provisions of this act shall be complete authority for the issuance of bonds by the authority and the provisions of any other laws shall not apply to the issuance of such bonds.

21. If any section, part, phrase, or provision of this act or the application thereof to any person, project or circumstances, be adjudged invalid by any court of competent jurisdiction, such judgment shall be confined in its operation to the section, part, phrase, provision or application directly involved in the controversy in which such judgment shall have been rendered and shall not affect or impair the validity of the remainder of this act or the application thereof to other persons, projects or circumstances.

22. There is hereby appropriated to the authority from the General State Fund the sum of $250,000.00 or so much thereof as may be necessary, for the purposes of carrying out its functions and duties pursuant to this act. Such appropriation shall be repaid to the General State Fund as soon as practicable out of the proceeds of any Federal revenues provided to the State as a result of activities concerning hazardous waste management, subject to any terms or conditions on the disposition of such revenues that may be imposed by the Federal Government; provided, however, that in the event such Federal moneys are not readily available upon the adoption of the State hazardous waste management plan, such appropriation shall be repaid to the General State Fund as soon as practictable thereafter out of the proceeds of bonds issued by the authority or other available funds.

23. This act shall take effect immediately.

STATEMENT

This bill would create a New Jersey Hazardous Waste Disposal Authority, a public body corporate and politic, in, but not of, the Department of Environmental Protection.

This authority would consist of the Commissioner of Health, the Commissioner of Environmental Protection, the Commissioner of Energy, the State Treasurer, and three citizens appointed by the Governor with the advice and consent of the Senate.

Under the provisions of this bill, the New Jersey Hazardous Waste Disposal Authority is a State instrumentality designed to produce efficient collection, storage and disposal of hazardous wastes within the State. Private industry with a demonstrated capacity to perform the various planning, design, management, construction, operation and maintenance functions related to hazardous waste, collection, storage and disposal is to be utilized by the authority, under its control and supervision, to the maximum extent practicable and feasible. After undertaking a study of the most efficient, sanitary and economical ways of collecting, storing

and disposing hazardous wastes, the Department of Environmental Protection would be responsible for the preparation of a Statewide Hazardous Waste Management Plan.

Following the adoption of the Plan, the authority would contract with municipal and regional authorities and State agencies to provide hazardous waste management services. Emphasis will be given to the maximum utilization of existing facilities and contracts between the authority and the private sector.

ASSEMBLY, No. 626

STATE OF NEW JERSEY

INTRODUCED JANUARY 21, 1980

By Assemblyman BAER

Referred to Committee on Agriculture and Environment

A SUPPLEMENT to "An act concerning the handling of radioactive materials in this State and supplementing the 'Radiation Protection Act' (P. L. 1958, c. 116)," approved September 26, 1977 (P. L. 1977, c. 233, C. 26:2D–18 et seq.).

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. It shall be unlawful for any person to transport or temporarily store the following radioactive materials in any county in New Jersey which has an average population density exceeding 1,000 persons per square mile as measured in the most recent decennial census:

a. Plutonium isotopes in any quantity and form exceeding 2 grams or 20 curies, whichever is less;

b. Uranium enriched in the isotope U-235 exceeding 25 atomic per cent of the total uranium content in quantities where the U-235 content exceeds 1 kilogram;

c. Any of the actinides (i.e., elements with atomic number 89 or greater) the activity of which exceeds 20 curies;

d. Spent reactor fuel elements or mixed fission products associated with such spent fuel elements the activity of which exceeds 20 curies; or

e. Any quantity of radioactive material specified as a "Large Quantity" by the Nuclear Regulatory Commission in 10 CFR Part 71, entitled "Packaging of Radioactive Material for Transport."

2. The Department of Environmental Protection may by rules and regulations, in accordance with the "Administrative Procedure Act" P. L. 1968, c. 410 (C. 52:14B–1 et seq.) designate or define any categories or subcategories of radioactive material covered under the act to which this act is supplement, except radiopharmaceuticals, to be banned from areas it so designated. The department shall only do so where it finds that such material may create an

unwarranted hazard to public safety and where the transportation of such material in the area is not essential to the public welfare.

3. The Commissioner of Environmental Protection may authorize a "certificate of handling" only for the most compelling reasons involving urgent public policy or national security interest transcending public health and safety concerns, notwithstanding the provisions of sections 1 and 2 of this act. Economic consideration alone will not be an acceptable basis for justifying an exception to sections 1 or 2 in the issuing of a certificate.

4. Any person who violates sections 1 and 2 of this act shall have all certificates of handling revoked and shall be ineligible to receive any certificate of handling for 3 years.

5. This act shall take effect 60 days after enactment, except for section 1 which shall take effect immediately.

STATEMENT

This bill bans the transport or intransit storage of the most dangerous radioactive and nuclear materials from the most densely populated counties of New Jersey: Bergen, Camden, Essex, Hudson, Passaic, Mercer, Middlesex and Monmouth. It also permits the DEP by regulation to additionally ban specific radioactive materials where a special need exists. Approximately 68% of the people of New Jersey reside in these counties.

An amendment to the NYC Health Code in 1976 provided similar protection to the people of that city. Certain areas in New York protected by the resolution, specifically Staten Island, has lesser or nearly equal population density than 4 New Jersey counties: Hudson, Essex, Union and Bergen. It is senseless to allow densely populated areas of New Jersey to go unprotected while other areas nearby are enjoying such protection. This legislation provides that needed protection for New Jersey residents.

This bill is needed to restrict the potential movement of large numbers of shipment of hi-level wastes and spent fuel as the NRC begins approving proposed routes.

The new rules by the Nuclear Regulatory Commission (NRC) effective July 16, 1979 are not adequate to cover New Jersey's needs by themselves, however these rules respect local restrictions and do not preempt State action.

The Federal rules apply only to irradiated fuel, leaving unregulated many other highly dangerous nuclear substances. NRC rules do not specifically cover all areas covered in this bill. In addition, they cover an irregular patchwork of census tracts and small

municipalities thereby causing difficulty in enforcement due to irregular boundaries.

Another shortcoming of the Federal rules is that shipments through designated heavily populated areas would be permitted if "alternate routes would (i) result in excessive increase in transit time" or "there were no routes along which the vehicle would be allowed on the basis of its size, weight, or cargo description."

Such loose exception might justify a hazardous shipment of nuclear material though any heavily populated area. The economics of additional travel time doesn't justify subjecting these areas to the danger of radioactive material. The exception regarding weight of the cargo is also too broad making no distinction when there is a possibility of dividing the cargo to be within weight restrictions.

In contrast this bill allows an exception for a certificate of handling to be issued by the Commissioner of Environmental Protection through prohibited areas only for the most urgent public policy considerations similar to the NYC exception which has withstood legal challenge.

Violators of this bill will be subject to the misdemeanor penalty that is applicable to violators of Chapter 233 Laws of New Jersey 1977 regarding handlers of nuclear cargo.

In addition due to the hazards resulting from unnecessary introduction of extraordinarily hazardous materials in highly populated areas this act provides the additional and potentially economically greater penalty of disqualifying the violator from obtaining any certificate of handling for a period of 3 years.

[OFFICIAL COPY REPRINT]

ASSEMBLY, No. 966

STATE OF NEW JERSEY

INTRODUCED FEBRUARY 21, 1980

By Assemblymen STEWART and HERMAN

Referred to Committee on Agriculture and Environment

AN ACT concerning the establishment of procedures for implementing protective action in the event of certain radiation accidents, requiring the preparation and implementation of a State Radiation Emergency Response Plan, providing for the assessment of certain electric utilities, providing penalties for violations, supplementing the "Radiation Protection Act," approved July 8, 1958 (P. L. 1958, c. 116, C. 26:2D-1 et seq.), and making an appropriation.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. This act shall be known and may be cited as "The Radiation Accident Response Act."

2. The Legislature hereby finds and determines that the citizens of the State of New Jersey are entitled to the maximum protection possible from any and all threats to their health and welfare which may result from a radiation accident at a nuclear facility or during the transportation of radioactive material; that existing emergency response capabilities to abate these threats are dispersed among various State and local agencies and private organizations and limited in geographic scope; and that the dangers posed by these accidents can best be minimized by the development and implementation of a comprehensive and coherent response plan to coordinate and guide all necessary and appropriate resources and personnel into a unified course of action.

3. As used in this act:

a. "Department" means the Department of Environmental Protection;

b. "Division" means the Division of State Police in the Department of Law and Public Safety;

c. "Nuclear facility" means any facility which would pose a threat to the health and welfare of the public in the event of a

radiation accident, including but not limited to, atomic fission or fusion electric generating facilities, nuclear fuel fabrication plants, nuclear fuel reprocessing plants, nuclear waste handling and disposal facilities, and any other facility requiring a certificate of handling pursuant to P. L. 1977, c. 233.

d. "Plan" means the State Radiation Emergency Response Plan mandated by section 4 of this act;

e. "Radiation accident" means any occurrence or event during the operation and maintenance of any nuclear facility or during the transportation of radioactive material which results in the release of unnecessary radiation *as defined in section 1 of P. L. 1958, c. 116 (C. 26:2D-1)*.

4. The department and the division, after consultation with the Departments of Health, Energy, and Transportation *and after careful review of all relevant guidelines established by the Federal Emergency Management Agency*, shall, within 18 months of the effective date of this act, jointly prepare or cause to be prepared and adopt a State Radiation Emergency Response Plan. The plan shall be based upon planning criteria, objectives, requirements, responsibilities and concepts of operation for the implementation of all necessary and appropriate protective or remedial measures to be taken with respect to a radiation accident, or threatened radiation accident, at a nuclear facility or during the transportation of radioactive material, including but not limited to, the designation of all counties and municipalities which shall prepare radiation emergency response plans, the establishment and implementation of appropriate training programs for all personnel who may be involved in any aspect of radiation emergency planning and response, *the establishment of an emergency operations headquarters proximate to the site of each nuclear facility from which emergency response operations can be coordinated efficiently and effectively, the development and installation of a mechanism to monitor all temporary circumstances or conditions such as road repairs, utility activities, and floods, which may impede or preclude implementation of the emergency response plan and apprise all relevant emergency response personnel thereof, the preparation and updating of an inventory of temporary housing facilities which may be required in the event of a radiation accident,* the development and administration of a communications system to efficiently and effectively discharge all responsibilities and duties in the event of a radiation accident, the preparation of a public emergency response plan for residents of the affected area, *the establishment of procedures*

*and practices to review and monitor potential threats from nuclear facilities in neighboring states and to coordinate emergency response plans with any such plans established for such out-of-State facilities,** and a public emergency notification and public information and educational program to furnish all citizens who may be affected with information as they may require to act safely and prudently. The plan shall be revised and updated at least biannually; provided, however, that a thorough revision and updating shall be undertaken and completed at least 6 months prior to the projected commencement of operations of any new nuclear facility. The criteria, objectives, requirements, concepts of operation, and designations shall be published by the department and division within 3 months of the effective date of this act.

5. Every municipality **in each county** wherein is located one or more nuclear facilities or which is designated as an affected municipality within 6 months of the adoption of the designation and in conformity with the criteria and objectives, requirements, responsibilities, and concepts of operation established, shall prepare and submit to the county wherein it is located, a local radiation emergency response plan. The local radiation emergency response plans shall be submitted through the county for approval by the division and the department. The local plans shall be reviewed at least 18 months and revised, subject to county approval. **Any municipality required to prepare an emergency response plan pursuant to this section may apply to the department for financial and technical assistance therefor.**

6. Every county wherein is located one or more nuclear facilities or which is designated as an affected county, shall, within 6 months of the designation and in conformity with criteria and guidelines established, prepare and submit to the department **and the division** a county radiation emergency response plan which coordinates and supplements and, if necessary, replaces radiation emergency response plans of municipalities within its jurisdiction. The county emergency response plan shall, after initial approval, be updated at least every 18 months.

7. The department is authorized and directed to:

a. Carry out all duties and responsibilities established by any memoranda of understanding between the department and the division necessary or incident to the implementation of the plan;

b. Assess any danger attendant to a radiation accident, provide immediate public health and safety and other technical guidance, and coordinate on-site radiation emergency abatement procedures;

c. Provide public health and safety and other technical advice and guidance as it may deem appropriate with respect to the preparation and implementation of the plan;

d. Review, approve or modify, in cooperation with the division, all radiation emergency response plans and procedures developed or modified pursuant to this act;

e. Conduct, in cooperation with the division, public hearings annually in each designated county to determine the adequacy and effectiveness of the plan;

f. Direct, in cooperation with the division, the testing and evaluation of all plans developed pursuant to this act upon their adoption, and annually thereafter, to assure that all personnel with emergency response duties and responsibilities effectively carry out their assigned tasks.

*g. *Develop and implement a comprehensive monitoring strategy which shall include, but not necessarily be limited to, the daily monitoring of levels of radioactivity in the environment; and*

*h. Seek and apply for funds, grants, and other forms of financial assistance from the Federal Emergency Management Agency and any other public and private success to support the purposes and provisions of this act.**

8. The division is authorized and directed to:

a. Carry out all duties and responsibilities established by any memoranda of understanding between the department and the division necessary or incident to the implementation of the plan;

b. Exercise operational control during any threatened or actual radiation emergency;

c. Review, approve or modify, in cooperation with the department, all radiation emergency response plans and procedures developed or modified pursuant to this act;

d. Direct, in cooperation with the department, the testing and evaluation of all emergency response plans developed pursuant to this act upon their adoption, and annually thereafter, to assure that all personnel with emergency response duties and responsibilities effectively carry out their assigned tasks.

9. The Department of Health shall, within 1 year of the effective date of this act:

a. Complete and update annually a study of the public health aspects of nuclear emergency response planning, which study shall include, but not necessarily be limited to, an evaluation of existing medical facilities and personnel to determine the State's present capacity to respond to any radiation threat to public health; an evaluation of the evacuation plans of hospitals and other health

care facilities and alternate sources of care for patients; and an inventory of the standby plans, capacity, and distribution of all prophylactic or preventive supplies and equipment deemed medically advisable for use. The results of the study, and any recommendations, shall be submitted to the department and the division for their use in preparing the plan *and relevant portions of such study shall be submitted by the department to the municipalities charged with developing local emergency response plans to assist them in the preparation of such plans*;

b. Establish standards and criteria to identify those persons at greatest health risk in the event of radiation exposure so that they may be afforded maximum protection;

c. Develop a plan for medical services to evacuees enroute and at the sites of temporary shelter, and submit such plan to the department and the division for incorporation into the plan;

d. Develop and implement appropriate training programs for emergency medical personnel, health facility managers, and health officers;

e. Develop and implement, in cooperation with the division and the department, public educational programs concerning the effects and hazards of radiation.

10. The Department of Transportation shall, within 1 year of the effective date of this act:

a. Complete a study evaluating all means of transportation serving affected counties and municipalities and, in conjunction with the Department of Health, develop an inventory of emergency transport vehicles*. *Such study shall be submitted to the department and the division, and relevant portions thereof shall be submitted by the department to municipalities charged with developing local emergency response plan for their use in preparing emergency response plans*;

b. Prepare and submit to the department and the division for inclusion in the plan, and annually update, a radiation emergency transportation plan, which plan shall include, but not be limited to, the designation, construction, and maintenance of primary and secondary routes to be used by radiation emergency response personnel and the general public in the event of a radiation accident or threatened radiation accident, and the development of traffic management procedures sufficient to assure rapid access to and from any affected county or municipality.

11. The Department of Energy shall, within 1 year of the effective date of this act:

a. Complete a study and evaluation of all existing emergency energy supplies available to the State and accessible to affected counties and municipalities in the event of a radiation accident or threatened radiation accident, and *submit such study to the department and the division, and relevant portions shall be submitted by the department thereof to municipalities charged with developing local emergency response plans for their use in preparing emergency response plans, and*;

b. Develop and submit to the department and the division, for inclusion in the plan, and update annually, an emergency energy supply plan to assure that any area affected by a radiation accident or threatened radiation accident, will have access to sufficient energy supplies to implement any emergency response plans or procedures.

12. a. In order to defray the expenses of local, county and State agencies in discharging their responsibilities under this act, including those costs associated with the development, testing and updating of the Emergency Radiation Response Plans and for the acquisition and maintenance of any equipment necessary to carry out their responsibilities, the State Treasurer shall annually make an assessment against each electric utility which has an ownership or operating interest in a nuclear facility located in New Jersey;

b. The assessment shall be equal to a percentage of the gross operating revenue of the public utilities derived from intrastate *electric* operations during the preceding calendar year at a rate to be determined annually by the State Treasurer on or before June 30 in the following manner:

The total amount appropriated to the various local, county and State agencies by law for the purpose of discharging their responsibilities under this act for the next fiscal year shall be divided by the total amount of the gross *electric* operating revenues of all affected electric utilities derived from intrastate *electric* operations during the preceding calendar year. The quotient resulting shall constitute the percentage rate of the assessment for the calendar year which such computation is made. The total amount so assessed to any particular utility shall not exceed 1/10 of 1% of the gross *electric* operating revenue subject to assessment hereunder of that utility derived from its intrastate *electric* operations during the preceding calendar year.

The assessment prescribed above shall be levied by the State Treasurer not later than July 1, and shall be paid within 30 days after mailing by first class mail to the affected electric utility notice thereof and a statement of the amount.

Each affected utility shall, on or before June 1, file with the State Treasurer, under oath, an affidavit showing its gross operating revenues derived from intrastate operations during the preceding calendar year;

c. The assessments shall be appropriated through the regular appropriation process in accordance with a joint budget to be submitted by the division and the department.

13. Within 15 days after the date of mailing a statement as provided in this act, the electric utility against which the statement is rendered may file with the State Treasurer its objections thereto. Not less than 30 nor more than 60 days after giving notice thereof to the objecting utility, the State Treasurer shall hold a hearing on the objections.

14. If, after the hearing, the State Treasurer finds that any part of the charge against the objecting utility is excessive, erroneous, or invalid, he shall transmit to the utility, by registered mail, an amended statement in accordance with the findings, which shall have the same force and effect as an original statement. If the State Treasurer finds the entire statement invalid, he shall notify the objecting utility, by registered mail, of the determination, and the original statement shall be null and void. If the State Treasurer finds that the statement as rendered is neither excessive, erroneous, unlawful nor invalid, in whole or in part, he shall transmit notice thereof to the objecting utility by registered mail.

15. No action or proceeding shall be maintained in any court for the purpose of restraining or delaying the collection or payment of a statement rendered in compliance with the provisions of this act. A utility against which a statement is rendered shall pay the amount thereof, and after the payment may, in the manner provided by this act, at any time within 2 years from the date of the payment, bring against the State an action at law to recover the amount paid, with legal interest thereon from the date of payment, upon the ground that the assessment was excessive, erroneous, or invalid in whole or in part.

16. If any affected electric utility, to which a statement for the amount assessed against it as provided in this act has been rendered, fails to pay the amount within 15 days, or fails to file with the State Treasurer objections to the statement as provided herein, the State Treasurer shall proceed to collect the amount stated to be due, with legal interest, by seizure and sale of any goods or chattels, including stocks, securities, bank accounts, evidences of debt and accounts receivable belonging to the affected electric utility anywhere within the State.

17. The department and the division are authorized in accordance with the provisions of the "Administrative Procedure Act," P. L. 1968, c. 410 (C. 52:14B–1 et seq.), to jointly promulgate, adopt, and enforce any rules and regulations necessary or appropriate to carry out the purposes and intent of this act.

18. The department and the division shall have the authority to enter and inspect any building or place for the purpose of determining compliance or noncompliance with the provisions of this act, any rules or regulations adopted pursuant thereto, or the plan.

19. The existing State Radiation Emergency Plan, as contained in the PIPAG Manual (Procedures for Implementing Protective Action Guides), shall continue in full force and effect until all energy response plans required by this act are adopted, after which it shall expire.

20. If any section, part, phrase, or provision of this act or the application thereof to any person be adjudged invalid by any court of competent jurisdiction, the judgment shall be confined in its operation to the section, part, phrase, provision, or application directly involved in the controversy in which the judgment shall have been rendered and it shall not affect or impair the validity of the remainder of this act or the application thereof to other persons.

21. Any person who *"willfully"* violates this act or any rule, or regulation promulgated pursuant hereto, including the State Radiation Emergency Response Plan, shall be liable to a penalty of not more than $2,500.00 for each offense, to be collected by the department and the division in a summary proceeding under "the penalty enforcement law" (N. J. S. 2A:58–1 et seq.) or in any case before a court of competent jurisdiction wherein injunctive relief is requested. If the violation is of a continuing nature, each day during which it continues shall constitute an additional, separate and distinct offense. The department and the division are authorized to compromise and settle any claim for penalty under this section in an amount in their discretion as may appear appropriate in all these circumstances.

22. In implementing the provisions of this act, the department and the division shall seek the advice of the Governor's Advisory Council for Emergency Services established pursuant to P. L. 1972, c. 133.

23. a. There is appropriated from the General Fund the sum of $500,000.00 to the Department of Environmental Protection to implement the provisions of this act.

b. There is appropriated from the General Fund the sum of $350,000.00 to the Department of Law and Public Safety, Division of State Police, to implement the provisions of this act.

c. The appropriations made pursuant to this section shall be repaid to the General Fund as soon as practicable from the assessments made pursuant to section 12 of this act.

24. This act shall take effect immediately.

[OFFICIAL COPY REPRINT]

ASSEMBLY, No. 968

STATE OF NEW JERSEY

INTRODUCED FEBRUARY 21, 1980

By Assemblymen STEWART and HERMAN

Referred to Committee on Agriculture and Environment

AN ACT concerning radiation protection, amending P. L. 1958, c. 116, P. L. 1971, c. 372 and P. L. 1977, c. 233, repealing section 11 of P. L. 1958, c. 116 and section 6 of P. L. 1971, c. 372 and supplementing Title 26 of the Revised Statutes.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

*1. Section 2 of P. L. 1958, c. 116 (C. 26:2D-2) is amended to read as follows:

2. As used in this act, unless the context indicates another or different meaning or intent:

(a) "Commission" means the Commission on Radiation Protection created pursuant to this act;

(b) "Department" means the Department of Environmental Protection;

(c) "Unnecessary radiation" means the use *or presence* of electromagnetic radiation including microwave, infrared, visible, ultraviolet, X-ray, and gamma-ray; sonic, infrasonic, or ultrasonic waves; and particle radiation including alphas, betas, high energy electrons, neutrons, protons and other atomic or nuclear particles in such manner as to be or tend to be injurious or dangerous to the health of the people or the industrial or agriculture potentials of the State, or to the ecology of the State and its wildlife.*

[1.] *2.* Section 7 of P. L. 1958, c. 116 (C. 26:2D-7) is amended to read as follows:

7. The commission shall have the power to formulate, adopt, promulgate, amend and repeal codes, rules and regulations as may be necessary to prohibit and prevent unnecessary radiation[; provided, however, that no such code, rule or regulation and no such amendment or repeal shall be adopted except after a public hearing

EXPLANATION—Matter enclosed in bold-faced brackets [thus] in the above bill is not enacted and is intended to be omitted in the law.

to be held after 30 days' prior notice thereof by public advertisement of the date, time and place of such hearing, in such a manner as may be provided by the commission, at which opportunity to be heard by the commission with respect thereto shall be given to the public; and provided, further, that no such code, rule or regulation and no such amendment or repeal shall be or become effective until 60 days after the adoption thereof as aforesaid. Any person heard at such public hearing shall be given written notice of the determination of the commission] *in accordance with the provisions of the "Administrative Procedure Act," P. L. 1968, c. 410 (C. 52:14B–1 et seq.).*

[2.] *3.* Section 9 of P. L. 1958, c. 116 (C. 26:2D–9) is amended to read as follows:

9. The department shall:

(a) Administer this act and codes, rules or regulations promulgated by the commission;

(b) Provide the commission with the necessary personnel required to carry out its duties;

(c) Develop comprehensive policies and programs for the evaluation and determination of hazards associated with the use of radiation, and for their amelioration;

(d) Advise, consult, and cooperate with other agencies of the State, the Federal Government, other states and interstate agencies, and with affected groups, political subdivisions and industries;

(e) Accept and administer according to law loans, grants or other funds or gifts from the Federal Government and from other sources, public or private, for carrying out its functions under this act;

(f) Encourage, participate in or conduct studies, investigations, training, research and demonstrations relating to the control of radiation hazard, the measurement of radiation, the effects on health of exposure to radiation and related problems as it may deem necessary or advisable for the discharge of its duties under this act;

(g) Collect and disseminate health education information relating to radiation protection;

(h) Require registration of sources of radiation, and require records concerning sources of radiation to be kept in such manner as may be prescribed by codes, rules or regulations of the commission;

(i) Review plans and specifications on the design and shielding for radiation sources submitted pursuant to codes, rules or regulations of the commission for the purpose of determining possible radiation hazards;

(j) [Inspect] *Enter and inspect any bulding or place for the purpose of investigating an actual or suspected source of radiation and ascertaining compliance with this act or any rule, regulation or order promulgated or issued pursuant thereto and inspect* radiation sources, their shielding and immediate surroundings and records concerning their operation for the determination of any possible radiation hazard;

(k) Have power, to be exercised subject to codes, rules and regulations of the commission, to require, issue, renew, amend, suspend and revoke licenses for the construction, operation or maintenance of sources of radiation including byproduct materials, source materials and special nuclear materials in quantities not sufficient to form a critical mass. The codes, rules and regulations may provide for recognition of other State or Federal licenses, subject to the registration requirements prescribed by or under the authority of this act;

(l) Have the power in accordance with a fee schedule adopted as a rule or regulation in accordance with the "Administrative Procedure Act" P. L. 1968, c. 410 (C. 52:14B–1 et seq.), to establish and charge fees for any of the services it performs, which fees shall be annual or periodic as the department shall determine. The fees charged by the department pursuant to this section shall [not] be [less than $10.00 nor more than $500.00] based on criteria contained in the fee schedule. *The criteria shall reflect the actual or projected expense incurred by the department in the performance of the service for which the fee is charged;*

(m) Be empowered to issue orders for the implementation and enforcement of the provisions of this act or of any rule or regulation promulgated pursuant hereto.

[3.] *4.* Section 13 of P. L. 1958, c. 116 (C. 26:2D–13) is amended to read as follows:

13. The department may bring a civil action in the Superior Court to prevent the violation of the provisions of this act or codes, rules or regulations promulgated by the commission and orders of the department and said court may proceed in the action in a summary manner or otherwise and may restrain in all such cases any person or legal entity from violating any of the provisions of this act or said codes, rules, regulations or orders.

Any person who violates the provisions of this act or any rule, regulation or order promulgated or issued pursuant hereto or uses, removes, or disposes of any property in violation of an embargo imposed under the provisions of this act shall be liable to a penalty of not more than $2,500.00 to be collected in a civil action by a

summary proceeding under "the penalty enforcement law" (N. J. S. 2A:58–1 et seq.) or in any case before a court of competent jurisdiction wherein injunctive relief has been requested. If the violation is of a continuing nature, each day during which it continues shall constitute an additional, separate and distinct offense.

The department is authorized and empowered to compromise and settle any claim for a penalty under this section in an amount in the discretion of the department as may appear appropriate and equitable under all of the circumstances.

[4.] *5.* Section 4 of P. L. 1971, c. 372 (C. 26:2D–11.1) is amended to read as follows:

4. Notwithstanding any other remedy available to the department, whenever an agent of the department finds or has probable cause to believe that any material, machine, appliance, apparatus or device, or any part thereof, is a radiation hazard or danger of such nature as to constitute a threat to public health or welfare, *or is being operated in a manner as to result in such a threat,* he may embargo such article by affixing thereto a tag or other appropriate marking, giving notice that such article is, or is suspected to be, a radiation hazard or danger and has been detained or embargoed, and warning all persons not to use, remove or dispose of such article by sale or otherwise until permission for use, removal or disposal is given by the department, *or he may cause any material, machine, appliance, apparatus or device to be secured or impounded.* It shall be a violation of this act for any person to remove or dispose of such detained or embargoed article by sale or otherwise without such permission.

Within 10 days after embargoing or impounding any source of radiation, the department shall give notice to the person causing the violation or hazardous condition prescribing circumstances under which the source of radiation will be returned to the custody of the person. If the person, within a reasonable time as may be fixed by the department, does not furnish satisfactory evidence to the department of present and intended future compliance with the conditions, the rights of the person, with respect to the source of radiation so secured or impounded, shall become the property of the State to be disposed of by the department on behalf of the State in any manner consistent with public health and safety.

[5.] *6.* Section 5 of P. L. 1977, c. 233 (C. 26:2D–22) is amended to read as follows:

5. *Any person who violates any provision of this act shall be liable to the penalties contained in P. L. 1958, c. 116.* Any person who violates any provision of this act shall be guilty of a [misdemeanor] *crime of the fourth degree. The State Police shall, and any local police department may, enforce the provisions of P. L. 1977, c. 233 (C. 26:2D–18 et seq.).*

•[6.]• •7.• (New section) No person shall obstruct, hinder, delay or interfere with, by force or otherwise, the performance by the department, its personnel or any of its authorized agents of any duty under the provisions of this act or refuse to permit the personnel or authorized agents to perform their duties by refusing them upon proper presentation of a written order of the department, entrance to any premises at reasonable hours.

•[7.]• •8.• The following acts and parts of acts are repealed:

a. P. L. 1958, c. 116, s. 11 (C. 26:2D–11);

b. P. L. 1971, c. 372, s. 6 (C. 26:2D–11.3).

•[8.]• •9.• This act shall take effect immediately.

ASSEMBLY, No. 1836

STATE OF NEW JERSEY

INTRODUCED JUNE 16, 1980

By Assemblymen BAER and STEWART

Referred to Committee on Transportation and Communications

AN ACT to amend and supplement "An act concerning the handling of radioactive materials in this State and supplementing the 'Radiation Protection Act' (P. L. 1958, c. 116)," approved September 26, 1977 (P. L. 1977, c. 233).

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. (New section) As used in this act "highway" means any public street, alley, road, tunnel, bridge, viaduct, turnpike or parkway.

2. (New section) It shall be unlawful to ship or transport, or cause to be shipped or transported, by motor vehicle over the highways of this State radioactive materials for which a certificate of handling is required pursuant to P. L. 1977, c. 233 (C. 26:2D–18 et seq.), unless a certificate of handling is obtained from the Department of Environmental Protection and is in the possession of the operator of the motor vehicle. The operator shall produce the certificate of handling upon request by any motor vehicle inspector or police officer.

3. (New section) Once a certificate of handling has been issued by the Department of Environmental Protection, it shall be unlawful to ship or transport, or cause to be shipped or transported, by motor vehicle over the highways of this State radioactive materials in any manner or condition deviating from the conditions of the certificate of handling.

4. (New section) Any motor vehicle inspector, police officer or representative of the Department of Environmental Protection is authorized to inspect any motor vehicle to investigate any actual or suspected source of radiation for the purpose of determining compliance with the provisions of, or the need for, a certificate of handling.

EXPLANATION—Matter enclosed in bold-faced brackets [thus] in the above bill is not enacted and is intended to be omitted in the law.

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ASSEMBLY, No. 1345

STATE OF NEW JERSEY

INTRODUCED MARCH 13, 1980

By Assemblymen BASSANO, SNEDEKER, ORECHIO, ROCCO, DOWD, KOSCO, Assemblywoman CURRAN and Assemblyman BENNETT

Referred to Committee on Agriculture and Environment

AN ACT to prohibit the permanent disposal of radioactive waste materials in the State or in the territorial waters thereof.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. The Legislature finds and declares that the *[storage and]* *permanent* disposal of radioactive materials *[for an indefinite period of time]* poses a serious threat to the health and safety of the public; that the threat is of particular concern in a State as densely populated as New Jersey; and that any repository of radioactive materials located in this State would jeopardize the health, safety, and welfare of the citizens of New Jersey.

2. The provisions of any law, rule, or regulation to the contrary notwithstanding, no person shall construct or operate any plant or facility to be used for the permanent disposal of radioactive waste materials in this State, or in the territorial waters thereof, unless the Legislature shall pass a concurrent resolution finding that such materials can be safely stored for an indefinite period of time, declaring that the plant or facility would serve the public interest, and that the Legislature therefor expressly authorizes its construction and operation.

3. The Department of Environmental Protection may institute a civil action in the Superior Court for injunctive relief to prohibit and prevent a violation of this act and the court may proceed in a summary manner. Any person who violates the provisions of this act is liable to a penalty of not more than $100,000.00 to be collected in a summary proceeding in accordance with "the penalty enforcement law" (N. J. S. 2A:58-1 et seq.). If the violation is of a continuing nature, each day during which it continues constitutes an additional, separate and distinct offense.

4. This act shall take effect immediately.

EXPLANATION—Matter enclosed in bold-faced brackets [thus] in the above bill is not enacted and is intended to be omitted in the law.

5. (New section) Violations of sections 2 and 3 of this amendatory and supplementary act shall be punishable, for a first offense, by a penalty of not more than $500.00, or by imprisonment not exceeding 60 days, or by suspension or revocation of the operator's motor vehicle driver's license or all three, and for a subsequent offense, by a penalty of not more than $1,000.00, or by imprisonment not exceeding 6 months, or by suspension or revocation of the operator's motor vehicle driver's license or all three. Jurisdiction for the enforcement of the penalties imposed by this section shall be in the municipal court.

6. (New section) The Commissioner of Environmental Protection, his duly authorized representatives, and any peace officer, hereinafter referred to as "enforcement officers", may arrest on view, without warrant, and conduct before the nearest available municipal court judge any operator of a vehicle containing radioactive materials or any person who has committed a violation punishable under section 5 hereof. In lieu of arrest, as provided in this section, an enforcement officer may serve a summons and complaint upon any person believed to have committed a violation of sections 2 and 3 of this amendatory and supplementary act. The complaint shall be brought in the name of the State, and if made by an enforcement officer, it may be on information and belief. Proceedings may be instituted against the defendant on any day of the week including Sunday, or on a holiday. Any enforcement officer may serve and execute process in such proceedings. If a money judgment is rendered against an individual defendant, and if he fails forthwith to pay the same, he shall be imprisoned for a period not exceeding 60 days, unless the judgment shall be sooner paid. A copy of every judgment of conviction under section 5 hereof shall be furnished to the Division of Motor Vehicles in the Department of Law and Public Safety by the clerk of the court rendering the judgment.

7. (New section) a. The operator of any shipment of radioactive materials which requires a certificate of handling pursuant to section 1 of P. L. 1977, c. 233 (C. 26:2D–18 et seq.) and which does not require placarding on the outside of the shipping vehicle pursuant to the provisions of the "Hazardous Materials Transportation Act" (49 U. S. C. 1801 et seq.) and any rules and regulations adopted pursuant thereto shall conspicuously post a placard in the cab of the vehicle bearing the conventional radiation symbol and the words "CAUTION: THIS VEHICLE CONTAINS RADIOACTIVE MATERIAL" in letters at least 6 inches high.

b. Persons failing to comply with subsection a. shall be guilty of a petty disorderly persons offense.

8. Section 5 of P. L. 1977, c. 233 (C. 26:2D–22) is amended to read as follows:

5. Any person who violates any *other* provision of this act shall be guilty of a [misdemeanor] *crime of the fourth degree.*

9. This act shall take effect immediately.

STATEMENT

The purpose of this bill is to provide direct and efficient means by which the provisions of the "Radiation Protection Act" (P. L. 1958, c. 116) concerning the transportation of radioactive materials may be enforced.

ASSEMBLY RESOLUTION No. 22

STATE OF NEW JERSEY

INTRODUCED FEBRUARY 21, 1980

By Assemblymen KERN, MARKERT, PAOLELLA, KOSCO and IMPERIALE

Referred to Committee on Transportation and Communications

AN ASSEMBLY RESOLUTION directing the Speaker of the General Assembly to establish a special committee to commence an investigation and conduct hearings relative to the transporting of radioactive cargo on highways within the State.

WHEREAS, The Bergen county board of freeholders, the mayor and council of the borough of Paramus and many distressed citizens have expressed concern, and

WHEREAS, It is a known fact that the highways of northern New Jersey are being used to transport radioactive cargo and that such cargo can present a potential danger to the health and welfare of its residents, and

WHEREAS, The element known as Plutonium is so toxic that 500 times less than one millionth of a pound is enough to cause cancer, and

WHEREAS, Plutonium is so radioactive it must be isolated from the biosphere for a period of 250,000 years and is most commonly used in the construction of atom bombs, and

WHEREAS, A highway accident involving the transporting of Plutonium or other nuclear substances could cause a major catastrophe; now, therefore,

BE IT RESOLVED *by the General Assembly of the State of New Jersey:*

1. That the Speaker of the General Assembly is directed to establish a special committee to commence an investigation and conduct hearings relative to the transporting of radioactive materials on the roads and highways of New Jersey. The committee shall be comprised of at least one member from each of the follow-

ing Assembly standing reference committees, Transportation and Communications, Judiciary, Law, Public Safety and Defense, and Energy and Natural Resources.

2. That the committee be empowered to conduct hearings throughout the State, but may concentrate its efforts within northern New Jersey and the Bergen county area, on the problem of transporting radioactive materials. The committee may make use of the records and transcripts of the former subcommittee of the Transportation and Communications Committee established pursuant to Assembly Resolution 3003 of 1979.

3. That local citizenry be invited to attend these hearings so that they are made aware of the precautions or lack thereof in transporting radioactive materials in their areas and so that their opinions and concerns can be heard.

4. That the purpose of said hearings is to inquire into the need for further legislation both State and Federal for controlling and regulating the shipping of dangerous radioactive cargo on the highways and roads of the State of New Jersey. The committee shall report its findings to the Legislature before January 6, 1981.

5. The committee shall have all the authority given to special committees pursuant to the law concerning legislative investigations (R. S. 52:13–1 et seq.).

ASSEMBLY, No. 1974

STATE OF NEW JERSEY

INTRODUCED SEPTEMBER 22, 1980

By Assemblymen PATERNITI, BORNHEIMER, STOCKMAN, McENROE, Assemblywoman McCONNELL, Assemblymen FORTUNATO, KARCHER, OTLOWSKI and LESNIAK

Referred to Committee on Agriculture and Environment

AN ACT concerning the disposal of hazardous waste, chemical waste, bulk liquids and pesticides, and amending P. L. 1976, c. 99.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Section 2 of P. L. 1976, c. 99 is amended to read as follows:

2. [After January 1, 1977, no] *No* commercial solid waste facility located within[:] 1,000 yards of a river flood hazard area delineated prior to the effective date of this act pursuant to P. L. 1962, c. 19 (C. 58:16A-50 et seq.), *or within 1,000 yards of any area zoned residential,* shall accept for disposal on or in the ground any hazardous waste, chemical waste, bulk liquids or pesticides.

2. This act shall take effect immediately.

STATEMENT

This bill would prohibit the disposal of hazardous waste, chemical waste, bulk liquids or pesticides in commercial solid waste facilities located within 1,000 yards of any area zoned for residential purposes.

ASSEMBLY JOINT RESOLUTION No. 10

STATE OF NEW JERSEY

PRE-FILED FOR INTRODUCTION IN THE 1980 SESSION

By Assemblyman SCHWARTZ

A JOINT RESOLUTION directing the New Jersey Department of Environmental Protection to prepare action plans for the cleanup of nuclear waste and for the safe handling and storage of nuclear waste in nonpopulated areas.

WHEREAS, The Federal Environmental Protection Agency and the State Department of Environmental Protection have both acknowledged that there exists a radioactive waste problem at sites in Middlesex borough and Piscataway township; and

WHEREAS, The level of radioactivity at these sites is significantly above normal background levels; and

WHEREAS, The prevalent levels of radioactivity at these sites in Middlesex borough and Piscataway township may well constitute a substantial, continuing health hazard; and

WHEREAS, The immediate cleanup of these sites, restoring the radioactivity level of normal backround levels, is important to the physical and mental wellbeing of the people of Middlesex and Piscataway; and

WHEREAS, The interim storage of radioactive waste in populous areas is clearly an important public policy; and

WHEREAS, Middlesex, Piscataway and the surrounding communities are populous areas; and

WHEREAS, Federal, State and local officials are or ought to be aware that other Middlesex county communities may also have radioactive problem sites; now, therefor,

BE IT RESOLVED *by the Senate and General Assembly of the State of New Jersey:*

1. That the State Department of Environmental Protection is directed to prepare, in consultation with appropriate Federal, county and local officials, action plans for the cleanup of radioactive problem sites in Middlesex borough and Piscataway township.

2. That the State Department of Environmental Protection be directed to prepare action plans for the safe transmittal of nuclear waste for storage in nonpopulous areas.

3. That the State Department of Environmental Protection be directed to prepare and conduct appropriate studies in cooperation with Federal, county and local officials, in other suspected radioactive problem sites in New Jersey.

4. This Joint Resolution shall take effect immediately.

STATEMENT

The purpose of this joint resolution is stated in its title.

SENATE, No. 159

STATE OF NEW JERSEY

PRE-FILED FOR INTRODUCTION IN THE 1980 SESSION

By Senator ZANE

AN ACT to amend and supplement "An act concerning the handling of radioactive materials in this State and supplementing the 'Radiation Protection Act' (P. L. 1958, c. 116)," approved September 26, 1977 (P. L. 1977, c. 233).

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Section 1 of P. L. 1977, c. 233 (C. 26:2D-18) is amended to read as follows:

1. [No] *Except as provided in section 2 of this amendatory and supplementary act, no* person shall transport into or through the State, or store, hold or detain pending or during such transit, any of the following materials without first having obtained a "certificate of handling" from the department:

a. Plutonium isotopes in any quantity and form exceeding 2 grams or 20 curies, whichever is less;

b. Uranium enriched in the isotope U-235 exceeding 25 atomic per cent of the total uranium content in quantities where the U-235 content exceeds 1 kilogram;

c. Any of the actinides the activity of which exceeds 20 curies;

[d. Spent reactor fuel elements or mixed fission products associated with such spent fuel elements the activity of which exceeds 20 curies;] (*Deleted by amendment, P. L. ....., c. .....*).

e. Any quantity of radioactive material which exceeds 20 curies; or

f. Any lesser quantity of radioactive material which, when combined with any other quantity of such material, exceeds 20 curies.

2. (New section) No person shall transport into this State any spent reactor fuel elements or mixed fission products associated with such spent fuel elements the activity of which exceeds 20 curies.

3. This act shall take effect immediately.

EXPLANATION—Matter enclosed in bold-faced brackets [thus] in the above bill is not enacted and is intended to be omitted in the law.

STATEMENT

This bill prohibits the importation of out-of-state radioactive wastes into New Jersey.

APPENDIX C

MASS MEDIA COVERAGE OF NUCLEAR ISSUES

NEW JERSEY MEDIA

Publication	Cycle	Circulation	Coverage Area	Ownership
NEWARK/NEW YORK				
New York Times	(M) (Sun)	841,000 1,403,000	New York Metro & All New Jersey	Local
Newark Star-Ledger	(M) (Sun)	413,000 567,000	Newark Metro & North Jersey	Local
TRENTON				
Times	(E) (Sun)	72,000 87,000	Trenton Metro & Central Jersey	Washington Post
Trentonian	(M Tab)	60,000	Trenton Metro & Central Jersey	Local
SOUTH JERSEY/PHILADELPHIA				
Courier-Post*	(E) (Sun)	122,000 110,000	Camden Metro & South Jersey	Gannett
Inquirer	(M) (Sun)	420,000 832,000	Philadelphia Metro & South Jersey	Knight-Ridder
Bulletin	(E) (Sun)	402,000 584,000	Philadelphia Metro & South Jersey	Charter

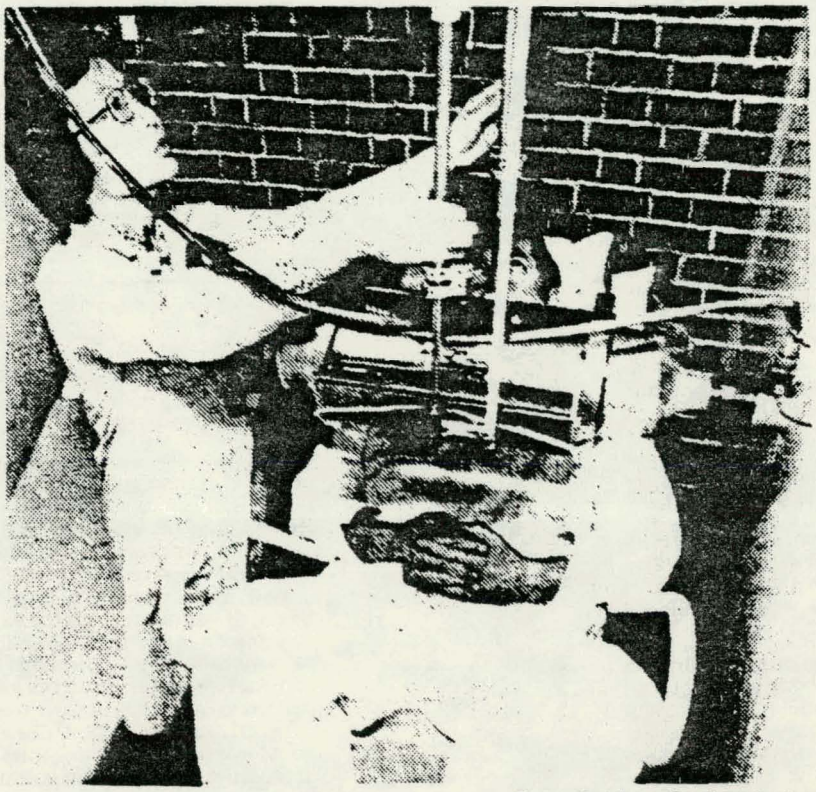
*Camden

(M) - morning publication
(E) - evening publication
(Sun) - Sunday edition
(MTab) - Morning tabloid

NEW YORK TIMES

Wednesday, May 9, 1979

U.S. Testing Workers for Effects Of 13 Years Amid Atomic Waste



The New York Times Don Hogan Charles

Vaughn Crile during radiobiology tests at Argonne, Ill., National Laboratory

By BEN A. FRANKLIN

Special to The New York Times

ARGONNE, Ill., May 7 — "This is boring," said Vaughn Crile, a robust, 47-year-old machine shop operator from Pennsylvania, as he reclined in disposable paper pajamas in a lead-lined underground vault here.

But Mr. Crile and his wife, Gayei, 45, were at the human radiobiology center of Argonne National Laboratory outside Chicago today for reasons that were anything but boring. They were in the vault for whole-body counts of gamma radiation.

Their tests are the first of a series to be conducted on workers in a Canonsburg, Pa., industrial park that has been found to be contaminated with radioactive waste. The park, in turn, is one of the first such contaminated sites to be scheduled for a Federal clean-up under a 1978 law.

The Criles' trip here at Government expense illustrates the widening efforts of nuclear scientists to understand and remedy the effects of past ignorance and carelessness about radiation.

More than five years ago, the Government decided that it ought to recheck more than 100 sites once used in the nuclear weapons program and abandoned in the 1950's and 1960's. Files were pulled, forgotten places revisited. And under the new law, Canonsburg Industrial Park became one of the first 20 sites to be scheduled for a clean-up.

When scientists involved in this effort examined the industrial park last fall, they found that some 125 people employed in machine shops and a trucking terminal

Morning: 841,000 Sunday: 1,403,000 Coverage Area: New York Metro & All of New Jersey

NEW YORK TIMES

Wednesday, May 9, 1979 (Page 2)

there were receiving radiation exposures far above the limits set for the general population. Some were exposed to radiation above the higher limits set for workers in the nuclear industry.

For 13 years, ever since Mr. Crile bought the vacant, 18-acre factory site, he and his wife worked together in the office of Crile Metalizing, the family business. And unknown to them or the other workers at the site, they were being bombarded from inside as well as outside their bodies with low-level radiation lingering from the site's former use as a radium refining plant.

Radium residues in buildings and in abandoned piles of ore on the grounds give off radon gas, an odorless, tasteless decay product that accumulates in fatty tissues and, in turn, bears "radon daughters," particles that lodge in the lungs and continue to emit harmful radiation.

In 1978 a Department of Energy survey found that the workers were exposed to radon daughter concentrations up to 14 times higher than the level considered safe by the Government.

The limits for continuous exposure to radon gas are three picocuries per liter of air for the general population, 30 picocuries for nuclear workers. A picocurie is one-billionth of a curie, a standard measure of radioactivity. The radon concentrations measured in 1978 at Canonsburg ranged from 2.6 to 106 picocuries per liter.

Radon daughters were measured at 10 percent over the limit set for uranium miners. In measuring direct gamma radiation, the scientists said, "some spots of up to 1,600 microroentgens per hour were observed outside the buildings." The radiation guidelines for the general population allow 250 microroentgens per hour.

Results Not Due for Weeks

The Criles show no apparent ill effects from the radiation, and the results of their gamma radiation, radon exhalation and urine tests will not be known for several weeks. The low level of their retained radiation requires extensive computer analysis to sort out what Dr. John Rundo, a senior biophysicist at Argonne, said were "imprecise" readings at best.

The New York Times May 9, 1979

The radioactive contamination of what is now the Canonsburg Industrial Park began 68 years ago with the extraction of tiny specks of radium from huge volumes of Colorado ore. Uranium and other radioactive materials in the ore were discarded in ignorance of their dangers.

In 1911, the Standard Chemical Company was one of the bustling industrial companies in Canonsburg that made the now-gritty little town just south of Pittsburgh prosperous and famous. It imported hopper carloads of carnotite ore from Montrose, Colo., consuming 500 tons of ore to make one gram of radium, then worth the astronomical price of $120,000. The company discarded the tailings where it could, mostly in piles around the plant.

In 1914, Joseph M. Flannery, the company president, predicted in an interview with a local newspaper that radium would prove to have curative effects in "such things as insanity, tuberculosis, rheumatism and anemia, and a lot of cancers." Mr. Flannery and two other principals in his company later died of radiation sickness.

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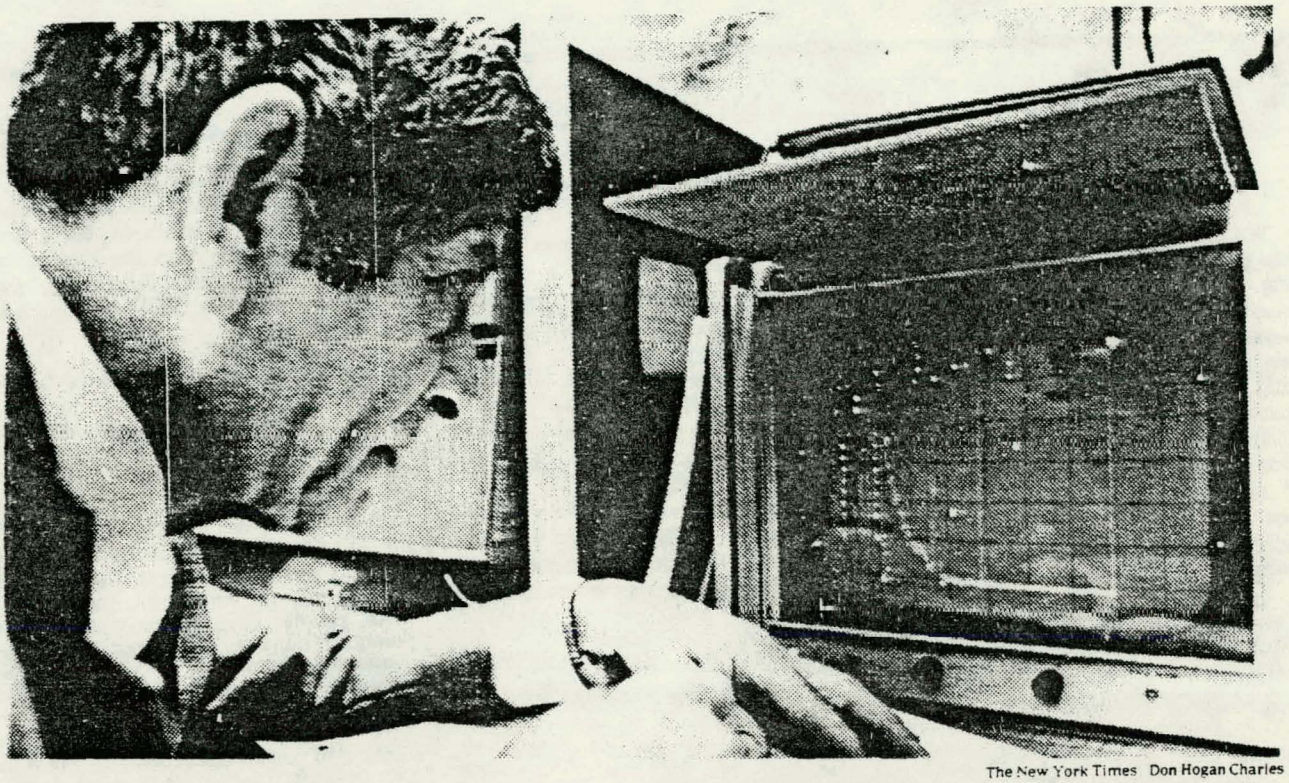

The New York Times Don Hogan Charles

Dr. John Rundo at the Argonne, Ill., National Laboratory as he studied data from tests performed on Vaughn Crile, the owner of the Canonsburg Industrial Park. The park in Pennsylvania is situated on site of former radium refining plant.

Visit by Madame Curie

In 1921, Canonsburg was visited by Marie Skoldowska Curie, the codiscoverer with her husband of the radioactive properties of radium.

"The women of America" had raised the necessary $120,000 to give Madame Curie a gram of precious radium to enable her to continue her research, and despite the ravages of radiation she was suffering by then, she visited Canonsburg and Washington to accept the gift. The radium was handed to her in the East Room of the White House by President Harding, in a vial unprotected except for the security attending its cash value.

Standard Chemical and its successors gave up the radium business in Canonsburg in 1942. The Government then moved in, contracting secretly with the Vitro Corporation to process the leftover ore and extract uranium for experimental nuclear weapons. Until the company left Canonsburg in 1958, radioactive wastes continued to be dumped around the plant, according to the Pennsylvania Department of Environmental Resources, which is now stuck with the disposal problem.

Because "depleted" uranium ore was not considered hazardous in the 1950's, was not even regulated by the Atomic Energy Commission, Vitro created a radioactive lagoon at the plant's western boundary. When the dangers were finally recognized in 1965, the A.E.C. dealt with the lagoon by filling it in

Options for Cleanup

"The options now are to stabilize the Canonsburg site by tearing down the buildings, putting up two to ten feet of soil over it and turning the property over to the ownership of the Federal Government for some use or for being fenced in as uninhabitable," according to Thomas M. Gerusky, Pennsylvania's director of radiological protection.

"Or we may have to have an estimated 160,000 tons of contaminated material moved out of there to an approved nuclear disposal site, probably in Arizona," he said.

Vaughn Crile is a canny, self-made businessman, and as he shakes his head at the blunders of bureaucrats, he is also calculating his potential gain from their mistakes.

Under the Uranium Mill Tailings Radiation Control Act of 1978, the Federal Department of Energy must pay 90 percent of any "remedial action" at a contaminated site, including the cost of acquisition. Pennsylvania would pay the balance. Mr. Crile paid $130,000 for the land and now figures it would be worth about $3 million if not "hot."

No Federal money can flow, however, until the Environmental Protection Agency establishes the radiation level at which the act's indemnity provisions apply. That action is not expected until November.

In the meantime, Mr. Crile seems less concerned about his own 13-year exposure to radioactivity than about the difficulty of keeping and hiring workers, and about the slow pace of settling on a price for his land.

"The Government doesn't seem very interested in getting us off the property," he said. "They're more interested in using us as guinea pigs. We feel we're being taken advantage of just to collect more data."

Morning: 841,000 Sunday: 1,403,000 Coverage Area: New York: & All of New Jersey

NEW YORK TIMES

Sunday, July 1, 1979

Public Fears Over Nuclear Hazards Are Increasing

By RICHARD D. LYONS
Special to The New York Times

WASHINGTON, June 30 — In Colorado the protests are over a uranium processing plant. In South Carolina and Mississippi the complaints involve nuclear waste. People in Florida and Pennsylvania are angry because they discovered that their homes had been built atop radium mine tailings.

From New York to Washington State, from Texas to Montana, people are edgy, if not outright angry, over radiation — not necessarily over the Three Mile Island accident in Pennsylvania, but over potential hazards that exist, in some cases, literally in their own backyards.

The concern comes amid a shortage of gasoline and other fossil fuels, which is forcing a choice between a prolonged energy shortage and an expanded nuclear power industry.

Low-Level Radiation: How High the Risks?

First of several articles.

The hazards, and the growing concern, are those posed by low-level radiation, which usually does not cause measurable damage but which may eventually have adverse effects that are not fully understood. While the horrors of death and disfigurement from large doses of radiation have been well documented, the degree to which low levels can harm is still a mystery.

Everyone is exposed to low-level radiation from sources both natural and manmade. Most people are not even aware of many of the sources; even building stone can emit low-level radiation. Others are widely known and accepted. This year, for example, it is estimated that 240 medical and dental X-rays will be taken — more than one for every American.

As people have become aware of potential dangers from radiation, the protests and the new discoveries have widened. Those in recent months include the following:

¶People in Colorado have protested the opening of a uranium processing plant in part because the product is to be used in power plants in the Great Lakes area.

¶South Carolinians have demanded that the dumping of nuclear waste in their state be stopped, and they have even refused to allow entry of radioactive debris from Three Mile Island.

¶Mississippians have steadfastly opposed attempts by Federal agencies to store similar nuclear waste in underground salt domes along the Gulf Coast.

¶People in Florida, Colorado and Pennsylvania have suddenly awakened to the potential hazards their families face because their homes are built over ore tailings from uranium, radium and phosphate mines.

¶Residents of West Valley, N.Y., and Richland, Wash., have found that radioactive material is leaking from rusting storage containers into the ground.

Scores of such incidents, together with the outcries over Three Mile Island, have created an atmostphere of consternation over the hazards of radiation and led to a polarization of public opinion.

Transcending Traditional Labels

Increasingly, in states and municipalities around the country, the issue is creating rival groups, groups whose points of view transcend labels of Democrat and Republican, conservative and liberal.

Proponents of nuclear power such as Dr. Alvin Weinberg of the Oak Ridge National Laboratory in Tennessee view it as "that miraculous and quite unexpected source of energy," while opponents such as Anthony Z. Roisman of the Natural Resources Defense Council see it as a "nuclear monster."

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Mr. Roisman's group, although it is made of up antinuclear activists, says increased use of nuclear power should be allowed until about the year 2000 to alleviate the energy crisis. But Mr. Roisman emphasized that the trade-off would be a Federal commitment to phase out nuclear power plants, starting in about 40 years, and replace them with such other sources as solar power.

The conflicting views of the risks and benefits spotlight the fact that nuclear power has become the most complicated technical issue ever to come before the American people, among whom fewer than one in 150 has taken a high-school physics course.

Decision-making has fallen to politicians and scientists, which has only deepened public misundersanding and distrust because of ambiguities from the latter group and instances of deception from the former.

" The past and present record of Federal radiation protection programs shows a clear preference for protecting radiation technologies rather than protecting public health and safety," Robert Alvarez of the Environmental Policy Center told Congress recently.

A Lack of Coordination

Neither the policy planners at the White House, nor Congress, nor the Federal and state bureaucracies have been able to coordinate regulatory efforts well or to allay public fears. For example, the Federal Radiation Council, which was the Government's lead radiation regulation agency, was dissolved in 1970. Its responsibilities fell to the Environmental Protection Agency, where staff and budget devoted to radiation has been cut in half.

Public distrust has been intensified in the last year by a series of disclosures of secrecy and deception on the part of Federal officials, up to and including President Eisenhower, who sought to mute the hazards of fallout from atomic weapons tests.

Residents of the heaviest fallout areas in Utah and Nevada, who for years had complained unsuccessfully to the Federal authorities about suspicious cancer deaths, are suddenly commanding attention at the White House and the Pentagon. Searches also have started for 250,000 former servicemen exposed to radiation during nuclear tests almost a generation ago, this following a decade of official assurances that there were no hazards.

Cancer Rate Among Workers

Three Mile Island has also served to underscore the complaints of a small group of scientists, some of whom had been written off by colleagues as fearmongers and crackpots, that people who work with nuclear materials have been getting cancer at a much higher rate than those in other industries.

Their complaints were answered, in part, by a Federal jury's award of more than $10 million to the survivors of Karen Silkwood, a laboratory technician in Oklahoma who was harassed, and some say killed, for seeking to call attention to specialized radiation hazards in the workplace.

Still, the scientific community has been unable to resolve basic questions surrounding the hazards of radiation. Scientists have produced tens of thousands of pages of research papers and statistical treatises in support of conflicting viewpoints — all in terms that the public is not able to understand.

A report the National Academy of Sciences made public a few weeks ago that dealt with the risks of low-level radiation was almost totally incomprehensible even to people with scientific backgrounds. Indeed, the dispute over the meaning of the numbers that had been assembled ran so deep that a rump group on the committee that conducted the study publicly disavowed some of the main majority views, thus exacerbating the very disagreement that the study was supposed to have settled.

Revision in Estimates

After the Three Mile Island accident, the position of Federal officials was that less than one case of fatal cancer could be expected to develop among residents of the area. But, in a statistical sleight of hand that further demonstrated the uncertainties of trying to gauge the effects of low-level radiation, they revised the estimate and said that several cases were probable.

All nuclear plants emit some radiation from leaking pipes, venting gases and waste water. The question, central to the Three Mile Island episode, is how much danger these emissions pose to people in the area. It is a question that is unlikely to be resolved for decades, if ever.

The hazards for nuclear plant workers are also difficult to measure. But the problem has produced a category of workers called "jumpers," who travel from plant to plant, accumulating radiation dosage as they perform maintenance work and repairs.

"It's a comment on our society that we allow people to overexpose themselves to radiation in order that they can eat," said Dr. Arthur R. Tamplin, a prominent critic of the nuclear establishment who now works for the Natural Resources Defense Council.

"This isn't just the problem of harm to the individuals involved," he said, "but becomes a societal problem because most of these people are of reproductive age and their defective genes will go into the total pool of human genes."

Debris of Mining and Milling

While occupational exposures may bring tens of thousands of people to some risk, the number exposed to radiation from the debris of the mining and milling of uranium and other radioactive isotopes is far greater.

At least 150 million tons of tailings, which contain about 85 percent of their original levels of radioactivity, have been discovered. Dealing with such waste is a national issue that has yet to be resolved.

Another problem concerns the use of X-rays. In addition to the 240 million dental and medical X-rays that will be taken this year, there will be at least 15 million tests in which radioactive materials are injected into the body and traced by radiation detectors. The increasingly popular CAT (computerized axial tomography) scanners, which provide three-dimentional views of internal organs, also employ X-rays.

Radiation for medical uses in recent years is believed to be about equal to that from background sources, but it could be going up because of the increasing employment of CAT scanners and an even more sophisticated device called PETT, for positron emission transverse tomography.

Although many critics believe that Americans are overexposed to radiation from X-ray units, these risks have generated far less public attention than those posed by radiation from the various phases of the nuclear power cycle.

A More Subtle Question

While scientists try to determine the extent of these risks, a more subtle question is being asked. Could it not be, this line of reasoning goes, that society can tolerate a certain number of deaths from the pitfalls of nuclear power generation in a manner akin to the toleration of 50,000 deaths a year from auto accidents?

Unless the nation reduces its standard of living significantly, there will have to be an increase in electric power generation and there are only two practical sources — nuclear energy and coal. If nuclear expansion is curtailed, the use of coal will expand dramatically.

Morning: 841,000 Sunday: 1

Sunday: 1,403,000

Coverage Area: New York Metro & All of New Jersey

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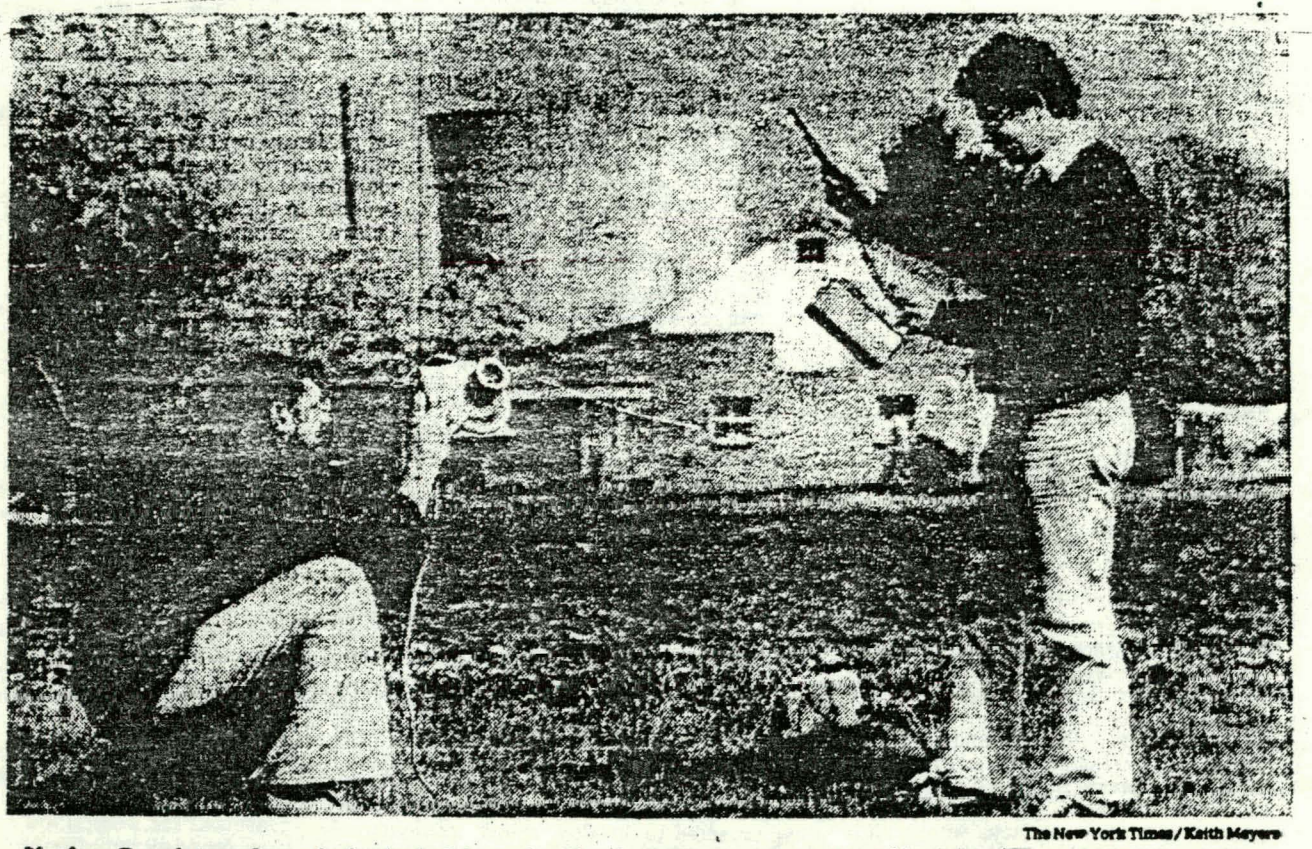

The New York Times/Keith Meyers

Nuclear Regulatory Commission technicians checking for radiation in a backyard in sight of Three-Mile-Island plant

According to a Congressional estimate made public last month, the number of deaths attributable to pollutants from coal combustion, using 1975 as a base, is 48,120 a year. Should the use of coal rise dramatically over the next decade, as expected, that number was calculated to rise to 55,835.

Perhaps a Cheaper Alternative

It could be that the economics of the health and environmental problems posed by expanded use of coal might make nuclear power the cheaper alternative in the future, even considering increases in costs as more safety equipment is added to nuclear plants.

The Green Mountain Power Company in Vermont has calculated that nuclear power is holding down energy costs even now. The company, which uses nuclear power as well as oil and coal, said that a typical residential customer would have been charged $106.44 more for electricity last year if the utility's power had been generated only by fossil fuels.

People seeking an end to nuclear power have urged the development of technology that would burn coal more cleanly, thus reducing pollution and health problems. But Dr. Karl Z. Morgan of the Georgia Institute of Technology cites another problem with this alternative to nuclear power.

"It's not fair to the generations yet unborn to deprive them of coal hundreds, if not thousands, of years from now," he said. "We get medications, we get plastics, we get all kinds of other useful things from coal. To use up all the coal and oil would mean making these very necessary commodities the hard way — building up very complicated molecules from sea water."

Morning: 841,000 Sunday: 1,403,000 Coverage Area: New York Metro & All of New Jersey

NEW YORK TIMES

Sunday, August 3, 1979

Report Urges Regional Plan On Radioactive Waste Sites

By MOLLY IVINS
Special to The New York Times

PHOENIX — A study group's report on the disposal of low-level radioactive waste recommends that the states, rather than the Federal Government, handle the problem in regional associations and that Washington provide them a number of incentives.

The report, to be released today at a meeting in Denver of the National Governors Association, was prepared by a committee of eight governors chaired by Bruce Babbitt of Arizona.

While the report takes a "carrot" approach to the long-festering intergovernmental problem of radioactive waste disposal, Governor Babbitt said that one of two proposals now being considered by Congress, a bill by Representative Morris K. Udall of Arizona, represented the "stick" approach. Under that proposal, any producer of low-level radioactive waste, such as a nuclear power plant or hospital radiotherapy program, would lose its license after five years if the state in which it was located did not provide a waste-disposal plan.

The Other Proposal

The other bill being considered by Congress, introduced by Representative Mike McCormack of Washington, is referred to by the governors' staff members as "the shove-it-down-their-throats technique." This bill would simply authorize the Department of Energy to pick six waste-disposal sites around the country and build the dumps; the states would have no say in the selection process.

"Both those bills are guaranteed to further the level of hostility between the statehouses and Washington," Governor Babbitt said. "They are both overused and inadequate responses."

According to the Governor, the problem is political and involves all the problems of federalism, with none of the 50 states likely to want a dump within their borders.

"Rather than having a great confrontation with the Feds on this," he asserted, "if you really want to advance a solution you're going to have to look carefully at incentives for the states to solve their own problems. If they don't do it this way, they're going to have six states in rebellion. I know I'd be in rebellion by return plane if they picked Arizona."

A Six-Region Suggestion

The governors' report would require Congressional approval, and an amendment encompassing some of its recommendations was passed this week in the Senate.

The report recommends that the nation be divided into six regions. Any regional association of states, working together in a formal compact, would jointly decide on a disposal site and could then exclude radioactive waste from any state outside the region.

But dividing the nation into regions is a notoriously tricky problem and the report leaves several "floater" states to decide which region they want to join. As to figuring out which state in a region would draw the black bean, so to speak, the report provides only some guidelines on site-selection procedures.

Of particular interest is a recommendation that states within a region "trade off." For example, a state that agreed to have a radioactive waste dump could then ship all its hazardous industrial waste to another state. Such a trade-off is in effect in the Northwest, where Washington takes Oregon's nuclear waste and Oregon takes Washington's toxic chemical waste.

Compensations Suggested

The report recommends that a state accepting a low-level dump be given a variety of economic compensations, most notably direct payments to be financed by both the Federal Government and the nuclear industry. The report also recommends public participation at all stages of the site-selection process, with the final decision to be ratified by the state legislatures.

In addition, it points out the need for a system of classifying low-level waste. In general, low-level waste does not include spent fuel rods from reactors, reprocessed fuel or uranium mill tailings below a certain threshold of radioactivity. According to Governor Babbitt, about half the low-level waste in the country is just refuse items from nuclear power plants such as gloves, clothing, tools and so forth that have been contaminated through contact with radioactive devices. About one-fourth is waste from medical sources and another fourth is industrial waste such as that from factories that make tritium-lighted watch faces.

Some of these wastes could be safely incinerated rather than buried. And some of the isotopes used in medical procedures break down in two to three days, suggesting that a simpler form of disposal than now is used might be devised.

Members of the Committee

The governors of the three states that have low-level disposal sites all served on the study committee — Richard W. Riley of South Carolina, Dixy Lee Ray of Washington and Robert List of Nevada. The group also included Dick Thornburgh of Pennsylvania, whose state is the site of the Three Mile Island plant, and James R. Thompson Jr. of Illinois, which has a large number of reactors, plus Bill Clinton of Arkansas and John V. Evans of Idaho.

Pat Costello, legal counsel to Governor Evans, is credited with producing the idea that the governors believe will make their plan work — the power of a regional association to turn down waste from states that have yet to face the problem and form an association of their own. Since the three existing sites would presumably continue to be used, but only as regional disposal places, the pressure would start to build up on states that would no longer be permitted to send wastes to those sites.

It has been known for some time that the existing sites are inadequate. Washington's and Nevada's sites were closed for a time last summer by the respective governors because of repeated violations of the Nuclear Regulatory Commission's packaging and shipping regulations. And South Carolina has been cutting back on the waste it will accept.

It is estimated that by 1990 the country will generate three times as much low-level waste as it does now. The Nuclear Regulatory Commission estimates that, even after the difficult problem of choosing a site is met, it would take two to four years to develop a disposal facility.

NEW YORK TIMES

Monday, October 29, 1979

The Junk Crisis in Nuclear Medicine

The governors of three states have created a crisis for hospitals and research laboratories by refusing to store any more nuclear junk. Three-fifths of the junk, officially called "low-level radioactive waste," comes from the nuclear power industry, chiefly in the form of contaminated clothing, equipment, filters and sludge. But most of the rest comes from biomedical institutions that use radioactive materials to diagnose and treat disease and perform experiments. The governors are reacting to a genuine problem of inept handling and poor planning. But the total ban on further shipments to Washington and Nevada and severe restrictions in South Carolina threaten to disrupt some of the nation's most valuable biomedical programs.

For years, these lightly contaminated materials have been buried in shallow trenches at commercial sites in the three states. Some of the shipments, however, have clearly violated both regulations and common sense. Barrels have been found to leak. Contaminated steel has been poorly packaged. An overweight truck dodged state weighing stations. Some of the garbage has even been found buried *outside* a protective fence. The shippers have grown lax and neither the Nuclear Regulatory Commission nor the Department of Transportation has bothered to enforce the rules. A few stiff penalties might well have corrected matters.

So the three governors have a point and they have made it. But now the trash is beginning to pile up in much more harmful ways. Most power plants have enough storage space to keep operating. But biomedical labs and hospitals and the small firms that supply them with radiopharmaceuticals cannot store their garbage for long. Some have already been forced to postpone experiments and diagnostic tests. The Society of Nuclear Medicine predicts that most clinical and research activity will choke to a halt within a few weeks unless some outlet for the waste is found.

Perhaps the closed sites could be reopened for some carefully packaged priority shipments. Perhaps room could be found on Federal nuclear reservations. Federal agencies have urged the states that produce the waste to store it temporarily. That is a fair enough suggestion but it is bound to be widely ignored by state officials under pressure from antinuclear constituents. A stopgap solution is needed and Federal officials have an obligation to see that it is found. It would be tragic to abort vital medical projects because of a small number of infractions in handling wastes that are not very dangerous to begin with.

Nonetheless, the three governors have dramatized a shameful pattern of neglect. The crisis exposes a serious shortage of "low-level" waste storage sites. Washington, Nevada and South Carolina have become dumping grounds while the rest of the nation goes on generating the garbage and avoiding the politically sensitive problem of storing it. New York, for instance, produces the most but ships its garbage clear across the country.

A study group recommended to President Carter this year that "low-level" wastes be handled regionally under a national plan. Such a plan is overdue. It would reduce transportation problems and augment storage facilities for a waste load that will only grow larger. It would let every region decide whether it wants to provide and regulate decent dumps or go to the extreme of halting nuclear medicine.

Morning: 841,000 Sunday: 1,403,000 Coverage Area: New York Metro & All of New Jersey

NEW YORK TIMES

Tuesday, August 5, 1980

Who Should Be the Nuclear Junkman?

A committee of eight governors has come up with a sensible proposal for a vexing political problem — where to dispose of lightly contaminated radioactive junk, things like gloves, tools and debris from hospitals and power plants. Instead of ducking the issue or railing against possible Federal intervention, the governors propose a welcome idea: that the states solve the problem themselves, using regional compacts approved by Congress. This plan is rightly described as "creative Federalism" because it may ease a crisis that has long pitted states against each other and against the Federal Government.

Every state is home to activities that generate low-level radioactive waste. This material is far less dangerous than that produced by nuclear plants and military bomb factories, but it is almost as sensitive politically. Many states won't even allow the stuff to be buried within their borders. Their refusal has put an unfair burden on the three states that do have commercial disposal sites — Nevada, South Carolina, and Washington. They rightly protest being treated as dumping grounds by states like New York and California that create vast amounts of waste but will not take responsibility for storing it.

The best answer is regional. There is no need for each state to set up its own site — most don't have enough waste volume to justify the cost; some lack suitable sites. National needs could be met by half a dozen dumps, scattered to reduce transportation risks and political burdens. The question is, where should they go? If the Federal Government tried to dictate locations, it would meet stiff resistance. The regional compacts suggested by the governors' committee would provide an effective mechanism.

States would be authorized to set up regional associations to decide jointly on disposal sites. They would thus be encouraged to trade burdens; nuclear waste might go to some states, toxic chemical wastes to others. An association could refuse shipments from states outside the region. That would put immense pressure on heavy waste sources like New York to form their own compacts and set up their own sites.

The proposal is now before the National Governors Association meeting in Denver. Legislation that has passed the Senate and is soon to be introduced in the House would allow the formation of regional radioactive waste compacts. There are still disagreements over whether Congress should approve such compacts in advance or only after reviewing their details, and over the need for Federal financial incentives. But such details are less important than the principle.

Some hospitals, industries and power plants might have to curtail operations if places are not found soon to put the junk. Finding them, as the governors are starting to recognize, is a job best done by the states. The right approach to low-level wastes is regional.

Morning: 841,000 Sunday: 1,403,000 Coverage Area: New York Metro & All of New Jersey

TRENTON TIMES

Oct. 24, 1979

Nuke dump closing a problem

CARSON CITY, Nev. (UPI) — The closing of a nuclear waste dump in Southern Nevada could force thousands of hospitals, research centers and industries across the nation to stockpile their own radioactive materials, a spokesman for Gov. Robert List said yesterday. George Kolbenschlag, assistant to the president for Nuclear Engineering Co., of Louisville, Ky., which operates the dump, said the shutdown could limit such things as cancer research, metallurgical work and hospital treatment. He said private industries don't have the facilities to store their own wastes. "This is a national problem," said Kolbenschlag. There are only two other commercial nuclear dumps in the nation, in Hanford, Wash., and Barnwell, S.C.

Afternoon 74,000 Sunday 90,000 Coverage Area: Trenton Metro & Central Jersey

TRENTON TIMES

Oct. 25, 1979

Three states won't take nuclear wastes anymore

WASHINGTON (AP) — By deciding to stop or cut nuclear waste shipments into their states, three governors are signaling Washington they are unwilling to take the political heat for a national problem.

Nevada this week closed the second of the nation's only three low-level waste dumps.

A burial site in Washington state has been shut down for three weeks. Shipments to the only other site — in South Carolina — are expected to be curtailed next week.

Spokesmen for the nuclear power industry say the problem is not immediate for them since power plants have on-site storage capacity. But some officials say hospitals and research facilities will run into storage problems within a few weeks.

Leonard Freeman, president of the Society for Nuclear Medicine, called it "an immediate crisis for nuclear medicine," which is used thousands of times a day to diagnose and treat diseases, including cancer and heart illness.

SOME HOSPITALS already have asked doctors to curtail the use of radioactive materials because of expected storage problems.

The sudden militancy by the governors of Washington, Nevada and South Carolina is an attempt to force the Carter administration to play a stronger role in the disposal of low-level wastes, an issue which could become crucial in an election year.

Almost daily, trucks have brought wastes from commercial reactors, hospitals and research laboratories around the country to the only commercial burial sites available.

"I'm just tired of having to assume the responsibility for having our people take the risks in a system that is not properly regulated," complained Nevada Gov. Robert List as he resisted attempts Tuesday to reopen the burial site near Reno.

What also gnaws at the governors is that no dumps are located in areas where most of the wastes are produced — including most of the Northeast.

On Oct. 4, Washington Gov. Dixy Lee Ray, former head of the Atomic Energy Commission, closed the burial site near Richland, Wash., charging lax enforcement of shipping regulations.

ON TUESDAY, after List's action, Gov. Dick Riley made it clear he will not allow more waste to be diverted into South Carolina, where 80 percent of the nation's low-level radioactive garbage is already being buried. He predicted forced cutbacks in shipments next week.

The governors' specific complaints vary, but their anger is aimed at the federal government. They argue that while plans for a national program languish, the three states are becoming the dumping ground for the rest of the country.

About 60 percent of the low-level wastes are byproducts of commercial power reactors, including sludge, resins and contaminated clothing. Most of the rest comes from research laboratories and radiological treatment and diagnosis at hospitals.

For more than a year the Carter administration has had before it a unanimous inter-agency recommendation that the Energy Department set up regional low-level nuclear waste dumps to spread the burden.

The recommendation — part of an overall report on nuclear wastes — has awaited President Carter's decision for several months. One problem, an administration source concedes, is that the regional burial grounds are sure to spark opposition in the states for which they will be planned.

BUT, SAID Goetz Oertel, the Energy Department's director of waste products, "The same is true with the alternative — to have the wastes pile up as they are (at the three existing dumps). It's a choice each state is going to have to make."

Today 80 percent of the wastes, almost all generated in the East, ends up at the dump near Barnwell, S.C., with another 15 percent allocated to the site near Richland, Wash.

Afternoon 74,000 Sunday 90,000 Coverage Area: Trenton Metro & Central Jersey

TRENTON TIMES

Oct. 26, 1979

States requested to store nuclear waste temporarily

WASHINGTON (AP) — With two of the country's three dumps for low-level nuclear waste closed, the government is planning to ask governors to provide temporary storage sites for radioactive waste produced in their own states, officials said yesterday.

The proposal could lead to establishment of temporary storage sites in at least a dozen states which together produce nearly 70 percent of the country's low-level nuclear waste.

The 12 states producing the most wastes and the percentage of the national total each produces are: New York, California and Illinois, 8 percent each; Pennsylvania and North Carolina, 7 percent each; South Carolina, 6 percent; Florida 5 percent; New Jersey, Connecticut, Massachusetts, Alabama and Michigan, 4 percent each.

Two of the three sites for disposal of nuclear waste were closed this month. A dump in Washington state was closed because improperly packaged wastes were being delivered to the site. Another site, in Nevada, was closed after radioactive waste was discovered outside dump boundaries.

THE THIRD site, in South Carolina, remains open but officials said none of the wastes that would normally go to Nevada or Washington could be sent there.

Government officials and spokesmen for the medical community have said hospitals, research facilities and some nuclear power plants will face serious problems within weeks because they will have nowhere to ship their radioactive wastes.

In an attempt to head off that problem, the Nuclear Regulatory Commission and the Energy Department will urge governors in the states where the wastes are produced to establish interim above-ground storage facilities, administration officials said.

Meanwhile, Govs. Dixy Lee Ray of Washington and Robert List of Nevada were described by federal officials as remaining adamant about keeping the waste dumps in their states shut until a national policy for disposing of the material is worked out.

South Carolina Gov. Dick Riley, who barred any of the wastes from being diverted from Washington and Nevada to his state, said the amount of material now moving into the South Carolina dump will be cut next week.

AMONG THOSE who attended Wednesday's meeting were representatives of the NRC, the Energy Department, the Transportation Department, the American Medical Association, the Society of Nuclear Medicine, and the governor's association.

Asked how hard the NRC would push the governors to adopt such a plan, NRC spokesman Frank Ingra said: "To the extent that we can. We can't order them to do it."

Richard Cunningham, whose NRC office licenses operations that produce low-level nuclear wastes, said the proposal to get states to provide temporary storage was discussed Wednesday at a hastily called meeting of federal officials and others involved in the issue.

"THERE WAS discussion that perhaps the states should take a look at providing temporary storage," Cunningham said in an interview.

A spokesman for the National Governor's Association, which was represented at the meeting, said such a plan was sure to provoke controversy and that some governors and state legislators would oppose it.

"We recognize the wastes have to be put somewhere, but you can't leave it up to the 50 governors," said Joe McLaughlin of the governor's association.

Afternoon 74,000 Sunday 90,000 Coverage Area: Trenton Metro & Central Jersey

TRENTON TIMES

Oct. 27, 1979

New Jersey not planning to build nuclear dump

From staff and wire reports

New Jersey doesn't plan to build a dump to store low-level nuclear wastes, a top state environmental official said yesterday.

"We have too many dumps already," said Paul Arbesman, assistant state environmental commissioner.

The federal government said New Jersey is one of a dozen states that may be asked to provide a temporary storage facilities for radioactive wastes produced in their areas.

Two of the nation's three nuclear dump sites were closed this week. Officials at the commercial site in Barnwell, S.C., said, however, they could not accept materials previously destined for the closed facilities in Nevada and Washington state.

But Arbesman said it is the responsibility of the federal government to provide adequate dumping facilities for radioactive materials. "If they can't find a place for it, how can we?" said Arbesman.

ARBESMAN SAID the federal Department of Energy asked the state last year to find a storage facility for low-level "nuclear dirt" left over from several development sites for the Manhattan Project, which produced this country's first atomic bomb.

But Arbesman said the state has not found any suitable sites. If the state does find any possible sites, officials will hold public hearings before moving the waste.

He said a particular state concern is a multi-million dollar cleanup project for a contaminated area in Middlesex Township which includes a former Marine Corps station.

Six firefighter groups hold drills

To make sure firefighters' skills aren't getting rusty — and to make sure the firefighting apparatus is in top shape — five other fire companies will join with the Yardley-Makefield Fire Company in a Mutual Aid Drill tomorrow morning.

Participating in the 8 a.m. drill on the grounds of the Exide Engineering and Development Center on West College Avenue will be the Newtown Fire Association, West Trenton Fire Company, Capitol View and Union fire companies, both of Morrisville, and Falls No 1 of Fallsington.

Afternoon 74,000 Sunday 90,000 Coverage Area: Trenton Metro & Central Jersey

TRENTON TIMES

Nov. 1. 1979

S. Carolina limits nuke waste entry

COLUMBIA, S.C. (UPI) — South Carolina, with the nation's only low-level nuclear waste dump, plans to halve the amount it accepts in two years and is putting pressure on other states to dispose of their own radioactive wastes.

Gov. Dick Riley yesterday put the nation on notice that South Carolina would not become its nuclear burial ground and unveiled a two-year plan to cut by 50 percent the volume of nuclear waste arriving at Chem-Nuclear Systems Inc. in Barnwell.

The rural Barnwell site, which accepts 80 percent of the nation's waste, is the only one of the nation's three low-level nuclear dumps that is currently open. Washington state and Nevada recently closed their nuclear waste disposal sites.

"This announcement is another element in my effort to effect a reasoned national policy in low-level nuclear waste," Riley said. "The absence of such a policy has now put all of the burden on South Carolina."

ONE-HALF of the waste buried in the 300-acre facility comes from seven Northern and Midwestern states, he said.

"It is imperative that these and other states take action now to develop other sites across the country."

Riley said the cutback at Chem-Nuclear would start immediately and last until October 1981.

Chem-Nuclear agreed to an amendment to its operating license that calls for it to gradually cut back the amount of waste it accepts from 200,000 cubic feet a month to 100,000 cubic feet a month in the next 23 months.

Riley said the reduction from 2.4 million cubic feet annually to 1.2 million cubic feet will keep Chem-Nuclear operating past the year 2000.

CHEM-NUCLEAR will decide which wastes it will accept, but it probably will be handled on "first-come, first-serve" basis, the governor said. The licensing agreement requires that any waste generated in South Carolina must be buried at Chem-Nuclear, he said.

Afternoon 74,000 Sunday 90,000 Coverage Area: Trenton Metro & Central Jersey

TRENTON TIMES

Nov. 13, 1979

Only half kidding

La Donna Harris must be half-serious in suggesting, as she did at the nuclear teach-in at Trenton State College, that if nuclear wastes are so safe they should be buried in the White House Rose Garden. Mrs. Harris, of course, doesn't buy the assurances about how safe the wastes are. She wants everyone to remember they have to be disposed of somewhere.

But where? Nevada and Washington have closed their dumps, and South Carolina has cut in half the amounts of low level nuclear wastes it will take at the nation's last open dump. This has created a crisis in the industry, but it is one that has been brewing since the dawn of the atomic age.

Washington's Gov. Dixy Lee Ray, herself a former chairman of the Atomic Energy Commission who knows something about it, says the wastes are being transported unsafely and dumped unsafely, and her state has had it with the dumpers.

If things are that bad, the Rose Garden suggestion is no worse than any other. But mindful of Governor Ray's warning that the transportation, too, is unsafe, Mrs. Harris must have been only half-serious. She surely doesn't want to expose everyone to those leaky shipments on their way to the Rose Garden. Even half-serious, she makes more sense than the nuclear industry or the government.

Afternoon 74,000 Sunday 90,000 Coverage Area: Trenton Metro & Central Jersey

TRENTON TIMES

June 26, 1980

Assembly bans using N.J. as nuke dump

Associated Press

The state Assembly voted 64-2 yesterday to prohibit the permanent disposal of radioactive wastes in New Jersey or its territorial waters without legislative approval.

The bill, which would not affect temporary 17-year disposals, now goes to the Senate. It was sponsored by Assemblyman C. Louis Bassano, R-Union.

There was no debate on the bill.

The bill would affect not only spent fuel from nuclear power plants, but also radioactive wastes from the military or medical X-rays.

The federal government has yet to come up with a nationwide plan for permanent disposal of nuclear wastes. When such a plan is written, Bassano said, there should be no sites in New Jersey because it is densely populated.

THERE ARE CURRENTLY no permanent disposal sites for highly radioactive spent fuel in New Jersey.

Bassano's bill would give the Legislature the final word on nuclear waste disposal within New Jersey. Under the bill, the Department of Environmental Protection could file a civil suit against anyone who permanently dumps nuclear waste without the Legislature's approval. The maximum penalty would be $100,000.

Afternoon 74,000 Sunday 90,000 Coverage Area: Trenton Metro & Central Jersey

STAR-LEDGER

June 17, 1979

Shipping rules for A-wastes may take time

By BEVERLY SAVAGE

It could take six months before regulations on the transporting of radioactive wastes are adopted by the State Commission on Radiation Protection.

Three input hearings last week were "unusually well attended, and we were extremely pleased with the public's response," said Frank Cosolito, a radiation physicist on the commission, a division of the State Department of Environmental Protection (DEP).

He said the environmental groups found the proposed regulations too lax, while nuclear industry representatives claimed they were too strict.

The regulations will implement legislation passed in September, 1977, amending the State Radiation Protection Act. If the proposed draft of the regulations is adopted, notification of a shipment of radioactive material of 20 curies (a unit of measuring radioactivity) or more would have to be made to the State Police seven days in advance and a certificate of handling would have to be issued.

The proposed regulations also contain stipulations for the shipment of radiopharmaceuticals or radiographic exposure devices of 20 curies or more. Such shipments to hospitals and pharmaceutical companies could be sent with a certificate which would be valid for up to a year.

At a hearing in Hackensack on Monday, Assemblyman Byron Baer (D-Bergen) had a proposal read to the Commission on Radiation Protection in which he objected to the regulations for radiopharmaceuticals and radiographic exposure devices.

"These regulations should not be so broadly drawn because any number of materials could be lumped together in an application for an annual permit," Baer said. "Two categories simply aren't enough to take into account the wide range of radioactive pharmaceuticals and radiographic exposure devices. For example, the replacement material for a cobalt X-ray is extremely radioactive and needs more than an annual certificate for transporting," Baer said.

Cosolito admitted there was a problem with classification of radioactive material in the proposed regulations but attributed this to the bill itself.

Morning 413,000 Sunday 567,000 Coverage Area: Newark Metro & North Jersey

NEWARK STAR-LEDGER

August 22, 1979

A-waste shipping ban assailed and defended

By MARK BOADA

Representatives of the state's trucking industry and a major utility company squared off last night against advocates of a bill that would ban shipments of highly radioactive substances through New Jersey's most densely populatedd counties.

Assemblyman Byron Baer (D-Bergen), the bill's co-sponsor, said the ban is needed to plug gaps in federal regulations that are allowing uncounted shipments of the materials through the state and exposing residents to a potentially disastrous nuclear accident.

But Kenneth Goddard, a senior nuclear engineer for Jersey Central Power & Light Co. (JCP&L) and Paul T. Stalknecht of the New Jersey Motor Truck Association referred to the "excellent" safety record of shippers of nuclear substances and said the ban would be an unnecessary barrier to businesses industries that rely on the materials.

The remarks came in testimony in Hackensack last night at a fact-finding hearing of a special subcommittee on radioactive materials of the Assembly's Transportation and Communications Committee.

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Assemblyman Walter D. Kern (R-Bergen) prefaced the testimony by voicing the concerns over the safety of nuclear truck and rail shipments shared by advocates of Baer's bill.

"New Jersey has become a corridor state for radioactive waste" with an estimated total of about 200,000 shipments passing through in recent years and about 700 a month going over Bergen County's major and minor roads.

"Nationally, there have been more than 300 accidents involving (shipped) radioactive material, and in one-third radioactive material escaped," he said. "Radioactive shipments constantly emit low levels of radiation . . (and a) 1 per cent leak of (a large shipment of highly radipactive) spent (reactor) fuel could kill as many as 10,000."

"Does a major accident have to happen before something is done about this?" he asked.

Baer's bill would prohibit the sh ments from areas with a population density of at least 1,000 persons per square mile and would cover most parts of Bergen, Passaic, Hudson, Essex, Union, Middlesex, Mercer, Camden and Monmouth counties.

"This is just a straightforward attempt to protect the people of New Jersey from a potentially calamitous accident," Baer said.

Baer's bill received the support of Dennis Hirschfelder of Teaneck, who represented the Bergen chapter of the National Organization for a Sane Nuclear Policy. "With the magnitude of the potential for disaster, there is no margin for error" in safety precautions taken by transporters of nuclear materials, he said.

But Goddard said the ban is unnecessary because of what he called shippers' "excellent" safety record. While acknowledging there have been accidents in which some radiation has escaped from trucks and trains, Goddard said, "There has never been one person killed or seriously injured" in any of the accidents.

"More people have been killed from the transport of toxic and flammable chemicals than of nuclear materials," he added.

Baer's bill would not affect JCP&L's nuclear power plants because they are located in lightly populated Salem County. But the bill would give the state Department of Environmental Protection the option of extending the ban to any area of the state.

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Stalknecht said the bill would be ineffective because it would force "respectable" truckers to halt shipments of the materials and would bring about the development of an illegal "underground" nuclear shipping industry.

"The (proposed and existing DEP) regulations represent an intolerable burden on interstate commerce, do not clearly address themselves to many areas of radioactive material transportation, are confusing and ambiguous and in all likelihood are pre-empted by federal rules," Stalknecht said.

Morning 411,000 Sunday 568,000 Coverage Area
Newark Metro & North Jersey

STAR-LEDGER

November 16, 1979

DEP takes aim at radioactive 'hot spot' in Orange

By SCOTT MINERBROOK

The State Department of Environmental Protection (DEP) said yesterday there is a "radiation problem" at a former radium processing factory in Orange, and urged remedial action to eliminate radioactive contamination of both air and ground at the site.

During a four-month study of the low-level radiation found in ground and air samples on the High and Alden streets site, formerly owned by the U.S. Radium Corp., DEP researchers found numerous radioactive "hot spots" and above-normal radiation readings in and around the property.

The property is now occupied by seven businesses, none of which is engaged in work with radioactive substances. The largest of the businesses is T & E Industries Inc., which makes electronic components.

According to Jeanette Eng, director of the DEP's radiation laboratory in Trenton, the radiation found on the property is the result of pitchblende ore processing operations conducted from 1915 to 1926 by the U.S. Radium Corp., which refined the ore into radium and used the luminescent substance on watch dials.

Eng said while high gamma radiation levels were discovered in several places at the site, of more concern to tenants is the existence of radon gas, formed as a result of the radioactive decay of radium in the soil.

"These gases essentially percolate up or diffuse through cracks and fissures in a building's flooring and can be inhaled in the lungs, where the gases emit radiation," she said.

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However, Eng was cautious when asked about the possible health effects of breathing radon gas.

She said there are stringent guidelines for radiation exposure to both gamma radiation and radon gases.

"If a person working in a place with the highest measurements is exposed for more than 40 hours a week, he will likely be getting more than the recommended federal guidelines for non-radiation workers," Eng said.

At this point, she said the biological health effects of radiation over long periods are difficult to determine and can only be estimated.

The DEP, which took 600 measurements from the site and adjacent properties, found readings for gamma radiation in the T & E oven room exceeding the 40-hour workweek exposure rate.

The report also found:

• Unusually high levels of radium in the soil behind businesses at the site.

• Extremely high concentrations of radium in the soil beneath the oven room at T & E Industries.

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Leonard Box, president of T & E Industries, said the DEP report "is not a cause for alarm."

"It is a cause for concern," Box said. "But our first reactions to the report are that radon gas concentrations are within occupational limits. We think there are many inconsistencies and omissions in the data."

Eng said remedial actions to be taken by the DEP in connection with the state health department include the following:

• A survey to document occupancy within the affected businesses at the site to minimize "unnecessary exposure."

• A survey to document employment history of the workers at the affected businesses.

• An epidemiological study of the workers at the site.

Box said his company will begin experimenting with a fan and ventilation system to eliminate radon gas from all affected work areas.

"We'll do that as soon as we can," Box said.

Morning 413,000 Sunday 567,000 Coverage Area: Newark Metro & North Jersey

STAR-LEDGER; April 10, 1980

Court says counties lack power to ban A-haulers from roads

By ROBERT G. SEIDENSTEIN

A county may not ban the shipment of radioactive materials over its roads, a state appeals court ruled yesterday.

The court's ruling upheld the decision of state transportation officials saying Bergen County could not restrict the shipments.

In declaring invalid a resolution, approved by the Bergen County freeholders and designed to ban the shipments over county roads, Appellate Division Judges Sonia Morgan and George Francis noted "the storage and transport of radioactive materials has been preempted by state legislation."

The judges pointed out that in 1977 the Legislature passed a law requiring handlers of the materials to obtain permits before shipping them through the state.

Department of Environmental Protection (DEP) regulations, detailing the permit procedures, are expected to become effective next week, according to Frank Cosolito, an environmental scientist with DEP's Bureau of Radiation Protection.

In May 1979, the Bergen County Board of Chosen Freeholders passed a resolution banning the transportation on county roads of radioactive materials—except for small amounts or shipments "for legitimate medical purposes."

Freeholder Bennett Mazur said the resolution was needed to prevent the shippers from varying their routes and using the county roads.

Mazur said the board also was upset at the transporting of the materials through the heavily populated Bergen County area.

The county resolution was sent to the New Jersey Department of Transportation (DOT) but was disapproved as an improper traffic regulation.

Although DEP regulates the shipping of radioactive materials through the state, the resolution was not forwarded to that department, according to legal papers filed by the state.

In ruling the county resolution invalid, the appeals panel cited the 1977 law and said "adoption by other counties of similar resolutions could, quite easily, put at nought (DEP) attempts to regulate the transportation and storage of these materials.

"In our view, the state scheme of regulation is so pervasive and comprehensive that it precludes...county regulation," the judges added.

The state had argued that the Bergen County resolution could encourage other counties to try to ban the shipments and eventually subvert DEP's power over the field.

The court also noted the county's attempted ban was improper since traffic laws may not be used to restrict the shipping of "a specified cargo."

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While Mazur said he would ask DEP to outlaw shipments of radioactive materials through populous areas, Cosolito said major shippers already are avoiding the state.

DEP staff attorney Michael Marotta noted New York City restrictions on the shipment of radioactive materials are causing haulers to bypass New Jersey routes.

Cosolito said notifying handlers of the materials of New Jersey's laws on the shipping of radioactive waste was a major job.

He estimated from 3,000 to 5,000 shipments of radioactive materials that come under state laws are originated from sites within the state each year. Pharmaceutical companies taking the materials to hospitals make up a large percentage of the trips, Cosolito said.

Cosolito said he was unaware of any accidents in the state resulting in the release of radioactive materials.

According to the DEP, in 1985 there will be 5.6 million shipments of radioactive materials nationwide.

Ironically, while the appeals court said Bergen County's handling of the shipment issue was pre-empted by the state, New Jersey officials have to be careful their regulations do not conflict with federal rules dealing with radioactive materials.

Jack Stanton, DEP's deputy director of environmental quality, said state regulations on radioactive materials were based on similar rules adopted by the federal Nuclear Regulatory Commission which cover spent fuel from power plants.

He added, however, that it was unclear whether regulations proposed by the federal Department of Transportation could pre-empt New Jersey's shipping rules.

Morning 413,000 Sunday 567,000 Coverage Area: Newark Metro & North Jersey

STAR LEDGER

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Officials call state unlikely A-waste site

By PAUL B. BROWN

State energy and environmental officials said yesterday they believed there is little chance a federal study will recommend New Jersey be used to store radioactive waste from throughout the nation.

Twenty-three states, including New Jersey, are being studied as a site for an underground dump for low-level radioactive waste, the Department of Energy announced Thursday.

State officials, who were not aware of the study until the DOE made its announcement, stressed the federal review is in its preliminary stages and said they had been told it will be four years before the site is selected.

"I am not a geologist, but I don't think New Jersey has any suitable place where this stuff can be stored," State Energy Commissioner Joel R. Jacobson said. "Obviously, there must be a place where radioactive waste can be put, but I don't think New Jersey is it."

Assistant State Department of Environmental Protection (DEP) Commissioner George J. Tyler agreed.

Tyler said the major problem associated with storing the low-level radioactive material — such as wastes from hospitals and drug companies that use radioactive materials in therapy — was having it leak into the ground water.

"There are much better places in the country where you can store the material and keep it away from the ground water supply," Tyler said.

For the last several years the DEP has called on the federal government to conduct such a study, but Tyler added, "We should have been made aware of it."

Tyler said the state also was conducting its study of possibly suitable sites in New Jersey, to be able to check on the accuracy of the federal report.

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