MASTER

**North Carolina State Briefing Book
for
Low-Level Radioactive ~~Waste~~ *W*
Waste Management**

DISCLAIMER

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

DISCLAIMER

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

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

DOE/ID/01570--T30

DE82 015283

NORTH CAROLINA STATE BRIEFING BOOK
FOR
LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

Prepared for

EG&G Idaho, Inc.

under

Subcontract No. K-1917

NOTICE

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

Prepared by

Southern States Energy Board
One Exchange Place, Suite 1230
Atlanta, Georgia 30338

August 1981

DISCLAIMER

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

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

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

TABLE OF CONTENTS

	<u>Page</u>
Table of Contents.....	iii
List of Figures.....	v
List of Tables.....	vi
List of Maps.....	vii
<u>Section</u>	
1. Introduction.....	1-1
2. Overview of Low-Level Radioactive Waste Management Practices.....	2-1
3. Demography.....	3-1
3.1 Population and Location.....	3-2
3.2 Agriculture.....	3-15
3.3 Health.....	3-17
3.4 Higher Education.....	3-19
3.5 Government.....	3-21
3.6 Economy.....	3-24
4. Governmental and Public Aspects.....	4-1
4.1 Major Political Parties.....	4-1
4.2 Congressional Representatives.....	4-1
4.3 State Government.....	4-4
4.3.1 Executive Branch.....	4-4
4.3.2 Legislative Branch.....	4-15
4.3.3 Judicial Branch.....	4-22
4.3.4 Relevant Statutes and Regulations.....	4-23
4.4 Federal Activities.....	4-25
4.5 Interest Groups.....	4-26
4.6 Printed Media.....	4-32
5. Survey Methodology.....	5-1
6. Use of Commercial Low-Level Waste Disposal Facilities.....	6-1

Appendices

- A. Annotated Bibliography
- B. General Bibliography
- C. Selection of Newspaper Articles
- D. Counties in the State Economic Areas of North Carolina
- E. Report of the Governor's Task Force on Waste Management
- F. Regulations for Protection Against Radiation

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
3.1.1	Population Data, SEA 1, North Carolina Blue Ridge.....	3-6
3.1.2	Population Data, SEA 2, Blue Ridge Slopes.....	3-6
3.1.3	Population Data, SEA 3, North Carolina Old Belt Tobacco.....	3-7
3.1.4	Population Data, SEA 4, Central North Carolina.....	3-7
3.1.5	Population Data, SEA 5, South Central North Carolina.....	3-8
3.1.6	Population Data, SEA 6, North Carolina Upper Coastal Plain - Northern.....	3-8
3.1.7	Population Data, SEA 7, Lower Roanoke Coastal Plain.....	3-9
3.1.8	Population Data, SEA 8, North Carolina Central Coastal Plain.....	3-9
3.1.9	Population Data, SEA 9, North Carolina Upper Coastal Plain - Lumber River.....	3-10
3.1.10	Population Data, SEA 10, Currituck-Albermarle-Pamlico.....	3-10
3.1.11	Population Data, SEA 11, Neuse-Cape Fear.....	3-11
3.1.A	Population Data, SMSA A, Asheville SMSA.....	3-11
3.1.B	Population Data, SMSA B, Winston-Salem SMSA.....	3-12
3.1.C	Population Data, SMSA C, Greensboro-High Point SMSA.....	3-12
3.1.D	Population Data, SMSA D, Charlotte SMSA.....	3-13
3.1.E	Population Data, SMSA E, Raleigh SMSA.....	3-13
3.1.F	Population Data, SMSA F, Durham SMSA.....	3-14
3.1.18	Population Data, State of North Carolina.....	3-14
4.1	Structure of the North Carolina Executive Board.....	4-5
5.1	Low-level Radioactive Waste Survey Form.....	5-5
5.2	Vachon, Nix and Associates Survey Letter.....	5-11
5.3	State of North Carolina Survey Letter.....	5-12
5.4	Vachon, Nix and Associates Letter to North Carolina Division of Radiological Health.....	5-13
5.5	Survey Response Form.....	5-14

LIST OF TABLES

<u>Table</u>	<u>Page</u>
3.1 Demographic Growth and Density Information for the State of North Carolina and its State Economic Areas.....	3-5
3.2 Agricultural Data for the State of North Carolina and its State Economic Areas, 1974 and 1978.....	3-16
3.3 Health Information for the State of North Carolina and its State Economic Areas, 1975.....	3-18
3.4 Information on Institutions of Higher Education for the State of North Carolina and its State Economic Areas: Academic Years of 1974-75 and 1977-78.....	3-20
3.5 Government Employment and Payroll Data for the State of North Carolina and its State Economic Areas.....	3-22
3.6 Government Finance Data for the State of North Carolina and its State Economic Areas.....	3-23
3.7 Economic Data for the State of North Carolina.....	3-26
6.1 Respondents Reporting Nuclear Wastes.....	6-5
6.2 Respondents Reporting Use of Sealed Sources Not Producing Nuclear Wastes.....	6-7
6.3 Respondents Reporting No Waste.....	6-9
6.4 Sealed Sources Producing Shipped Nuclear Waste.....	6-11
6.4A Critical Reactors Producing Nuclear Waste.....	6-15
6.5 Millicuries of Nuclear Waste Shipped by Facility Type.....	6-17
6.6 Cubic Meters of Solid Nuclear Waste Shipped.....	6-21
6.7 Liters of Liquid Nuclear Waste Shipped by Facility Type.....	6-25
6.8 Percent Responses to the Survey.....	6-28
6.9 Nuclear Waste Shipped in Millicuries.....	6-30
6.10 Nuclear Waste Shipped Classified by Hazard.....	6-34
6.11 Nuclear Waste Shipped Classified by Container Type Form.....	6-36
6.12 Nuclear Waste Shipped Classified by Physical Form.....	6-38
6.13 Nuclear Waste Shipped Classified by Reduction Process Used....	6-40

LIST OF MAPS

<u>Map</u>		<u>Page</u>
3.1	The State Economic Areas of North Carolina.....	3-4
4.1	North Carolina Congressional Districts.....	4-3
4.2	North Carolina State Senate Districts.....	4-16
4.3	North Carolina State House of Representatives Districts.....	4-19

INTRODUCTION

This North Carolina State Briefing book for Low-Level Radioactive Waste Management has been prepared to assist in the orderly planning and implementation of state and federal policy on commercial low-level radioactive waste management. This North Carolina Briefing Book is one of a series of 12 books produced by the Southern States Energy Board describing states in the Southeastern region. The 12 state briefing books are part of a series produced under contract with the U.S. Department of Energy, Office of Nuclear Waste Management, Idaho Operations Office, through EG&G Idaho, Inc. The completed series will consist of briefing books on all 50 states and the Commonwealth of Puerto Rico. The books will provide background information on waste management practices, state government structure and jurisdiction, relevant state statutes and regulatory programs, nature and volume of low-level waste generation, interested groups and individuals, and state print media.

Radioactive wastes are usually produced whenever radioactive materials are processed or used. Low-level radioactive wastes are generated by medical and educational facilities, scientific research, and industrial processes. Nuclear powered electric generators also produce large quantities of low-level waste. Low-level wastes generally contain small quantities of radionuclides and less than 10 nanocuries per gram of transuranic (TRU) contaminants, therefore requiring little or no shielding. However, low-level wastes contain potentially hazardous concentrations of radionuclides. Shallow land burial of most low-level wastes provides adequate protection against radiation exposure to humans and the environment.

Only three facilities in the United States are currently accepting commercially generated low-level radioactive wastes for disposal. These facilities are located at Barnwell, South Carolina; Beatty, Nevada; and Richland, Washington. The U.S. Nuclear Regulatory Commission (NRC) estimates that the three sites will be filled to capacity between 1984 and 1989. The governors of South Carolina, Nevada, and Washington have stated that they do not intend to allow their states to maintain the sole facilities for disposal of the nation's low-level radioactive wastes. South Carolina will limit waste receipts to 100,000 cubic feet (2831.7 cubic meters) per month by October 1981, and Washington will likely restrict use of the Richland site to Northwestern states after 1982.

In December 1980, the Congress enacted the "Low-Level Radioactive Waste Policy Act," P.L. 96-573. This law places the responsibility for commercial low-level radioactive waste management in the hands of the states. The U.S. Department of Energy (DOE) has instituted a "National Low-Level Radioactive Waste Management Program" to assist the states in meeting this responsibility. Many states and national organizations, such as the National Governors' Association and the Southern Governors' Association, have endorsed the policy of state responsibility and have advocated allowing states to enter into regional compacts to provide adequate and safe low-level radioactive waste management.

The Southern region has a particular interest in providing a solution to the problem of diminishing disposal capacities. The Barnwell, South Carolina disposal facility accepted 80 percent of all low-level radioactive wastes shipped to commercial burial sites in 1979. Apart from the thousands of cubic feet of low-level waste produced by Southern hospitals and universities, the Southern region already leads the nation in nuclear power generation, and has a number of nuclear power plants under construction or being planned. The

Tennessee Valley Authority alone is engaged in a construction program that will result in 17 nuclear powered electric generation plants by 1990. To cope with the increasing amounts of low-level waste being produced daily, alternatives to the current disposal options must be developed.

Section 2 of this Briefing Book presents an overview of past and present low-level radioactive waste management practices within the State of North Carolina. Section 3 identifies those demographic and economic factors and trends that affect or can be related to the quantity and nature of low-level radioactive wastes within the state. Section 4 presents an overview of North Carolina's state government and identifies the government agencies and institutions with statutory or other responsibilities affecting the generation, handling, and disposal of radioactive wastes within the state. Section 5 presents the methodology employed for conducting a direct mail survey of radioactive material licensees within the state. The results of this survey are presented in Section 6 and provide information regarding quantities and qualities of low-level radioactive wastes currently being generated, current management practices and projected future trends in generation and management.

OVERVIEW OF LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT
IN NORTH CAROLINA

There are approximately 425 radioactive material licensees in the state of North Carolina.¹ These licensees generated about 5,720 cubic meters (202,000 cubic feet) of low-level radioactive waste in 1979, and it is anticipated that this number will increase at an annual rate of 10 to 15 percent². North Carolina is the fourth largest generator of low-level waste in the nation³. North Carolina's two commercial power reactors produce 55 percent of the total waste generated within the state. Nuclear fuel fabrication accounts for 33 percent of the waste generated, while medical, institutional, and research facilities account for the remaining 12 percent⁴.

Current Disposal Practices

In 1979, 5304 cubic meters of low-level radioactive waste generated by North Carolina licensees were disposed of at commercial burial facilities. Ninety-seven percent of the waste was shipped to Barnwell, South Carolina, the remaining three percent to Richland, Washington⁵. Fifty-eight percent of the waste disposed at commercial burial facilities was generated by commercial power reactors. The remaining 42 percent was generated by institutional and industrial facilities⁶.

Regulatory Enforcement

The U.S. Atomic Energy Commission (AEC) was the first agency to develop regulations for the control of low-level radioactive wastes. The Energy Research and Development Agency, Department of Energy, Nuclear Regulatory Commission, Environmental Protection Agency, and Department of Transportation have all promulgated regulations affecting radioactive waste management. In

1964, North Carolina was designated an "agreement state" by the Atomic Energy Commission (now the Nuclear Regulatory Commission), with specific authority to control and regulate low-level radioactive material⁷.

The states of Nevada, South Carolina, and Washington have regulations covering packaging and shipping of low-level radioactive wastes. Shipments of low-level wastes that are improperly packaged or are in violation of NRC regulations may be rejected at the disposal site.

Governor's Task Force on Waste Management

In July 1980 Governor Hunt appointed a Task Force on Waste Management to study waste management strategies of other states and to adopt procedures and technology applicable to North Carolina. The Task Force had six established goals:

- o To examine the need and capacity of North Carolina to manage hazardous and low-level waste;
- o To examine alternative waste management strategies;
- o To evaluate and recommend roles for the public and private sectors in waste management;
- o To review state statutes and regulations pertaining to waste management;
- o To make recommendations for the continuing planning, implementation and monitoring of a comprehensive waste management system; and
- o To propose to the 1981 session of the North Carolina General Assembly legislation to enable North Carolina to develop a comprehensive waste management system.

The Task Force was aided in its efforts by the Technical Advisory Committee on Low-Level Radioactive Waste Management. The "Report of the Governor's Task Force on Waste Management," was issued in February 1981.

REFERENCES

- 1 Report to the Governor's Task Force on Waste Management, Technical Advisory Committee on Low-Level Radioactive Waste Management, North Carolina, 1980, p. 15.
- 2 Report of the Governor's Task Force on Waste Management, Governor's Task Force on Waste Management, North Carolina, 1981, p. 9.
- 3 Ibid., p. 3.
- 4 Ibid., p. 9.
- 5 NUS Corporation, The 1979 State-by-State Assessment of Low-Level Radioactive Wastes Shipped to Commercial Burial Grounds, San Francisco, California, 1980, p. 69.
- 6 Ibid., p. 69.
- 7 Report of the Governor's Task Force on Waste Management, 1981, p. 26.

This demographic study of North Carolina is designed to analyze various demographic factors, data, and trends that could be related to the quantity, nature, and potential management options of low-level wastes within the state and its subunits.

State Economic Areas

The study covers the state of North Carolina as a whole and its subunits, namely, its State Economic Areas (SEAs). State Economic Areas are frequently used in demographic studies of the subunits of states because most states are so heterogeneous in terms of urban-rural distributions, climate, industry, topography, population size and growth, and economic activity that it is infeasible to investigate these phenomena strictly at the state level. It is necessary to reduce the state's geography into smaller units of analysis, but not so small that their number becomes too cumbersome, as might be the situation if the state were broken down into counties.

State Economic Areas are relatively homogeneous subdivisions of a state, consisting of single counties or groups of counties that have similar economic and social characteristics. The boundaries of these areas have been drawn in such a way that each state is subdivided into relatively few parts, with each part having significant characteristics that distinguish it from adjoining areas.

In the establishment of SEAs, factors in addition to industrial and commercial activities are taken into account. Demographic, climatic, physiographic, and cultural factors, as well as factors pertaining more directly to the production and exchange of agricultural and nonagricultural goods, are examined.

State Economic Areas that contain the counties of the larger Standard Metropolitan Statistical Areas (i.e., metropolitan areas which in 1960 had central

cities of 50,000 or more, with total populations of 100,000 or more) are recognized as metropolitan SEAs and are designated by the name of the respective metropolitan areas. The bulk of the SEAs, however, are nonmetropolitan and have names that reflect their locations in their states, their particular economic activities, or both. The nonmetropolitan SEAs are identified numerically, the metropolitan SEAs with letters.

The state of North Carolina is divided into 17 State Economic Areas, 11 of which are nonmetropolitan: SEA 1: North Carolina Blue Ridge; SEA 2: Blue Ridge Slopes; SEA 3: North Carolina Old Belt Tobacco; SEA 4: Central North Carolina; SEA 5: South Central North Carolina; SEA 6: North Carolina Upper Coastal Plain -- Northern; SEA 7: Lower Roanoke Coastal Plain; SEA 8: North Carolina Central Coastal Plain; SEA 9: North Carolina Upper Coastal Plain -- Lumber River; SEA 10: Currituck-Albermarle-Pamlico; SEA 11: Neuse-Cape Fear. The remaining six are metropolitan: SEA A: Asheville SMSA; SEA B: Winston-Salem SMSA; SEA C: Greensboro-High Point SMSA; SEA D: Charlotte SMSA; SEA E: Raleigh SMSA; SEA F: Durham SMSA. These state economic areas are outlined and identified, along with the major cities in the state, in Map 3.1. The counties comprising the respective State Economic areas are listed in the appendices.

3.1 Population and Location

The population of North Carolina on April 1, 1980, was 5,874,429, according to the final count of the returns of the 1980 Census of Population. This figure was an increase of over 790,000 or 15.5 percent, from the 5,084,411 inhabitants counted in the 1970 Census. In this section, the population of the state and its SEAs in terms of age composition in 1978, 1980, and 1990 is described. The data for 1980 and 1990 are based on population projections, and the data for 1978 on population estimates developed by the Bureau of the Census. At the time

of this writing, age data from the 1980 Census have not yet been released.

Population bar graphs have been developed for the state and each SEA that depict their age compositions in 1978. Figures 3.1.1 through 3.1.F are for the SEAs and Figure 3.1.18 for the state as a whole.

These bar graphs show that the metropolitan SEAs (especially Figures 3.1.E and 3.1.F) for the most part are characterized by concentrations of young men and young women in the late teens through the mid-to-late 20s, a distribution generally observed in most metropolitan areas. The nonmetropolitan SEAs (Figures 3.1.1 through 3.1.11), have slightly fewer persons in these younger ages, proportionately. One of the areas with an unusual age distribution is SEA 3: North Carolina Old Belt Tobacco (Figure 3.1.3). The University of North Carolina at Chapel Hill is located here and the SEA reflects the influence of the University's population. For the same reason similar concentrations are found in the Greensboro-High Point and Raleigh SEAs.

Table 3.1 presents population projection data for the SEAs and the state for 1980 and 1990. The 1980 data is provided on the basis of projections based on assumptions generally governing demographic conditions of fertility, mortality, and migration as they existed in the last half of the 1960s and the early 1970s. In the case of migration, trends in the state and its SEAs through 1978 were relied upon to generate 1980 projections.

The 1980 projection for the state as a whole (Table 3.1) is 5,874,677, only 248 away from the final census count. The age distributions within the state and within the SEAs are based on projections and may differ somewhat from the final 1980 census counts when they become available.

MAP 3.1 The State Economic Areas of North Carolina

Table 3.1 Demographic Growth and Density Information for the State
of North Carolina and its State Economic Areas

<u>State Economic Area</u>		<u>Population Growth Rate 1970 - 1975</u>	<u>Growth Rate Due to Net Migration 1970 - 1975</u>	<u>Population Density per Square Mile 1975</u>	<u>Population Projection 1980</u>	<u>Population Projection 1990</u>
SEA 1	North Carolina Blue Ridge	9.4	7.0	52	341,204	406,883
SEA 2	Blue Ridge Slopes	8.6	3.6	96	255,867	305,327
SEA 3	North Carolina Old Belt Tobacco	6.7	3.5	107	505,083	590,309
SEA 4	Central North Carolina	6.0	2.7	127	694,840	801,380
SEA 5	South Central North Carolina	7.7	3.1	136	456,959	536,302
SEA 6	N.C. Upper Coastal Plain - Northern	7.4	4.2	69	267,866	313,400
SEA 7	Lower Roanoke Coastal Plain	1.4	-2.5	49	192,325	197,991
SEA 8	North Carolina Central Coastal Plain	5.5	1.1	127	447,109	509,156
SEA 9	N.C. Upper Coastal Plain - Lumber River	7.2	1.2	128	492,863	592,294
SEA 10	Currituck-Albermarle-Pamlico	9.4	6.5	34	111,379	134,749
SEA 11	Neuse-Cape Fear	10.2	2.1	67	524,535	615,479
SEA A	Asheville SMSA	4.0	2.1	229	157,819	175,429
SEA B	Winston-Salem SMSA	5.2	1.3	540	242,231	278,435
SEA C	Greensboro-High Point SMSA	3.7	0.1	457	316,987	357,044
SEA D	Charlotte SMSA	5.4	0.5	705	405,609	476,874
SEA E	Raleigh SMSA	14.3	10.4	305	310,444	413,876
SEA F	Durham SMSA	5.0	2.3	472	151,557	176,250
State of North Carolina		7.0	2.6	111	5,874,677	6,881,448

SOURCE OF DATA: Data obtained for the counties of the state from the U.S. Bureau of the Census, County and City Data Book, 1972, Washington, D.C. (magnetic tape version).

Figure 3.1.1 SEA 1
North Carolina Blue Ridge

Figure 3.1.2 SEA 2
Blue Ridge Slopes

Figure 3.1.3 SEA 3
North Carolina Old Belt Tobacco

Figure 3.1.4 SEA 4
Central North Carolina

Figure 3.1.5 SEA 5
South Central North Carolina

Figure 3.1.6 SEA 6
North Carolina Upper Coastal Plain - Northern

Figure 3.1.7 SEA 7
Lower Roanoke Coastal Plain

Figure 3.1.8 SEA 8
North Carolina Central Coastal Plain

Figure 3.1.9 SEA 9
North Carolina Upper Coastal Plain - Lumber River

Figure 3.1.10 SEA 10
Currituck - Albermarle - Pamlico

Figure 3.1.11 SEA 11
Neuse - Cape Fear

Figure 3.1.A SEA A
Asheville SMSA

Figure 3.1.B SEA B
Winston - Salem SMSA

Figure 3.1.C SEA C
Greensboro - High Point SMSA

Figure 3.1.D SEA D
Charlotte SMSA

Figure 3.1.E SEA E
Raleigh SMSA

Figure 3.1.F SEA F
Durham SMSA

Figure 3.1.18
Population of North Carolina (1978)

SEA 4: Central North Carolina is the largest SEA in population (over 690,000), and the regions with the next largest populations are SEA 11: Neuse-Cape Fear and SEA 3: North Carolina Old Belt Tobacco. The data presented for 1990 suggest the continued predominance of these SEAs in population.

In Table 3.1 rates of population growth between 1970-1975 are presented for the state and its SEAs, along with growth rates due to net migration. Data on population density (the number of persons per square mile) are also presented. The first two columns of the table are particularly useful for an analysis of isotope use. A population with a positive growth rate over a five-year period, particularly one with a positive rate due to net migration, would imply increasing isotope use and waste generation. Winston-Salem and Charlotte are the most densely populated SEAs with 540 and 705 persons per square mile. These two SEAs are the major sites of population concentration in North Carolina.

3.2 Agriculture

Demographic data on agriculture for the State of North Carolina and its SEAs indicate those areas within the state heavily engaged in agriculture. Data of this type could be influential in determining which areas of the state could be suitable for disposal facilities for low-level radioactive waste. Table 3.2 presents information on the total amount of land in farms (expressed in thousands of acres) in 1974 and 1978. In addition, the percent of all land devoted to farming in 1974 and 1978 is presented along with the average value of land and buildings per farm for those years.

Acreage designated as "land in farms" consists primarily of agricultural land used for crops, pasture, or grazing. It also includes woodland and wasteland not actually under cultivation or used for pasture or grazing, provided it is part of the farmer's total operation. Large acreages of woodland and wasteland

Table 3.2 Agricultural Data for the State of
North Carolina and its State Economic Areas, 1974 and 1978

State Economic Area	Land in Farms Total Acres in 1,000s		Average Value of Land and Buildings per Farm in \$1,000s		Percent of Land Devoted to Farming	
	1974	1978	1974	1978	1974	1978
SEA 1 North Carolina Blue Ridge	846	819	53	94	22.0	21.3
SEA 2 Blue Ridge Slopes	298	297	58	90	19.1	19.0
SEA 3 North Carolina Old Belt Tobacco	1389	1336	55	103	49.9	48.0
SEA 4 Central North Carolina	1203	1155	80	127	37.1	35.6
SEA 5 South Central North Carolina	734	680	76	142	37.0	34.3
SEA 6 N.C. Upper Coastal Plain - Northern	1118	1075	62	129	49.6	47.7
SEA 7 Lower Roanoke Coastal Plain	1216	1215	106	230	49.0	48.9
SEA 8 North Carolina Central Coastal Plain	1276	1325	103	228	60.2	62.5
SEA 9 N.C. Upper Coastal Plain	857	798	79	145	38.3	35.7
SEA 10 Currituck-Albermarle-Pamlico	459	500	122	253	24.4	26.6
SEA 11 Neuse-Cape Fear	1183	1204	60	137	25.1	25.5
SEA A Asheville SMSA	117	110	56	92	27.8	26.1
SEA B Winston-Salem SMSA	74	66	68	100	27.5	24.6
SEA C Greensboro-High Point SMSA	164	142	85	121	39.1	33.8
SEA D Charlotte SMSA	50	52	125	220	14.7	15.3
SEA E Raleigh SMSA	204	171	99	169	37.1	31.1
SEA F Durham SMSA	56	50	134	197	29.6	26.4
State of North Carolina	11244	11360	73	135	36.0	36.3

SOURCE OF DATA: Data for 1974 taken from U.S. Bureau of Census, County and City Data Book, 1977, Washington, D.C. (magnetic tape version); data for 1978 taken from U.S. Bureau of the Census, Census of Agriculture, 1978 (machine readable data files). County data aggregated into State Economic Areas.

held for nonagricultural purposes were deleted from individual reports during the census processing operations. Except for open range and grazing land used under government permits, all grazing land was included as "land in farms," provided it was part of a farm or ranch.

The State Economic Area with the greatest area devoted to farming in 1978 was the North Carolina Old Tobacco Belt, more than 1.3 million acres, a slight reduction from the acreage devoted to farming in 1974. The Durham SMSA had the fewest acres under cultivation in 1978. In total land devoted to farming, North Carolina Central Coastal Plain had the highest percentage in 1978, more than 62 percent. The Charlotte SMSA had the smallest portion of its land devoted to agriculture.

The Currituck-Albemarle-Pamlico SEA had the highest average value of land and buildings per farm in 1978. The increased value in this area represented a gain of 58 percent over the 1974 value, after adjusting for inflation. Other areas with high values per farm in 1978 were Lower Roanoke Coastal Plain and North Carolina Central Coastal Plain. The values in these areas represented increases of 65 and 68 percent over 1974. The average value of land and buildings per farm in North Carolina in 1978 was \$135,000, an adjusted increase of some 41 percent over 1974.

3.3 Health

This section analyzes health data for North Carolina and its SEAs. Table 3.3 provides the following information for 1975: number of hospitals, number of hospital beds, hospital beds per 100,000 population, and physicians per 100,000 population. The data on hospitals and beds were collected by the American Hospital Association for all hospitals accepted for registration by the Association. The data on physicians were collected by the American Medical

Table 3.3 Health Information for the State of North Carolina
and its State Economic Areas

<u>State Economic Area</u>	<u>Number of Hospitals</u>	<u>Number of Hospital Beds</u>	<u>Hospital Beds per 100,000 Population</u>	<u>Physicians per 100,000 Population</u>
SEA 1 North Carolina Blue Ridge	20	1429	459	92
SEA 2 Blue Ridge Slopes	8	2492	1059	69
SEA 3 North Carolina Old Belt Tobacco	13	3320	712	221
SEA 4 Central North Carolina	16	3248	502	71
SEA 5 South Central North Carolina	11	1614	383	69
SEA 6 N.C. Upper Coastal Plain - Northern	7	785	319	56
SEA 7 Lower Roanoke Coastal Plain	8	582	304	47
SEA 8 North Carolina Central Coastal Plain	11	3206	762	92
SEA 9 N.C. Upper Coastal Plain - Lumber River	11	2649	589	72
SEA 10 Currituck-Albermarle-Pamlico	4	364	363	79
SEA 11 Neuse-Cape Fear	14	1849	370	73
SEA A Asheville SMSA	9	2054	1361	180
SEA B Winston-Salem SMSA	5	1483	655	297
SEA C Greensboro-High Point SMSA	5	1147	383	133
SEA D Charlotte SMSA	8	2337	625	164
SEA E Raleigh SMSA	9	2310	882	137
SEA F Durham SMSA	6	1787	1283	753
State of North Carolina	165	32656	600	128

SOURCE OF DATA: Data obtained for counties from U.S. Bureau of the Census, County and City Data Book, 1977, Washington, D.C. (magnetic tape version). Counties were aggregated into State Economic Areas.

Association and refer to professionally active non-federal physicians.

The data indicate that in absolute numbers of hospital beds three nonmetropolitan SEAs lead: SEAs 3, 4, and 8. The distribution of hospital beds and physicians calculated on a per population basis shows the prominence of the Asheville and Durham SEAs. These five SEAs are the major sites for radionuclide use in a hospital/medical context in the state of North Carolina.

3.4 Higher Education

Colleges and universities are major users of radionuclides. Table 3.4 provides baseline information on higher education in North Carolina and its SEAs for the academic years 1974-1975 and 1977-1978. In the year ending 1975, 112 colleges and universities in North Carolina had a student enrollment of over 198,000. Three years later the number of institutions had increased to 126, and the student enrollment increased to more than 263,000.

The geographical distribution of universities and student enrollments in North Carolina is most uneven, with five SEAs containing over 34 percent of the institutions and nearly 55 percent of the student enrollments: North Carolina Blue Ridge (SEA 1), North Carolina Old Belt Tobacco (SEA 3), Greensboro-High Point (SEA C), Charlotte (SEA D), and Raleigh (SEA E). Some of the large colleges and universities located in these SEAs are the University of North Carolina at Chapel Hill, Duke University, and North Carolina State University at Raleigh.

Consideration of isotope use and disposal should focus primarily on these five State Economic Areas. They contain the bulk of the institutions and student enrollments in the state of North Carolina.

Table 3.4 Information on Institutions of Higher Education for the State of North Carolina and its State Economic Areas: Academic Years 1974-75 and 1977-78

State Economic Area	Number of Post-Secondary Schools		Post-Secondary School Enrollments	
	1974-75	1977-78	1974-75	1977-78
SEA 1 North Carolina Blue Ridge	9	10	17,602	22,652
SEA 2 Blue Ridge Slope	4	4	3,682	5,676
SEA 3 North Carolina Old Belt Tobacco	8	7	25,918	28,951
SEA 4 Central North Carolina	10	13	8,247	13,893
SEA 5 South Central North Carolina	7	8	6,902	9,408
SEA 6 N.C. Upper Coastal Plain - Northern	5	5	4,977	6,765
SEA 7 Lower Roanoke Coastal Plain	4	4	3,828	3,583
SEA 8 North Carolina Central Coastal Plain	10	9	19,139	12,031
SEA 9 N.C. Upper Coastal Plain - Lumber River	8	9	13,403	15,846
SEA 10 Currituck-Albermarle-Pamlico	3	4	2,394	3,905
SEA 11 Neuse-Cape Fear	9	9	7,056	12,903
SEA A Asheville SMSA	4	6	3,211	5,164
SEA B Winston-Salem SMSA	6	7	8,517	11,146
SEA C Greensboro-High Point SMSA	7	10	18,642	37,439
SEA D Charlotte SMSA	6	7	19,032	27,810
SEA E Raleigh SMSA	8	10	21,164	27,746
SEA F Durham SMSA	4	4	14,535	18,161
State of North Carolina	112	126	198,249	263,079

SOURCE OF DATA: U.S. Department of Health, Education and Welfare, National Center for Educational Statistics, Educational Directory, Colleges and Universities, 1974-75; and same issue for 77-78, Washington, E.C.

3.5 Government

Demographic data on government employment and revenues in North Carolina and its SEAs provide information on the scope of local, state, and federal government activity, and the extent to which it has changed in magnitude in recent years.

Data on government employment and payrolls are provided on Table 3.5. The SEA with the greatest number of government employees is Central North Carolina, with more than 21,000 in 1977. North Carolina as a whole had the equivalent of more than 195,000 full-time government employees in the same year, an increase of about 36 percent over its 1972 levels. Three other SEAs have more than 17,000 government employees: North Carolina Central Coastal Plain, Neuse-Cape Fear and Charlotte.

Table 3.6 presents general revenue, total intergovernmental revenue, and the amount of revenue received from the federal government for 1972 and 1977. The Charlotte SEA had the largest general governmental revenue in 1977, more than \$361 million, an increase of 49 percent between 1972 and 1977 in terms of adjusted 1977 dollars. The State of North Carolina had total revenues in 1977 of more than \$3.3 billion, an adjusted increase of about 41 percent over 1972 revenues.

In total intergovernmental revenues in 1977, Central North Carolina is the most prominent SEA. The state as a whole had more than \$1.9 billion in intergovernmental revenue that year. In 1977 Central North Carolina received about 7 percent of its intergovernmental revenue from the federal government while the State of North Carolina received 18 percent.

Table 3.5 Government Employment Data for the State of North Carolina and its State Economic Areas

State Economic Area	Government Employment ¹			Local Government Payroll ²		
	1972	1977	ratio 1977/72	Oct. 1972	Oct 1977	adj. ratio ³ 1977/72
SEA 1 North Carolina Blue Ridge	6,750	9,584	1.41	4.3	7.9	1.40
SEA 2 Blue Ridge Slopes	4,926	6,943	1.40	3.3	6.0	1.39
SEA 3 North Carolina Old Belt Tobacco	10,837	15,007	1.38	7.4	13.3	1.36
SEA 4 Central North Carolina	15,293	21,038	1.37	10.1	18.0	1.35
SEA 5 South Central North Carolina	9,624	13,452	1.39	6.8	12.3	1.38
SEA 6 N.C. Upper Coastal Plain - Northern	6,530	9,102	1.39	4.1	7.4	1.37
SEA 7 Lower Roanoke Coastal Plain	5,670	7,462	1.31	3.5	6.0	1.29
SEA 8 North Carolina Central Coastal Plain	12,801	17,527	1.36	8.3	14.7	1.35
SEA 9 N.C. Upper Coastal Plain - Lumber River	10,902	15,167	1.39	7.2	13.0	1.37
SEA 10 Currituck-Albermarle-Pamlico	3,258	4,626	1.41	2.1	3.9	1.40
SEA 11 Neuse-Cape Fear	11,929	17,061	1.43	7.9	14.6	1.41
SEA A Asheville SMSA	3,917	4,836	1.23	2.5	4.1	1.25
SEA B Winston-Salem SMSA	8,329	10,192	1.22	5.7	9.1	1.22
SEA C Greensboro-High Point SMSA	8,706	11,290	1.30	6.0	11.3	1.44
SEA D Charlotte SMSA	13,846	17,073	1.23	9.8	16.4	1.28
SEA E Raleigh SMSA	6,418	9,569	1.49	4.3	9.0	1.60
SEA F Durham SMSA	4,055	5,339	1.32	2.6	4.7	1.38
State of North Carolina	143,791	195,267	1.36	95.9	171.6	1.37

¹ Government employment is expressed in terms of full-time equivalents.

² Local government payrolls are for the month of October of the particular year and are expressed in millions of dollars.

³ The adjusted ratio of 1977 to 1972 payrolls was computed after converting the 1977 payroll dollars into their equivalent in 1972 dollars, hence introducing a control for inflation.

Table 3.6 Government Finance Data for the State of North Carolina and its State Economic Areas

State Economic Area	General Revenue in millions of dollars ¹			Total Intergovernmental Revenue in millions of dollars ³			Intergovernmental Revenue from the Federal Government (percentage)	
	1972	1977	adj. ratio ² 1977/72	1972	1977	adj. ratio ² 1977/72	1972	1977
SEA 1 North Carolina Blue Ridge	81.2	155.4	1.46	49.7	97.8	1.50	2.6	8.6
SEA 2 Blue Ridge Slopes	61.8	117.4	1.45	36.4	71.1	1.49	1.4	4.6
SEA 3 N.C. Old Belt Tobacco	136.5	254.8	1.42	79.4	152.4	1.46	2.8	9.3
SEA 4 Central North Carolina	173.1	321.0	1.41	95.2	181.6	1.45	2.0	6.6
SEA 5 South Central North Carolina	117.9	222.1	1.43	69.9	135.4	1.47	3.7	12.3
SEA 6 N.C. Upper Coastal Plain - N.	68.4	128.5	1.43	40.8	78.8	1.47	1.4	4.6
SEA 7 Lower Roanoke Coastal Plain	64.4	114.2	1.35	44.0	80.3	1.39	4.4	14.6
SEA 8 N.C. Central Coastal Plain	140.3	258.9	1.40	83.9	159.3	1.44	7.8	25.9
SEA 9 N.C. Upper Coastal Plain - L.R.	136.6	256.2	1.43	92.3	178.0	1.47	8.3	27.5
SEA 10 Currituck-Albermarle-Pamlico	30.0	57.4	1.46	19.2	37.8	1.50	8.5	28.2
SEA 11 Neuse-Cape Fear	135.6	261.4	1.47	85.5	169.5	1.51	5.6	18.6
SEA A Asheville SMSA	45.4	92.2	1.55	24.2	52.4	1.65	6.3	26.0
SEA B Winston-Salem SMSA	114.2	195.1	1.30	48.6	88.9	1.40	21.0	28.1
SEA C Greensboro-High Point SMSA	132.8	222.3	1.28	59.7	116.2	1.49	16.5	28.2
SEA D Charlotte SMSA	184.9	361.1	1.49	85.2	164.5	1.47	17.7	29.7
SEA E Raleigh SMSA	89.4	182.1	1.55	44.8	95.3	1.62	2.7	19.3
SEA F Durham SMSA	72.5	103.6	1.09	31.7	52.3	1.26	5.9	20.7
State of North Carolina	1784.9	3303.9	1.41	990.4	1911.9	1.47	7.2	18.0

¹ General revenue data are exclusive of interlocal revenue and are for the fiscal year which closed at various dates for each government during the 12 months ending June 30 of the particular year.

² The adjusted ratio of 1977 to 1972 revenue was computed after converting the 1977 dollars into their equivalent in 1972 dollars, hence introducing a control for inflation.

³ Intergovernmental revenue data are exclusive of interlocal revenue.

SOURCE OF DATA: Data for 1972 taken from the U.S. Bureau of the Census, County and City Data Book, 1977, Washington, D.C. (magnetic tape version); 1977 data taken from U.S. Bureau of the Census, Census of Governments, 1977 (machine readable data files). County data were aggregated into respective State Economic Areas.

3.6 Economy

This section describes the economy and distribution of economic activities in North Carolina in 1974 and 1978. Table 3.7 lists nine industrial categories and indicates the number of employees, annual payroll, and growth of payrolls between 1974 and 1978 for each category. The data reported pertain mainly to employment covered by the Federal Insurance Contributions Act (FICA). All workers are covered except government and railroad employees, self-employed persons, and a small number of others.

The information describing industrial activities for the state and its SEAs was taken from statistics provided in County Business Patterns, a source developed and published by the U.S. Bureau of the Census. County Business Patterns provides an annual report on the economic activities of all counties in the United States. In the following analysis, county data were aggregated into SEAs.

Manufacturing industry provided the major economic base for the North Carolina Blue Ridge SEA. In 1974 more than 23,000 manufacturing employees had an annual payroll of more than \$141 million. In 1978 this area exhibited the same general type of industrial concentration and distribution, experiencing an increase in manufacturing payrolls of 8 percent between 1974 and 1978 after adjusting for inflation. Increases occurred in most other industrial activities in this area. For example, 1978 payrolls in the service industries were 28 percent greater than in 1974.

The major economic activity in the Blue Ridge Slopes is manufacturing, with retail trade in second place. Both activities increased their payrolls between 1974 and 1978. The North Carolina Old Tobacco Belt is also mainly characterized by manufacturing, as are the remaining eight nonmetropolitan

State Economic Areas in the state. The major growth industry in these nonmetropolitan areas between 1974 and 1978, however, was services.

Manufacturing also constitutes the major economic activity in all but one of the six metropolitan SEAs of North Carolina in size of annual payrolls. Winston-Salem, for example, had a manufacturing payroll of almost \$700 million, the largest of any metropolitan area in the state. In employees, however, the services industry had more than any other the industrial category in 1978 in both Raleigh and Charlotte. The major industry in Charlotte is transportation, with manufacturing and services next.

Between 1974 and 1978 services payrolls increased more than any other industrial category in all six metropolitan SEAS. In Raleigh, for example, services payroll increased by 38 percent, after controlling for inflation.

North Carolina may be characterized mainly by manufacturing, with services in second place. In 1978 manufacturing payrolls in the state amounted to more than \$8.3 billion, with services and retail trade totalling more than \$2.2 billion. The difference between these industries in number of employees is not as striking, more than 770,000 manufacturing employees as compared to more than 277,000 services employees. North Carolina's manufacturing payrolls increased by about 10 percent between 1974 and 1978 while services payrolls increased by about 34 percent.

Table 3.7 Economic Data¹ for the State of North Carolina

<u>Industry Group</u>	<u>1974</u>		<u>1978</u>		Change in economic payrolls ² between 1974 & 1978
	Number of employees for week including March 12	Annual Payroll in \$1,000	Number of employees for week including March 12	Annual Payroll in \$1,000s	
Agricultural services, forestry, fisheries	4,774	25,837	5,076	36,683	1.08
Mining	5,593	68,472	5,410	70,312	.78
Contract construction	124,235	951,480	103,789	1,091,028	.88
Manufacturing	804,553	6,133,717	770,404	8,374,043	1.10
Transportation and other public utilities	104,445	1,081,056	95,137	1,381,301	1.10
Wholesale trade	110,349	1,114,104	112,004	1,403,482	1.03
Retail trade	278,260	1,555,075	304,242	2,179,206	1.09
Finance, insurance and real estate	83,458	706,124	94,926	1,051,832	1.31
Services	228,773	1,449,192	277,030	2,279,335	1.34

1 Excludes government employees, railroad employees, and self-employed persons.

2 Change in payroll expressed as ratio of 1978 payroll to 1974 payroll (in constant dollars).

References

- Poston, Dudley L., Jr. and Ervin, Delbert, A Technique for Estimating Age-Specific Net Migration for Short Term Projections of County Populations; paper read at the annual meetings of the Population Association of America: Washington, D.C., March 1981.
- Shryock, Henry S. and Siegel, Jacob S., The Methods and Materials of Demography; Volume 2, Chapter 24, U.S. Government Printing Office: Washington, D.C., April 1981.
- U.S. Bureau of the Census, 1980 Census of Population and Housing, Final Population and Housing Unit Counts, PHC80-V-1; U.S. Government Printing Office: Washington, D.C., April 1981.
- U.S. Bureau of the Census, County Business Patterns, 1974, and County Business Patterns, 1978; Washington, D.C. (machine readable data files).
- U.S. Bureau of the Census, County and City Data Book, 1972; Washington, D.C. (magnetic tape version).
- U.S. Bureau of the Census, Census of Governments, 1977; Washington, D.C. (machine readable data files).

This section describes the structure and jurisdiction of North Carolina's executive, legislative, and judicial branches. A summary of state statutes and regulations relevant to low-level radioactive waste management and a discussion of public interest groups that have expressed or may have an interest in radioactive waste management are also included.

4.1 Major Political Parties

The Democratic party is the majority party in North Carolina. Democrats control 40 of the 50 seats in the North Carolina Senate and 96 of the 120 seats in the North Carolina House of Representatives. In addition, Governor Hunt is a Democrat, as are seven of North Carolina's 11 United States Congressmen.

4.2 North Carolina Delegation

North Carolina's United States Senators and Congressmen are;

Senators

John P. East (R)
5313 Dirksen Senate Office Building
Washington, D.C. 20510
(202) 224-3154

Senator East was first elected to the U.S. Senate in 1980; he is a member of the Energy and Natural Resources, Judiciary, and Labor and Human Resources Committees.

Jesse Helms (R)
4213 Dirksen Senate Office Building
Washington, D.C. 20510
(202) 224-6342

Senator Helms was first elected to the U.S. Senate in 1972; he is Chairman of the Agriculture, Nutrition and Forestry Committee and a member of the Ethics, Foreign Relations, and Rules and Administration Committees.

Representatives

Ike F. Andrews (D)
2201 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-1784
(4th District)

Congressman Andrews was first elected to the U.S. House of Representatives in 1972; he is a member of the Aging Committee and the Education and Labor Committee.

James T. Broyhill (R)
2340 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-2576
(10th District)

Congressman Broyhill was first elected to the U.S. House of Representatives in 1962; he is the ranking member on the Energy and Commerce Committee.

L.H. Fountain (D)
2188 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-4531
(2nd District)

Congressman Fountain was first elected to the U.S. House of Representatives in 1952; he is a member of the Foreign Affairs and Government Operations Committees.

W.G. Hefner (D)
2161 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-3715
(8th District)

Congressman Hefner was first elected to the U.S. House of Representatives in 1980; he is a member of the Appropriations and Budget Committees.

William H. Hendon (R)
212 Cannon House Office Building
Washington, D.C. 20515
(202) 225-6401
(11th District)

Congressman Hendon was first elected to the U.S. House of Representatives in 1980; he is a member of the Interior and Insular Affairs and Aging Committees.

Walter Eugene Johnston, III (R)
128 Cannon House Office Building
Washington, D.C. 20515
(202) 225-3065
(6th District)

Congressman Johnston was first elected to the U.S. House of Representatives in 1980; he is a member of the Budget Committee and the Education and Labor Committee.

Walter B. Jones (D)
241 Cannon House Office Building
Washington, D.C. 20515
(202) 225-3101
(1st District)

Congressman Jones began service in the U.S. House of Representatives in 1966; he is Chairman of the Merchant Marine and Fisheries Committee and a member of the Agriculture Committee.

CONGRESSIONAL DISTRICTS
1971-
Session Laws 1971, C.257

Drawn by Cedric L. Clark, Institute of Government, Chapel Hill

James G. Martin (D)
341 Cannon House Office Building
Washington, D.C. 20515
(202) 225-1976
(9th District)

Congressman Martin was first elected to the U.S. House of Representatives in 1972; he is a member of the Budget and Ways and Means Committees.

Stephen L. Neal (D)
2463 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-2071
(5th District)

Congressman Neal was first elected to the U.S. House of Representatives in 1974; he is a member of the Government Operations and Banking, Finance, and Urban Affairs Committees.

Charlie Rose (D)
2435 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-2731
(7th District)

Congressman Rose was first elected to the U.S. House of Representatives in 1972; he is a member of the Agriculture, House Administration, and Intelligence Committees.

Charles O. Whitley (D)
404 Cannon House Office Building
Washington, D.C. 20515
(202) 225-3415
(3rd District)

Congressman Whitley was first elected to the U.S. House of Representatives in 1976; he is a member of the Agriculture Committee.

4.3 State Government

The Constitution of the State of North Carolina established three branches within the state government, executive, legislative and judicial, which are "separate and distinct from each other" (Article I, Section 6). The following text describes the structure and jurisdiction of North Carolina's executive, legislative and judicial branches. Figure 4.1 depicts the structure of the executive branch.

4.3.1 Executive Branch

The Executive Organization Act of 1971 created 19 principal offices and departments within the executive branch. The offices and departments are: Office

STRUCTURE OF THE NORTH CAROLINA EXECUTIVE BRANCH

Figure 4.1

of the Governor and Lieutenant Governor, Departments of the Secretary of State, State Auditor, State Treasurer, Public Education, Justice, Agriculture, Labor, Insurance, Administration, Transportation, Natural Resources and Community Development, Human Resources, Correction, Commerce, Revenue, Cultural Resources, and Crime Control and Public Safety.

The heads of the 19 offices and departments constitute the Executive Cabinet. The members of the Executive Cabinet are:

Governor James B. Hunt, Jr.
State Capital
Raleigh, North Carolina 27611
(919) 733-5811

James C. Greene, Lieutenant Governor
Legislative Building
Raleigh, North Carolina 27611
(919) 733-7351

Thad Eure
Secretary of State
Raleigh, North Carolina 27611
(919) 733-3433

Edward Renfrow, State Auditor
Administration Building
Raleigh, North Carolina 27611
(919) 733-3217

Harlan E. Boyles, State Treasurer
Albemarle Building
325 N. Salisbury Street
Raleigh, North Carolina 27611
(919) 733-3951

James C. Woodward
Secretary of Correction
840 West Morgan Street
Raleigh, North Carolina 27611
(919) 733-4926

Dr. A. Craig Phillips
Superintendent of Public Instruction
Education Building
Raleigh, North Carolina 27611
(919) 733-3813

Sara W. Hodgkins
Secretary of Cultural Resources
109 East Jones Street
Raleigh, North Carolina 27611
(919) 733-4867

Rufus L. Edmisten
Attorney General
P.O. Box 629
Raleigh, North Carolina 27611
(919) 733-3377

Dr. Sarah T. Morrow
Secretary of Human Resources
Albemarle Building
Raleigh, North Carolina 27611
(919) 733-4534

James A. Graham
Commissioner of Agriculture
P.O. Box 27647
Raleigh, North Carolina 27611
(919) 733-7125

Mark G. Lynch
Secretary of Revenue
P.O. Box 25000
Raleigh, North Carolina 27611
(919) 733-7211

John C. Brooks
Commissioner of Labor
4 West Edenton Street
Raleigh, North Carolina 27611
(919) 733-7166

Thomas W. Bradshaw, Jr.
Secretary of Transportation
P.O. Box 25201
Raleigh, North Carolina 27611
(919) 733-2520

John R. Ingram
Commissioner of Insurance
P.O. Box 26387
Raleigh, North Carolina 27611
(919) 733-7343

Howard N. Lee
Secretary of Natural Resources
and Community Development
P.O. Box 27687
Raleigh, North Carolina 27611
(919) 733-4984

Joseph W. Grimsley
Secretary of Administration
503 Administration Building
Raleigh, North Carolina 27611
(919) 733-7232

Burley B. Mitchell, Jr.
Secretary of Crime Control and
Public Safety
P.O. Box 27687
Raleigh, North Carolina 27611
(919) 733-2126

D.M. Faircloth
Secretary of Commerce
430 North Salisbury
Raleigh, North Carolina 27611
(919) 733-4926

Office of the Governor

The Governor of North Carolina is James B. Hunt, Jr., a Democrat from Wilson. The Constitution of 1868 prohibited the Governor from seeking consecutive terms of office. This provision was amended in 1977 and Governor Hunt is the first Governor elected to succeed himself since 1862. North Carolina's Governor is now elected to a four-year term and may serve no more than two consecutive terms in office. He serves as chief executive and director of the state budget. He is also Chairman of the Council of State. The Governor is empowered to:

- o Formulate and administer policies of the executive branch;
- o Administer federal loans and funds;
- o Convene the General Assembly into extra session;
- o Reorganize and consolidate state agencies;
- o Join interstate compacts;

- o Grant reprieves and pardons;
- o Appoint, with the advice and consent of the Senate, all officers whose appointment is not otherwise provided for;
- o Require written information from the head of any agency or department pertaining to the duties of their office.

North Carolina is the only state that does not allow the Governor veto power.

The Governor's address, his principal staff members, and his Washington Office address are:

Governor James B. Hunt, Jr.
State Capital
Raleigh, North Carolina 27611
(919) 733-5811

(principal staff members)

Personal Secretary: Barbara Buchanan (733-5043)
Executive Assistant: John A. Williams (733-5043)
Senior Assistant: Joseph Pell (733-5017)
Scheduling Assistant: Priscilla Hartle (733-5085)
Special Assistant for Minority Affairs: Ben Ruffin (733-6594)
Press Secretary: Gary Pearce (733-5612)
Special Assistant, State/Federal Relations: J. Paul Essex (733-2257)
Appointments Aide: Jim W. Phillips (733-5081)
Legal Counsel: Jack L. Cozort (733-2417)
Science Advisor: Quentin Lindsay (733-6500)
Budget Officer: Shirley Fowler (733-2888)

Washington Office:

State of North Carolina
Suite 320
444 N. Capital Street
(202) 624-5830
Director - Pat Shore

Department of Human Resources

The Department of Human Resources is dedicated to aiding individuals, families, and communities in achieving adequate levels of health and social and economic well-being. Eight divisions are contained within the Department: Division of Social Services, Mental Health and Mental Retardation Services, Health Services, Vocational Rehabilitation Services, Services for the Blind,

Facility Services, Medical Services, and Youth Services. The Secretary is:

Dr. Sarah T. Morrow
Albemarle Building
325 N. Salisbury St.
Raleigh, North Carolina 27611
(919) 733-4534

Division of Facility Services. Contained within the Department of Human Resources is the Division of Facility Services. The Division is composed of five major sections: Licensure and Certification, Emergency Medical Services, Rural Health Services, Construction, and Radiation Protection. The Director is:

I.O. Wilkerson, Jr.
1330 St. Mary's Street
Raleigh, North Carolina 27605
(919) 733-2342

Radiation Protection Section -- The Division of Facility Services also contains the Radiation Protection Section. Most state authority governing the installation, use, handling, transportation, and storage of sources of radiation has been concentrated within this section. The Radiation Protection Section is empowered to:

- o Advise, consult, and cooperate with individuals, groups, and state and federal agencies;
- o Encourage, participate in, and conduct studies, investigations, public hearings, and research on radiation control and the effects of radiation exposure on public health and safety;
- o Require the submission of plans, specifications, and reports for new construction or alteration of protective shielding or structures which house radioactive materials;
- o Collect and disseminate information pertaining to sources of radiation;
- o Respond to emergencies involving the potential or actual release of radioactive materials;

- o Develop and administer environmental radiation monitoring of air, water, soil, vegetation, animal life, milk, and food as is necessary to protect the health of North Carolina's citizens; and
- o Implement the provisions of the "Radiation Protection Act."

The Chief of the Radiation Protection Section is:

Dayne H. Brown
1330 St. Mary's Street
Raleigh, North Carolina 27605
(919) 733-4283

Division of Health Services. The Department of Human Resources Division of Health Services was established to serve the public health needs of North Carolina's citizens. The Division comprises eight sections that administer approximately 40 health programs. The Division also provides consultation to local public health departments and training for local health care personnel. The Division has four regional offices that advise local health officials on the administration of state and federal health care programs: Black Mountain, Winston-Salem, Fayetteville, and Greenville, North Carolina. The Director is:

Dr. Hugh H. Tilson
Cooper Memorial Building
225 N. McDowell Street
Raleigh, North Carolina 27611
(919) 733-3446

Environmental Health Section -- Within the Division of Health Services is the Environmental Health Section. The Section consists of five branches: Engineering Planning, Water Supply, Sanitation, Solid/Hazardous Waste, and Vector Control. The Chief of the Environmental Health Section is:

Jim Stamey
Bath Building
306 N. Wilmington Street
Raleigh, North Carolina 27611
(919) 733-2870

Board of Human Resources

The Board of Human Resources provides consultation and advice to the Secretary of Human Resources on matters that he refers to it. The Board also assists in the development of programs and recommends priorities for the Department. The Board is composed of 15 members. Its address is:

Albemarle Building
325 N. Salisbury Street
Raleigh, North Carolina 27611
(919) 733-4534

Radiation Protection Commission

The Radiation Protection Commission is composed of 21 members appointed by the Governor. It is empowered to:

- o Advise the Department of Human Resources on the Development of programs and policies for the evaluation, determination, and reduction of radiation hazards;
- o Adopt, promulgate, amend, and repeal rules, regulations, and standards relating to the manufacture, production, transportation, use, handling, servicing, or storage of radioactive materials;
- o Require sources of radiation to be shielded, transported, used, stored, and disposed in compliance with the provisions of the "Radiation Protection Act;"
- o Require the registration and licensing of persons who handle, use, store, transport, acquire, or own sources of radiation; and
- o Adopt, amend, and repeal rules and regulations pertaining to the nonradioactive toxic and hazardous aspects of radioactive waste disposal.

The Radiation Protection Commission's address is:

P.O. Box 12200
1330 St. Mary's Street
Raleigh, North Carolina 27605
(919) 733-4283

Department of Natural Resources and Community Development

The Department of Natural Resources and Community Development was created by the North Carolina General Assembly in 1977. It is responsible for managing and protecting North Carolina's natural resources and environment and for promoting the orderly development of North Carolina's counties and cities. The Department consists of two offices, the Office of Natural Resources and the Office of Community Development. Under these two offices are 10 divisions. The Office of Natural Resources comprises the Divisions of Land Resources, Marine Fisheries, Environmental Management, Forest Resources, and Parks and Recreation. The Secretary is:

Howard N. Lee
Archdale Building
512 N. Salisbury Street
Raleigh, North Carolina 27611
(919) 733-4984

Division of Environmental Management. Within the Department of Natural Resources and Community Development's Office of Natural Resources is the Division of Environmental Management. The Division is responsible for issuing air and water permits to industries and municipalities, administering North Carolina's clean water grants program, and enforcing air and water quality regulations. The Director is:

Neil S. Grigg
Archdale Building
512 N. Salisbury Street
Raleigh, North Carolina 27611
(919) 733-4006

Board of Natural Resources and Community Development

The Board of Natural Resources and Community Development is composed of 25 members. It advises and assists the Department of Natural Resources and Community Development and recommends priorities for Department programs.

The Board's address is:

Archdale Building
512 N. Salisbury Street
Raleigh, North Carolina 27611
(919) 733-4984

Environmental Management Commission

The Environmental Management Commission is composed of 13 members appointed by the Governor. The Commission is empowered to:

- o Promulgate rules and regulations for the protection, preservation, and enhancement of North Carolina's air and water resources;
- o Conduct investigations of possible sources of air and water pollution;
- o Provide consultative and technological services to local governments;
- o Review and supervise local air pollution control programs; and
- o Adopt regulations with respect to any state laws administered under its jurisdiction.

The Chairman is:

Pete Whitley
507 Lakeview Drive
Murfreesboro, North Carolina 27855

Air Quality Control Council

The Air Quality Control Council consists of nine members appointed by the Governor. The Council advises the Environmental Management Commission on the development of rules, regulations, and standards for air quality and on any other matters referred to it by the Commission. The Chairman is:

Virginia Anderson
P.O. Box 246
Hot Springs, North Carolina 28743
(704) 622-3231

Department of Commerce

Within the Department of Commerce are 11 regulatory agencies. Each engages in rulemaking for the industry that it regulates. One agency, the Utilities Commission, is responsible for regulating transportation services and for conducting safety inspections of carrier vehicles. The Secretary of the Department of Commerce is:

D.M. Faircloth
430 N. Salisbury
Raleigh, North Carolina 27611
(919) 733-4962

Southern States Energy Board

The Southern States Energy Board was founded in 1961 as the Southern Interstate Nuclear Board. It serves the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, West Virginia, Virginia, and the Commonwealth of Puerto Rico with technical assistance, program development, policy analysis, and research support. The activities of the Board staff are supervised by a Board of Directors composed of one member per state appointed by the Governor. In addition, the Southern States Energy Board has a Legislative Policy Advisory Council that consists of those state legislators serving on the Southern Legislative Conference Energy Committee. North Carolina's seat on the Board of Directors is vacant at present.

4.3.2 Legislative Branch

The General Assembly is the oldest of North Carolina's governmental bodies. It consists of a 50-member Senate and a 120-member House of Representatives. Both Senators and Representatives are elected to serve for terms of two years.

The North Carolina General Assembly convenes in odd-year biennial sessions on the first Wednesday after the second Monday in January. Short sessions are convened in even-numbered years for the consideration of budgetary matters only. The 1981 session convened on January 14, 1981.

Senate

The North Carolina Senate is composed of 50 members: 40 Democrats and 10 Republicans. The members of the Senate in the 1981 session of the North Carolina General Assembly are:

Alford, Dallas L., Jr., D
Allred, Carey D., R
Allsbrook, Julian R., D
Baker, Harold A., R
Ballenger, T. Cass, R
Barnes, Henson P., D
Boger, Gilbert Lee, R
Cavanagh, John J., Jr., R
Clarke, James McClure, D
Cockerham, Walter C., R
Creech, William A., D
Daniels, Melvin R., Jr., D
Duncan, Conrad R., Jr., D
Frye, Henry E., D
Garrison, James B., D
Gray, Rachel G., D
Hancock, William J., Jr., D
Hardison, Harold W., D
Harrington, J.J., D
Harris, Ollie, D
Jenkins, Cecil R., Jr., D
Jernigan, Glenn R., D
Johnson, Joseph E., D
Jordan, Robert B., III, D
Kincaid, Donald R., R

Lawing, W. Craig, D
Marion, George W., Jr., D
Marvin, Helen Rhyne, D
Mathis, Carolyn, D
McDuffie, James D., D
Mills, W.D., D
Noble, Sam R., D
Palmer, Joseph P., D
Rauch, Marshall A., D
Raynor, Joe P., D
Redman, William W., Jr., R
Royall, Kenneth C., Jr., D
Smith, Paul S., R
Soles, R.C., Jr., D
Speed, James D., D
Swain, Robert S., D
Thomas, Joseph E., D
Thomas, R.P., D
Vickery, Charles E., D
Walker, Russell G., D
Ward, Marvin, D
Warren, Robert D., D
White, Vernon E., D
Wright, J.A., R
Wynne, Robert W., D

SENATE DISTRICTS

Map 4.1

The State Senatorial Districts of North Carolina

Senate Leadership. The presiding officer of the Senate is the Lieutenant Governor, who serves as President of the Senate. The President is responsible for appointing chairmen and members of Senate standing committees and for conducting the day-to-day business of the Senate. The President does not vote except upon equal division of the Senate. In the absence of the President, the President Pro Tempore presides over the Senate. The officers of the Senate are:

President: James C. Green (Lieutenant Governor)
President pro Tempore: W. Craig Lawing (D, Mecklenburg)
Majority Leader: Kenneth C. Royall, Jr. (D, Durham)
Minority Leader: Donald R. Kincaid (R, Caldwell)
Minority Whip: William W. Redman, Jr. (R, Iredell)

Committee Structure. The 1981 session of the North Carolina General Assembly had 38 standing committees. The Lieutenant Governor is responsible for appointing chairmen and members of the committees. Relevant Senate standing committees are:

Appropriations

Chairman: Harold W. Hardison (D, Lenoir)
Vice Chairmen: Vernon E. White (D, Pitt)
Carolyn Mathis (D, Mecklenburg)

Human Resources

Chairman: Ollie Harris (D, Cleveland)
Vice Chairmen: Russell G. Walker (D, Randolph)
Joe B. Raynor (D, Cumberland)

Local Government and Regional Affairs

Chairman: George W. Marion, Jr. (D, Surry)
Vice Chairmen: Sam R. Noble (D, Robeson)
Cecil R. Jenkins, Jr. (D, Cabarrus)

Natural and Economic Resources and Wildlife

Chairman: Joseph E. Thomas (D, Craven)
Vice Chairmen: W.D. Mills (D, Onslow)
Conrad R. Duncan, Jr. (D, Rockingham)

Public Utilities and Energy

Chairman: Joseph E. Johnson (D, Wake)
Vice Chairmen: James B. Garrison (D, Stanly)
Marshall A. Rauch (D, Gaston)

Transportation

Chairman: J.J. Harrington (D, Bertie)
Vice Chairmen: Robert W. Wynne (D, Wake)
James D. McDuffie (D, Mecklenburg)

Ways and Means

Chairman: Kenneth C. Royall, Jr. (D, Durham)
Vice Chairmen: Robert B. Jordan, III (D, Montgomery)
W. Craig Lawing (D, Mecklenburg)

House of Representatives

The North Carolina House of Representatives is comprised of 120 members, 96 Democrats and 24 Republicans. The members of the House of Representatives in the 1981 Session of the North Carolina General Assembly are:

Ramsey, Liston B., D	Bundy, Sam D., D
Adams, Allen, D	Burnley, Dorothy R., R
Allran, Austin M., R	Chapin, Howard B., R
Almond, Pearson E., R	Church, John T., D
Anderson, Gerald, D	Clark, Douglas A., D
Barbec, Allan C., D	Clark, William E., D
Barker, Chris S., Jr., D	Coble, J. Howard, R
Barnes, Richard, D	Cochrane, Betsy L., R
Beam, Sam, D	Colton, Marie W., D
Beard, R.D., D	Cook, Ruth E., D
Bell, E. Graham, D	Craven, James R., R
Black, Jim, D	Crawford, Narvel J., Jr., D
Blue, Daniel T., Jr., D	Creecy, C. Melvin, D
Bone, Roger W., D	Diamont, David Hunter, D
Brannan, George W., D	Easterling, Ruth M., D
Brawley, C. Robert, R	Economos, Gus, D
Brennan, Louise S., D	Edwards, Ralph P., D
Brown, John Walter, R	Ellis, T.W., Jr., D
Brubaker, Harold J., R	Enloe, Jeff H., Jr., D
Bumgardner, David W., D	Etheridge, Bobby R., D
Etheridge, Bruce, R	Lutz, Edith L., D
Evans, Charles D., D	McAlister, Robert L., D
Fenner, Jeanne T., D	McDowell, Timothy H., D
Foster, Jo Graham, D	Mauney, D.R., Jr., D
Fulcher, G. Malcolm, Jr., D	Mavretic, Josephus, D
Fussell, Aaron E., D	Messer, Ernest B., D
Gay, William C., D	Miller, George W., Jr., D
Gillam, John B., III, D	Morgan, James F., D

HOUSE DISTRICTS

Map 4.3 The State House Districts of North Carolina

Grady, Richard R., D
 Greenwood, Gordon H., D
 Guy, A.D., D
 Hackney, Joe, D
 Harrison, William D., D
 Haworth, Byron, D
 Hayden, Margaret, D
 Hege, Joe H., Jr., R
 Helms, H. Parks, D
 Hiatt, William S., R
 Hightower, Foyle R., Jr., D
 Holmes, George M., Jr., R
 Holt, Bertha, D
 Holt, Charles, D
 Hughes, Charles H., R
 Hughes, James F., R
 Hunt, Jack J., D
 Hunt, Patricia S., D
 Hunter, Robert C., D
 Hunter, Thomas B., D
 Huskins, J.P., D
 Hux, George A., D
 James, Vernon G., D
 Jones, Robert A., D
 Jordan, John M., D
 Kaplan, Ted D
 Keesee, Margaret P., R
 Lacey, S.B., Jr., R
 Lancaster, Martin D., D
 Ligon, Bedford V., R
 Lilley, Daniel T., D
 Locklear, Horace, D

Musselwhite, Marvin D., Jr., D
 Nash, Robie L., D
 Nesbitt, Martin L., D
 Nye, Edd, D
 Parnell, David R., D
 Payne, Harry E., Jr., D
 Pegg, Mary N., R
 Pyler, Aaron W., D
 Poovey, J. Reid, R
 Pulley, Paul, D
 Quinn, Dwight W., D
 Rabon, Tom B., Jr., D
 Radford, John M., D
 Redding, Frank, R
 Rhodes, S. Thomas, R
 Robinson, George S., R
 Seymour, Mary P., D
 Smith, Ned R., D
 Spaulding, Kenneth B., D
 Spoon, Roy, R
 Stamey, Melvin L., R
 Tally, Lora S., D
 Taylor, Ron, D
 Tennille, Margaret, D
 Thomas, Betty D., D
 Tison, Ben, D
 Tyson, Henry M., D
 Warren, Ed N., D
 Watkins, William T., D
 Wicker, Dennis A., D
 Woodard, Wilma C., D
 Wright, Richard, D

House Leadership. The presiding officer of the House is the Speaker, who is elected by the members of the House. The Speaker presides over the daily sessions of the House and is responsible for appointing the chairmen and members of House Standing Committees. In the absence of the Speaker, the Speaker Pro Tempore presides over the House. The Speaker Pro Tempore is also elected by the members of the House. The officers of the House are:

Speaker: Liston B. Ramsey (D, Madison)
 Speaker pro Tempore: Allen C. Barbee (D, Nash)
 Minority Leader: Harold J. Brubaker (R, Randolph)
 Minority Whip: George M. Holmes (R, Yadkin)

Committee Structure. Fifty-eight House standing committees exist in the 1981 session of the North Carolina General Assembly. The Speaker is responsible for appointing the chairmen and members of the various committees. Relevant House standing committees are:

Energy

Chairman: Tom B. Rabon, Jr. (D, Brunswick)
Vice Chairmen: David Hunter Diamont (D, Surry)
Gordon H. Greenwood (D, Buncombe)

Health

Chairman: Thomas B. Hunter (D, Richmond)
Vice Chairmen: Marie W. Colton (D, Buncombe)
Ned R. Smith (D, Forsyth)
A.D. Guy (D, Onslow)
Richard R. Grady (D, Wayne)

Human Resources

Chairman: Gus Economos (D, Mecklenburg)
Vice Chairmen: Ruth E. Cook (D, Wake)
Byron Haworth (D, Guilford)
Margaret Tennille (D, Forsyth)
Betty Dorton Thomas (D, Cabarrus)

Natural and Economic Resources

Chairman: Betty Dorton Thomas (D, Cabarrus)
Vice Chairmen: Howard B. Chapin (D, Beaufort)
Bruce Ethridge (D, Onslow)
Timothy H. McDowell (D, Alamance)

Public Utilities

Chairman: Ron Taylor (D, Bladen)
Vice Chairmen: J.P. Huskins (D, Iredell)
Vernon G. James (D, Pasquotank)
David R. Parnell (D, Robeson)
Ben Tison (D, Mecklenburg)

Transportation

Chairman: David W. Bumgardner (D, Gaston)
Vice Chairmen: Jeff H. Enloe, Jr. (D, Macon)
Bobby R. Etheridge (D, Harnett)
Robert L. McAlister (D, Rockingham)
Ed Nye (D, Bladen)

4.3.3 Judicial Branch

North Carolina's judicial power is vested in a Court for the Trial of Impeachments (the Senate) and a General Court of Justice, which consists of Appellate, Superior Court, and District Court Divisions. The Appellate Division of the General Court of Justice consists of the Supreme Court and the North Carolina Court of Appeals.

Supreme Court

North Carolina's Supreme Court is the highest court of the state. It is an appellate court that hears oral arguments on questions of law only. All cases except capital and life imprisonment cases must first be appealed to the North Carolina Court of Appeals. The Supreme Court may, however, certify certain cases for hearing by it, bypassing the Court of Appeals, if it feels that the case is unusually important. The Supreme Court consists of a Chief Justice and six Associate Justices elected for eight-year terms.

Court of Appeals

The North Carolina Court of Appeals was established by constitutional amendment in 1965. All cases except capital and life imprisonment cases must first be appealed to the Court of Appeals. The Court consists of 12 judges elected to serve for eight-year terms. The Chief Justice of the Supreme Court designates a Chief Justice of the Court of Appeals from among the 12. The Court of Appeals sits in panels of three, thereby increasing the volume of cases that may be heard.

Superior Court

The Superior Court is the trial court of general jurisdiction in North Carolina. The state has been divided into 30 Superior Court districts.

One judge from each district is elected to an eight-year term. The 30 districts have been divided among four judicial divisions. Each elected judge presides for six months in each court of each district within his division. Eight Special Judges appointed by the Governor to terms of four years are available to hear case overloads.

District Court

The District Court has exclusive jurisdiction over misdemeanors, civil cases involving less than \$5,000, and domestic relations cases. District Court Judges are elected to four-year terms. In districts having more than one judge, the Chief Justice of the Supreme Court designates one of the judges as Chief District Judge.

4.3.4 Relevant Statutes and Regulations

This section summarizes North Carolina statutes and regulations that may be relevant to low-level radioactive waste management.

North Carolina Radiation Protection Act

The North Carolina Radiation Protection Act, contained in Chapter 104E of the General Statutes of North Carolina, established the Department of Human Resources as the state radiation protection agency. It also created and empowered the North Carolina Radiation Protection Commission. Under provisions of the Act, the Governor may "enter into agreements with the federal government providing for discontinuance of certain of the responsibilities of the federal government with respect to sources of ionizing radiation and the assumption thereof by this state." The Act further authorizes the Radiation Protection Commission to adopt and promulgate rules and regulations governing the transportation of radioactive materials within North Carolina.

North Carolina Regulations for Protection Against Radiation

The North Carolina Radiation Protection Commission adopted Regulations for Protection Against Radiation effective February 1, 1980. These regulations are contained in Title 10, Chapter 3, of the North Carolina Administrative Code. The regulations, unless stated otherwise, apply to all persons who receive, transport, own, use, or acquire radiation sources within North Carolina. Included in the regulations are requirements for the registration of radiation machines, facilities, and services; requirements for the licensing of radioactive materials; standards for protection against radiation; safety requirements for industrial radiography operations; standards for the use of x-rays and sealed radioactive sources in the healing arts; requirements for particle accelerators; and standards for notices, instructions, reports, and inspections.

Hazardous Waste Management Regulations

The State of North Carolina has adopted the U.S. Environmental Protection Agency's Regulations for Hazardous Waste Management. These include identification and listing of hazardous wastes, standards for hazardous waste generators and transporters, standards for owners and operators of hazardous waste management facilities, interim standards for hazardous waste management facilities, and permitting requirements and procedures.

Solid Waste Management Regulations

The North Carolina Department of Human Resources Solid and Hazardous Waste Management Branch has promulgated regulations governing solid waste management. These regulations are contained in Title 10, Chapter 10, of the North Carolina Administrative Code. These regulations, however, do not apply to any radioactive material as defined by the North Carolina Radiation Protection Act.

Surface Water Standards and Monitoring

The North Carolina Department of Natural Resources and Community Development has adopted "Regulations for Surface Water Standards and Monitoring." These regulations are contained in Title 15, Chapter 2, of the North Carolina Administrative Code. The standards for water quality applicable to all fresh surface waters and all tidal salt waters state that "the maximum average annual activity level for combined Radium-226 and Radium-228 shall not exceed five picocuries per liter; nor shall the average annual gross particle activity (including Radium-226, but excluding Radon and Uranium) exceed 15 picocuries per liter. The maximum average annual activity level for Strontium-90 shall not exceed eight picocuries per liter; nor shall the average annual gross beta particle activity (excluding Potassium-40 and other naturally occurring radionuclides) exceed 50 picocuries per liter; nor shall the maximum average annual activity level for tritium exceed 20,000 picocuries per liter."

4.4 Federal Activities

No major federal activities in North Carolina result in the generation of low-level radioactive waste.

4.5 Citizen Action

The section identifies those parties that have expressed or may have an interest in issues dealing with low-level radioactive waste management. Included in this section are the names, special concerns, and descriptions of interested parties within North Carolina.

Conservation Council of North Carolina

Established in 1968, the Conservation Council of North Carolina consists of 30 affiliated organizations and more than 700 individual members. The goal of the Council is to pursue an educational, political, and legal role in finding the answers to environmental problems, particularly those involving energy development in North Carolina. The Council is active in coordinating and advising local groups. In 1973 the Council established the first full-time environmentalist lobby in North Carolina. The Conservation Council publishes a monthly newsletter, Carolina Conservationist, that provides information on state and national energy developments. The President is Lavone Page.

Conservation Council of North Carolina
307 Cranville Road
Chapel Hill, North Carolina 29514
(919) 942-1080

Duke Environmental Center

The Duke Environmental Center is composed of faculty and students who wish to promote the quality of the environmental studies program at Duke University. The Director is Dr. P. Aarne Visland.

117D School of Engineering
Duke University
Durham, North Carolina 27706
(919) 684-5756

Audubon Society

The National Audubon Society maintains six chapters within the state of North Carolina. All inquiries or information concerning the North Carolina chapters may be directed to the Southeast Regional Office of the National Audubon Society. The Director of the office is Carlyle Blakeney.

Southeast Regional Office
National Audubon Society
P.O. Box 1268
Charleston, South Carolina 29402
(803) 723-6171

Carolina Action

Carolina Action is an organization concerned with environmental issues. It publishes a monthly newsletter, Action Power. The President is Barbara Harris.

Carolina Action
Durham, North Carolina 27702
(919) 682-6076
(919) 682-9329

Cleveland League on Conservation

The Cleveland League on Conservation is active in environmental issues and maintains its own environmental library. The President is Linda Cabiness.

Cleveland League on Conservation
Route 4
Shelby, North Carolina 28150
(704) 434-7427

Environmental Action Coalition

The Environmental Action Coalition is an environmentalist organization whose member groups include North Carolina PIRG, Audubon Society, Conservation Council of North Carolina, and the League of Women Voters of North Carolina. The Environmental Action Coalition may be contacted through:

Dr. John Jezorek
Department of Chemistry
UNC Greensboro
Greensboro, North Carolina 27412

Environmental Education, Recreation and Research Center

The Environmental Education, Recreation and Research Center is a facility of the High Point, North Carolina Parks and Recreation Department. The Center has an extensive library and conducts numerous environmental programs. The Center also publishes a newsletter that contains information on environmental issues in North Carolina. The President is:

Mrs. Nel Hedrick.
Environmental Education, Recreation and Research Center
Route 1, Box 401
High Point, North Carolina 27260
(919) 454-4214

Izaak Walton League, New River Chapter

The Izaak Walton League of America is a national organization whose slogan is "Defenders of soil, water, woods, and wildlife." Although the New River Chapter is located in Virginia, 50 percent of its members reside in North Carolina. The League publishes a monthly newspaper, Outdoor America. The President of the New River chapter is Lester Halsey.

Izaak Walton League of America
New River Chapter
Mouth of Wilson, Virginia 24363
(703) 579-2193

League of Women Voters of North Carolina

The League of Women Voters is an organization involved in both energy and environmental quality programs. The concerns of the League regarding radioactive waste are outlined in the League's "Criteria for Evaluating Suitability of Storage and Disposal Sites for Hazardous and Nuclear (including Low-Level Radioactive) Waste." The League proposes decision-making that allows for public and government participation at all levels and procedures for mediation of intergovernmental conflict. It also states that storage or disposal of radioactive waste should not occur on or near drinking water supply sources, fragile land areas, areas with significant renewable resource value, or areas where rare or valuable ecosystems or geological formations exist. The President of the League of Women Voters of North Carolina is Marianne Nichol. The State Energy Coordinator is Alice Turner.

League of Women Voters of North Carolina
2637 McDowell Street
Durham, North Carolina 27705
(919) 493-1178

Metrolina Environmental Concern Association

The Metrolina Environmental Concern Association is an organization whose members include the League of Women Voters of North Carolina, Council of Garden Clubs, Sierra Club, and Audubon Society.

Metrolina Environmental Concern Association
5033 Erickson Road
Charlotte, North Carolina 28205
(919) 535-2697

Mother Earth News, Inc.

Mother Earth News publishes a bimonthly magazine and numerous other publications that discuss environmental issues. The organization also has a weekly column in the following newspapers: Chapel Hill Newspaper, Charlotte News,

Greensboro Record, Lumberton Robsonian, Raleigh News and Observer, and Winston-Salem Journal-Sentinel. The President of Mother Earth News is Dave Adams.

Mother Earth News
P.O. Box 70
Hendersonville, North Carolina 28791
(704) 693-0211

North Carolina Public Interest Research Group

The North Carolina Public Interest Research Group is a student-directed, professionally-staffed organization concerned with environmental problems. The Group publishes numerous publications, including a newsletter, NC PIRG Advocate.

North Carolina Public Interest Research Group
704 1/2 Ninth Street
P.O. Box 2901
Durham, North Carolina 27705
(919) 286-2275

North Carolina Wildlife Federation

The North Carolina Wildlife Federation is interested in environmental education and wildlife conservation. It has opposed the ocean dumping of atomic wastes. The Federation publishes a quarterly magazine, Friend O' Wildlife.

North Carolina Wildlife Federation
1033 Wade Avenue
P.O. Box 10626
Raleigh, North Carolina 27605
(919) 833-1923

Carolinians for Safe Energy

Carolinians for Safe Energy is dedicated to informing the public of the potential danger of nuclear power. It has held conferences on nuclear power and publishes a newsletter on the subject. The President is Edgar Lyngholm.

Carolinians for Safe Energy
P.O. Box 8165
Asheville, North Carolina 28804

Carolina Environmental Study Group

The Carolina Environmental Study Group is concerned with health dangers posed by low-level radioactive waste. It has been active in the fight against the proliferation of nuclear power plants in North Carolina and it holds intervener status in operating licensing proceedings. The President is Jesse Riley.

Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207
(704) 375-4342

Sierra Club

The Sierra Club is an environmental organization concerned with the protection of natural resources and the maintenance of a clean environment. The Joseph LeConte Chapter of the Sierra Club operates in North Carolina. The Chairman of the Joseph LeConte Chapter is Bill Douceett.

Sierra Club
Joseph LeConte Chapter
2383 Champion Court
Raleigh, North Carolina 27606

Other Possible Interested Parties

Tom Wartenburg
Department of Philosophy
Duke University
P.O. Box 27708
Durham, North Carolina 27708

Jerome Kohl
Nuclear Engineering Department
North Carolina State University
Raleigh, North Carolina 27650
(919) 737-2303

Protect Our Piedmont
c/o Jim Overton
Institute for Southern Studies
604 W. Chapel Hill Street
Durham, North Carolina 27701

Wells Eddleman
Route 1, Box 183
Durham, North Carolina 27705
(919) 929-1800

Syed Z. Sharig
Duke Center for Resource
and Environmental Policy Research
Durham, North Carolina 27708
(919) 684-6090

Don Cox
122 E. Queen Street
Hillsborough, North Carolina 27278
(919) 732-2870

Chapel Hill Task Force on
Shearon Harris Nuclear Plant
C/o Phyllis Lotchin
415 Overland Drive
Chapel Hill, North Carolina 27514
(919) 929-4298

North Carolina Alternative Energy
Corporation
c/o Jimmy J. Wortman
Suite 117, 300 Park Drive
Research Triangle Park, North Carolina 27709

David Martin
820 Merrie Road
Raleigh, North Carolina 27606
(919) 851-5237

North Carolina League of Municipalities
Local Government Center
Lane and Dawson Streets
P.O. Box 3069
Raleigh, North Carolina 27602
(919) 834-1311

Barbara Winn, M.D.
Route 6, P.O. Box 94
Laurinburg, North Carolina 28352
(919) 276-7099

Pat Newman
2309 Weymouth Court
Raleigh, North Carolina 27612
(919) 787-9825

North Carolina Association of
County Commissioners
Local Government Center
Lane and Dawson Streets
P.O. Box 3069
Raleigh, North Carolina 27602
(919) 832-2893

Jane Sharp
116 West Jones Street
Raleigh, North Carolina 27611

4.6 Newspapers

The appendices contain newspaper articles relevant to low-level radioactive waste management that have been published in North Carolina's newspapers during the past several years.

A survey package was developed to solicit data and information necessary to characterize generally the low-level radioactive waste management practices in the State of North Carolina. The package included a questionnaire and appropriate letters encouraging licensees to participate in the survey. Administration of the survey was carefully planned to allow licensees adequate response time and included procedures for handling inquiries concerning the data requested and for performing selected follow-up telephone calls. The following sections provide specific information relative to the survey form and administration of the survey.

5.1 Survey Form

The survey form was designed to present the data requested in a concise, easily understood, yet comprehensive format. The intent was to request sufficient data to ascertain both the qualitative and quantitative nature of low-level radioactive waste management practices. The form was designed to allow "check-off" answers wherever possible and to minimize the effort required by respondents in supplying the requested data.

The survey form proper consists of six 14 x 8 1/2 inch typeset printed sheets (three sheets, front and back), as shown in Figure 5.1. Licensees were informed that the data would be treated as CONFIDENTIAL and would be ANONYMOUSLY reported in consensus and statistical form. Each licensee was assigned a number, stamped on each sheet of the questionnaire. The first two digits identify the state and the last four the licensee. These identifying numbers were used during data processing for control purposes.

Sheet One of the questionnaire contains introductory statements consisting of a Rationale for Study and General Guidelines for completing the form. The first four sections, also a part of sheet one, request the following information:

- 1.0 Organization and Facility Data
- 2.0 Type of Facility
- 3.0 License Information
- 4.0 Radioactive Waste Information

Section 4.0 asks a simple yes or no question about whether the facility generated and/or received radioactive waste during 1978, 1979, and/or 1980. Respondents answering NO for each year were informed that they had completed the questionnaire and were asked to return it.

Sheet Two consists of Section 5.0, Use Classification for Unsealed Radioactive Sources, and Yearly Data Sheet Instructions. The instructions require the use of a key for completing the yearly data sheets. The key contains multiple answers to certain questions and the respondent had only to select the appropriate corresponding number.

The Yearly Data Sheets for 1978, 1979, and 1980 comprise sheets Three through Five. These sheets solicit data in matrix format of radionuclides versus characteristic and quantitative data in six (6) general categories. The categories are the same for each Yearly Data Sheet, except they were sequentially numbered from 6.0 through 23.0 for processing purposes. The categories are:

- 6.0, 12.0, 18.0 Radionuclides Received/Produced
- 7.0, 13.0, 19.0 Radioactive Waste Generated

8.0, 14.0, 20.0 Radioactive Waste Received

9.0, 15.0, 21.0 Radioactive Waste Processed/Reduced

10.0, 16.0, 22.0 Radioactive Waste Shipped

11.0, 17.0, 23.0 On Site Waste Disposal

Sheet Six contains Sections 24.0 and 25.0, which inquire about the source(s) of radionuclide production and facility(ies) from which radioactive waste was received, and a comments and remarks section. This section allows the recipient of the survey to make suggestions or indicate any difficulties encountered that may have effected a particular response.

Some requests for information are included as part of the questionnaire for the sole purpose of determining the validity of other data collected. For example, the type of monitoring instrumentation that a respondent uses to collect data reveals the accuracy with which the data was obtained.

5.2 Survey Administration

Packages were prepared that included a questionnaire, a self-addressed prepaid return envelope, a letter from Vachon, Nix and Associates, and a letter from Mr. Dayne H. Brown, Chief, Radiation Protection Section, North Carolina Department of Human Resources. The Vachon, Nix and Associates letter and state letter included in the packages are presented as Figures 5.2 and 5.3.

Names and addresses of each user licensed to handle radioactive material in the State of North Carolina were obtained from EG&G Idaho, Inc. EG&G provided a list of U.S. Nuclear Regulatory Commission licensees. No

attempt was made to differentiate between those licensees believed not to generate radioactive waste and those known to generate waste. Survey packages were mailed to every name provided.

Large 7 1/2 x 10 1/2 inch envelopes were specifically used for the mailout so that the package would not be easily misplaced by recipients. Two special notices were printed on the envelopes: 1) DATED MATERIAL: Southern States Energy Board Radioactive Waste Management Survey, and 2) ATTN: Radioactive Material Control Officer.

The packages were mailed first class on April 23, 1981, and a sample package was subsequently mailed to Mr. Brown. Figure 5.4 is the letter of transmittal to him. After approximately two weeks had elapsed, follow-up telephone calls were made to selected licensees. Figure 5.5 is a copy of a standard form that was developed to record inquiries from licensees as well as follow-up contacts.

June 15th was established as a cut-off date for processing questionnaires. Questionnaires received after that date were monitored for the purpose of sorting out significant "waste generators." The results of the survey are presented in Chapter 6.

Figure 5.1

PAGE 1 OF 6	LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT SURVEY	01 0260																																							
<p style="text-align: center;">RATIONALE FOR STUDY:</p> <p>The purpose of this survey is to compile data on the generation, handling, and disposal of low-level radioactive waste in your State. The compilation of these data will serve as a basis to analyze the time-rate-of-change of low-level radioactive waste generation and further assist in the development of sound policies and programs for low-level radioactive waste management. Each survey form will be coded by respondent. The data are CONFIDENTIAL and will be reported in consensus and statistical form.</p>	<div style="text-align: center;"> <p>VACHON, NIX & ASSOCIATES P.O. Box 1385 Norcross, Georgia 30071 404/448-5235</p> </div> <p style="text-align: center;">2.0 TYPE OF FACILITY</p> <p>Please check the block(s) which represents your major operation(s) but not more than one per group.</p> <p>2.1 Medical</p> <p>2.1.1 ☐ Hospital</p> <p>2.1.2 ☐ Medical School (Research/Testing Lab)</p> <p>2.1.3 ☐ Nursing/Convalescent Home</p> <p>2.1.4 ☐ Physician</p> <p>2.1.5 ☐ Clinic</p> <p>2.1.6 ☐ Other _____</p> <p>2.2 Educational</p> <p>2.2.1 ☐ University/College</p> <p>2.2.2 ☐ Technical/Community College</p> <p>2.2.3 ☐ High School</p> <p>2.2.4 ☐ Other _____</p> <p>2.3 Industrial</p> <p>2.3.1 ☐ Manufacturing</p> <p>2.3.2 ☐ Construction</p> <p>2.3.3 ☐ Mining</p> <p>2.3.4 ☐ Well Logging/Seismology/ Oil-Gas Exploration</p> <p>2.3.5 ☐ Engineering</p> <p>2.3.6 ☐ Research & Development</p> <p>2.3.7 ☐ Pharmaceutical Manuf.</p> <p>2.3.8 ☐ Other _____</p> <p>2.4 Critical Nuclear Reactor</p> <p>2.4.1 ☐ Commercial Power Reactor</p> <p>2.4.2 ☐ Research Reactor</p> <p>2.5 Federal Government</p> <p>2.5.1 ☐ Military</p> <p>2.5.2 ☐ Non-Military</p> <p>2.6 State Government</p> <p>2.6.1 ☐ Highway Department</p> <p>2.6.2 ☐ State Health Department</p> <p>2.6.3 ☐ Other _____</p> <p>2.7 Other Jurisdictions</p> <p>2.7.1 ☐ County</p> <p>2.7.2 ☐ City</p>	<p style="text-align: center;">3.0 LICENSE INFORMATION</p> <p>Please provide information on licenses issued by the N Regulatory Commission and/or State Agencies.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">3.1 License Number</th> <th style="width: 33%;">3.2 Issuing Agency</th> <th style="width: 34%;">3.3 Classification</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p style="text-align: center;">4.0 RADIOACTIVE WASTE INFORMATION</p> <p>4.1 Did your facility generate radioactive waste during 1978, and/or 1980 that required holding, reprocessing, or disposal or shipment to an off-site disposal facility?</p> <table style="width: 100%;"> <tr> <td style="width: 33%;">1978</td> <td style="width: 33%; text-align: center;">☐ Yes ☐ No</td> <td style="width: 34%; text-align: center;">☐ Yes ☐ No</td> </tr> <tr> <td>1979</td> <td style="text-align: center;">☐ Yes ☐ No</td> <td style="text-align: center;">☐ Yes ☐ No</td> </tr> <tr> <td>1980</td> <td style="text-align: center;">☐ Yes ☐ No</td> <td style="text-align: center;">☐ Yes ☐ No</td> </tr> </table> <p>4.2 Did your facility receive radioactive waste from a p organization, a branch of your organization, or another or zation for holding, reprocessing, on-site disposal or ship to an off-site disposal facility during 1978, 1979 and/or 1</p> <table style="width: 100%;"> <tr> <td style="width: 33%;">1978</td> <td style="width: 33%; text-align: center;">☐ Yes ☐ No</td> <td style="width: 34%; text-align: center;">☐ Yes ☐ No</td> </tr> <tr> <td>1979</td> <td style="text-align: center;">☐ Yes ☐ No</td> <td style="text-align: center;">☐ Yes ☐ No</td> </tr> <tr> <td>1980</td> <td style="text-align: center;">☐ Yes ☐ No</td> <td style="text-align: center;">☐ Yes ☐ No</td> </tr> </table> <p>If your facility did not generate and/or receive radioactive waste during 1978, 1979 or 1980, then you have completed this questionnaire. Thank you. If you answered yes to and/or 4.2, please complete the form.</p>	3.1 License Number	3.2 Issuing Agency	3.3 Classification																			1978	☐ Yes ☐ No	☐ Yes ☐ No	1979	☐ Yes ☐ No	☐ Yes ☐ No	1980	☐ Yes ☐ No	☐ Yes ☐ No	1978	☐ Yes ☐ No	☐ Yes ☐ No	1979	☐ Yes ☐ No	☐ Yes ☐ No	1980	☐ Yes ☐ No	☐ Yes ☐ No
3.1 License Number	3.2 Issuing Agency	3.3 Classification																																							
1978	☐ Yes ☐ No	☐ Yes ☐ No																																							
1979	☐ Yes ☐ No	☐ Yes ☐ No																																							
1980	☐ Yes ☐ No	☐ Yes ☐ No																																							
1978	☐ Yes ☐ No	☐ Yes ☐ No																																							
1979	☐ Yes ☐ No	☐ Yes ☐ No																																							
1980	☐ Yes ☐ No	☐ Yes ☐ No																																							
<p style="text-align: center;">GENERAL GUIDELINES</p> <p>Please provide the requested information accurately and as complete as possible with typewriter, pen or pencil.</p> <p>When a request for information does not apply to your facility, leave blank and continue to the next request.</p> <p>When the selections provided for certain sections do not fit your situation, use the selection entitled other and specify in the space provided.</p> <p>Once you have completed this questionnaire, please return it in the enclosed stamped, self-addressed envelope. Thank you.</p>	<p style="text-align: center;">1.0 ORGANIZATION AND FACILITY DATA</p> <p>1.1 Facility Name _____</p> <p>1.2 Street Location (Hdqtrs/Admin) _____</p> <p>1.3 City _____ 1.4 State _____</p> <p>1.5 Telephone No. (____) _____ 1.6 Zip Code _____</p> <p>1.7 Officer-in-Charge of Radiological Safety</p> <p>1.7.1 Name _____</p> <p>1.7.2 Title _____</p> <p>1.8 Person Completing Form</p> <p>1.8.1 Name _____</p> <p>1.8.2 Title _____</p> <p>1.8.3 Date _____</p>																																								

LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT SURVEY

5.0 USE CLASSIFICATION FOR UNSEALED RADIOACTIVE SOURCES

Please indicate the percentage of total volume of unsealed radioactive material used for each category below. Total of all categories should equal 100%.

5.1 Human

- 5.1.1 () Diagnostic _____ %
 5.1.2 () Non-Diagnostic _____ %
 5.1.3 () Research _____ %

5.2 Animal

- 5.2.1 () Diagnostic _____ %
 5.2.2 () Non-Diagnostic _____ %
 5.2.3 () Research _____ %

5.3 General Research

- 5.3.1 () Physical _____ %
 5.3.2 () Chemical _____ %
 5.3.3 () Engineering _____ %
 5.3.4 () Other _____ %

Total of 5.1, 5.2 & 5.3 _____ 100 % (Specify)

YEARLY DATA SHEET INSTRUCTIONS

The following data sheets request information on radionuclides (isotopes) received and/or produced and radioactive waste generated, received, processed, shipped and disposed of on-site for calendar years 1978, 1979 & 1980.

The sheets are identical in format. As a convenience, a list of common radionuclides has been provided. Please report data as requested for all radionuclides handled by your facility. All quantitative data should be taken directly from facility records; if records are not available, please estimate answers as accurately as possible.

"Received/Produced" in Sections 8.0, 12.0 & 18.0 refers to radioactive emitting materials to be used at your facility. The term "Waste" as used in Sections 7.0-11.0, 13.0-17.0 & 19.0-23.0 refers to all radioactive emitting materials that have no further use at your facility and must be either disposed of on-site or transported to another facility. "Waste Generated" in Sections 7.0, 13.0 & 19.0 refers to that generated at your facility while "Waste Received" in Sections 8.0, 14.0 & 20.0 refers to waste received from other facilities. In Sections 9.0, 15.0 & 21.0 entitled "Waste Processed/Reduced", the column labeled "%" refers to percent reduction from the original volume to the reduced volume. The columns labeled A thru H on each sheet require the use of the key provided on this page for completion. Please select the appropriate answer from this key and insert the corresponding number(s) in the space provided for each radionuclide.

To insure accurate compilation, please report data in accordance with the units listed. Thank you very much for your cooperation. Space for additional comments is provided on page six.

KEY FOR COMPLETING
YEARLY DATA SHEETS

SECTIONS 9.0, 15.0 & 21.0

[A] REDUCTION PROCESS

- 1 = Compection
 2 = Solidification
 3 = Evaporation
 4 = Adsorption (Ion Exchange)
 5 = Absorption
 6 = Incineration
 7 = Other

SECTIONS 10.0, 11.0, 16.0, 17.0, 22.0 & 23.0

[B] WASTE FORM

- 1 = Dry Solid(s)
 2 = Solid Liquid(s)
 3 = Nonsolid Liquid(s)
 4 = Scintillation Vials
 5 = Biological
 6 = Gaseous
 7 = Sealed Source
 8 = Other

SECTIONS 10.0, 16.0 & 22.0

[C] SHIPPING CONTAINER

- 1 = Kraft Container
 2 = 55 Gallon Drum
 3 = 30 Gallon Drum within
 55 Gallon Drum
 4 = Other

SECTIONS 10.0, 16.0 & 22.0

[D] ADDITIONAL HAZARD POTENTIALS

- 1 = Corrosive
 2 = Toxic
 3 = Flammable
 4 = Volatile
 5 = Explosive
 6 = Other

SECTIONS 10.0, 16.0 & 22.0

[E] DESTINATION

- 1A = Barnwell, South Carolina
 1B = Beatty, Nevada
 1C = Richland (Hanford), Washing
 1D = Other
 2 = Distribution in Product Form
 3 = Return to Vendor
 4 = Other

SECTIONS 10.0, 16.0 & 22.0

[F] TRANSPORT METHOD

- 1 = Facility Truck
 2 = Motor Express
 3 = Air
 4 = Rail
 5 = Other

SECTIONS 11.0, 17.0 & 23.0

[G] METHOD

- 1 = Release to Sewer
 2 = Combine with Common Refue
 3 = Incinerate to Atmosphere
 4 = Evaporate or Distill
 5 = Vent to Atmosphere
 6 = Bury On Site
 7 = Redistribute to Facility Users
 in Original Form
 8 = Other

[H] MONITORING INSTRUMENTATION

- 1 = Ion Chamber
 2 = Thermoluminescent Dosimetry
 3 = End Window > 1.4 mgm/cm²
 Geiger-Mueller
 4 = Thin Window < 0.5 mgm/cm²
 Geiger-Mueller
 5 = Gas Proportional Counter
 6 = Liquid Scintillation Spectrometry
 7 = Electron Capture
 8 = Other

1979

[illegible]

5-9

Comments & Remarks by Respondent:[illegible]

- 24.1 Subcritical Reactor
- 24.2 Critical Reactor
- 24.3 Power Reactor
- 24.4 Cyclotron
- 24.5 Linear Accelerator
- 24.6 Neutron Generator
- 24.7 Synchrotron
- 24.8 Van de Graaff Generator
- 24.9 Other _____
- 24.10 Other _____
- 24.11 Other _____

Comments & Remarks by Respondent:

[illegible]

VACHON, NIX & ASSOCIATES

6855 Jimmy Carter Boulevard
Building J, Suite 1020
Norcross, Georgia 30071
404/448-5235

VACHON, NIX & ASSOCIATES

SUBJECT: Low-Level Radioactive Waste Management Survey

Dear Licensee:

VACHON, NIX AND ASSOCIATES and the SOUTHERN STATES ENERGY BOARD, under a U.S. Department of Energy Contract, are developing State Briefing Books on Low-Level Radioactive Waste Management Issues. This project is being conducted with the encouragement of your State Radiological Control Officer as indicated by the attached letter. We need your help to ensure that your State issues are presented correctly. Thus, we ask you to provide us with data on the generation, handling and disposal of low-level radioactive wastes relative to your facility.

The enclosed questionnaire and return envelope are designed to help you provide these data. Please complete the form and mail to us within seven (7) days. I am sure you share my dislike for filling out forms. However, in this case we will be working together to ensure the safe and continued use of radioactive materials.

As soon as the project is completed for the twelve-state area of our survey, we will send the results to each of the states. Your State Radiological Agency will share the results with you.

Your facility will remain anonymous and data provided will be CONFIDENTIAL and reported in consensus and statistical form.

Thank you for your time and interest. Please call us at (404)448-5235 if you need assistance with the questionnaire, wish to ask questions or make specific comments relative to the project.

Cordially,

VACHON, NIX & ASSOCIATES

Reginald I. Vachon, Ph.D., P.E.
President

RIV/caw

DIVISION OF OPTIMAL SYSTEMS INCORPORATED
8855 Jimmy Carter Blvd., N.W. • Norcross/Atlanta, Ga. 30071 • Phone: 404-448-5235 • Telex: 708408 OPTIMAL NRCS

STATE OF NORTH CAROLINA
DEPARTMENT OF HUMAN RESOURCES
Division of Facility Services

JAMES B. HUNT, JR.
GOVERNOR

P. O. BOX 12200

RALEIGH 27608

L. O. WILKERSON, JR.
DIRECTOR
TELEPHONE

SARAH T. MONROU, M.D., M.P.H.
SECRETARY

AC 919/733-4283
Radiation Protection

ALL NORTH CAROLINA LICENSEES:

The U.S. Department of Energy (DOE) is conducting a survey of all Radioactive Material licensees in North Carolina. The purpose of this survey is to determine the amount and types of low-level radioactive waste generated in North Carolina and the current storage and disposal practices in connection therewith.

This survey will provide information for DOE's National Low-Level Radioactive Waste Management Program. An early return of accurately completed survey questionnaires is necessary for the success and usefulness of the survey. Your cooperation will be greatly appreciated.

If you have any questions concerning this survey, please contact the persons designated in the accompanying instruction letter.

A handwritten signature in cursive script that reads "Dayne H. Brown".

Dayne H. Brown, Chief
Radiation Protection Section

DHB:lwv

Enclosure

VACHON, NIX & ASSOCIATES

April 24, 1981

Mr. Dayne H. Brown
Chief
Radiation Protection Section
Dept. of Human Resources
P.O. Box 12200
Raleigh, NC 27605

Dear Mr. Brown:

VACHON, NIX & ASSOCIATES and the SOUTHERN STATES ENERGY BOARD appreciate your assistance to our project of developing a Briefing Book on Low-Level Radioactive Waste Management Issues for the state of North Carolina.

I have enclosed a copy of the survey package which is being mailed to all North Carolina Licensees today. This package includes your letter, a letter from VNA and the Low-Level Radioactive Waste Management Survey Form. After an elapsed period of twelve (12) days, follow-up phone calls will be made to selected non-respondents. Afterwards, thirteen (13) days will be allowed for a final response. Responses received after May 19 may not be included in data processing due to contractual time restraints.

Thanks again for your cooperation. If I can answer any questions, please call me at (404) 448-5235.

Cordailly,

VACHON, NIX & ASSOCIATES

John Allen Gunn
John Allen Gunn
Project Manager

JAG/caw
Enclosure

INTRODUCTION

The purpose of this study was to compile data on the generation, handling, and disposal of low-level radioactive waste in the State of North Carolina. A total of 375 licensees were identified as producers or users of radioactive materials in the state. The licensees range from an individual physician to a nuclear power generating plant. Each licensee was sent via the U.S. Postal Service a packet containing the "Low-Level Radioactive Waste Management Survey" and other information as explained in Chapter 5.0. Figure 5 is a copy of the survey.

Compilation of the data generated by the survey is reported in Tables 6.1 through 6.13. Respondents to the survey were identified by one of the following seven broad categories: (1) Medical, (2) Educational, (3) Industrial, (4) Critical Nuclear Reactor, (5) Federal Government, (6) State Government, and (7) Other Jurisdictions (political subdivisions). Data in each of the above tables are presented for each category. A large number of respondents chose to identify multiple operations within a category. Thus, it is impossible to correlate between tables. Error analysis programs corrected for this problem wherever and whenever possible, but data presented in each table should be treated independently.

Two basic types of tables are presented, one revealing qualitative and quantitative data and the other revealing only qualitative data. The first table presents information on quantity of waste shipped by category and individual isotope. The latter presents information on type of container used for shipping, frequency of shipments containing hazardous materials, and techniques for volume and activity reduction.

hazardous materials, and techniques for volume and activity reduction.

Table 6.14 provides a forecast for low-level radioactive waste based on the limited information produced by this study. Additional studies covering a minimum of 10 years and a higher response rate would be necessary to add the desirable credibility to the forecast.

6.1 Summary

Of the 375 licensees, 126 (33.60 percent) responded to the survey. Of the 126 responding, 61 percent reported no waste generated and 39 percent reported both generation and shipment of low-level radioactive waste.

The total millicuries of low-level radioactive waste reported shipped during 1978, 1979, and 1980 was 2,221,382, 4,608,735, and 7,934,133.

The major limitation of this study is the large number of licensees who failed to return the survey. Another limitation is the small percentage of licensees who indicated that they generated and/or received waste but considered the information proprietary and did not report data for their facility. A final limitation of this study is the failure to respond of licensees who are known to manufacture and/or fabricate devices or items containing radioactive materials or devices capable of producing ionizing radiation that could generate nuclear waste.

Table 6.1 Respondents Reporting Nuclear Waste

Table 6.1 represents only those respondents to the survey who reported shipping nuclear waste in one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the total number of licensees reporting shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category.

TABLE 6.1 RESPONDENTS REPORTING NUCLEAR WASTES IN NORTH CAROLINA

Facility	Number	%	Cumulative %
MEDICAL			
Hospital	15	68.2	68.2
Medical School	2	9.1	77.3
Physician	1	4.5	81.8
Clinic	1	4.5	86.4
Other	3	13.6	100.0
EDUCATIONAL			
University-College	4	100.0	100.0
INDUSTRIAL			
Manufacturing	7	38.9	38.9
Construction	1	5.6	44.4
Engineering	1	5.6	50.0
R & D	7	38.9	88.9
Others	2	11.1	100.0
CRITICAL NUCLEAR REACTOR			
Commercial Power Reactor	1	100.0	100.0
FEDERAL GOVERNMENT			
Military	1	25.0	25.0
Non-Military	3	75.0	100.0
STATE GOVERNMENT			
Other	1	100.0	100.0
OTHER JURISDICTIONS			
County	1	50.0	50.0
City	1	50.0	100.0
TOTAL	52		

Table 6.2 Respondents Reporting Use of Sealed Sources Not Producing Nuclear Wastes

Table 6.2 represents those licensees using nuclear materials in the form of sealed sources who reported not shipping nuclear waste during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of licensees reporting not shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. Examples of Sealed Source devices were Strontium-90 eye applicators (Physicians); Radium-226 needles (Physicians); Iridium-192 (Manufacturing; Well-Logging and State Governments); Cobalt-60 (Manufacturing); and Cesium-137 (Manufacturing).

TABLE 6.2 RESPONDENTS REPORTING USE OF SEALED SOURCES NOT PRODUCING
NUCLEAR WASTES FROM NORTH CAROLINA

Facility	Number	%	Cumulative %
MEDICAL			
Hospital	3	100.0	100.0
University/College			
Technical/			
Comm. College	1	50.0	50.0
Other	1	50.0	100.0
INDUSTRIAL	0	0	0
CRITICAL NUCLEAR REACTOR	0	0	0
FEDERAL GOVERNMENT			
Non-Military	1	100.0	100.0
STATE GOVERNMENT	0	0	0
OTHER JURISDICTIONS			
County	2	66.7	66.7
City	1	33.3	100.0
TOTAL	9		

Table 6.3 Respondents Reporting No Waste

Table 6.3 represents those licensees using nuclear materials who reported not shipping nuclear waste during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of licensees reporting not shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. The numbers reported in this table represented all licensees from all categories.

TABLE 6.3 RESPONDENTS REPORTING NO WASTE IN NORTH CAROLINA

Facility	Number	%	Cumulative %
MEDICAL			
Hospital	8	72.7	72.7
Clinic	1	9.1	81.8
Other	1	18.1	100.0
EDUCATIONAL			
University/College	5	55.6	55.6
Technical/			
Comm. College	2	22.2	77.8
Other	2	22.2	100.0
INDUSTRIAL			
Manufacturing	22	47.8	47.8
Construction	2	4.3	52.2
Engineering	10	21.7	73.9
Other	12	26.1	100.0
CRITICAL NUCLEAR REACTOR	0	0	0
FEDERAL GOVERNMENT			
Military	1	50.0	50.0
Non-Military	1	50.0	100.0
STATE GOVERNMENT			
Highway Department	1	20.0	20.0
Other	4	80.0	100.0
OTHER JURISDICTIONS			
County	2	28.6	28.6
City	5	71.4	100.0
TOTAL	80		

Table 6.4 Sealed Sources Producing Shipped Nuclear Waste

Table 6.4 represents those respondents to the survey who reported using nuclear materials as sealed sources and produced nuclear waste that was shipped during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of licensees reporting shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. The respondents represented in this table were from the Medical and Industrial categories. Devices using Iridium-192 or combinations with other isotopes were used at the licensee's site until a marked specific nuclear activity dropped. This usually took place between six months and a year. When the activity was sufficiently low to interface with the device, the licensee shipped it to the original manufacturer-fabricator for a new sealed source in accordance with the licensee's authorized specific nuclear activity. The survey indicates that several users of these types of devices repeated the process of packing and shipping the source for another after decay as many as four times in the three-year period covered by this study. Those who responded by answering the appropriate questions on the survey form indicated that the sources were sent to manufacturer-fabricators in Louisiana and North Carolina. Others responding did not indicate the location of the manufacturer-fabricator. Other sealed sources included Cobalt-60 and Radium-226 which were shipped for disposal.

TABLE 6.4 SEALED SOURCES PRODUCING SHIPPED NUCLEAR WASTE FOR
NORTH CAROLINA, 1978

Facility	Number	%	Cumulative %
MEDICAL	0	0	0
EDUCATIONAL	0	0	0
INDUSTRIAL			
Manufacturing	2	66.7	66.7
Engineering	1	33.3	100.0
CRITICAL NUCLEAR REACTOR	0	0	0
FEDERAL GOVERNMENT			
Non-Military	2	100.0	100.0
STATE GOVERNMENT	0	0	0
TOTAL	5		

TABLE 6.4 SEALED SOURCES PRODUCING SHIPPED NUCLEAR WASTE FOR
NORTH CAROLINA, 1979

Facility	Number	%	Cumulative %
MEDICAL	0	0	0
EDUCATIONAL	0	0	0
INDUSTRIAL			
Manufacturing	2	66.7	66.7
Engineering	1	33.3	100.0
CRITICAL NUCLEAR REACTOR	0	0	0
FEDERAL GOVERNMENT			
Non-Military	2	100.0	100.0
STATE GOVERNMENT	0	0	0
TOTAL	5		

TABLE 6.4 SEALED SOURCES PRODUCING SHIPPED NUCLEAR WASTE FOR
NORTH CAROLINA, 1980

Facility	Number	%	Cumulative %
MEDICAL			
Other	1	100.0	100.0
EDUCATIONAL	0	0	0
INDUSTRIAL			
Manufacturing	3	60.0	60.0
Engineering	1	20.0	80.0
Other	1	20.0	100.0
CRITICAL NUCLEAR REACTOR	0	0	0
FEDERAL GOVERNMENT			
Non-Military	3	100.0	100.0
STATE GOVERNMENT	0	0	0
TOTAL	9		

Table 6.4A Critical Reactors Producing Nuclear Waste Shipped From
North Carolina

Table 6.4A represents those respondents to the survey who reported shipping nuclear waste produced from a critical nuclear reactor and shipped during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of licensees reporting shipping nuclear waste specifically generated from a critical nuclear reactor. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. This table was generated from data reported by a licensee on pages 1 and 6 of the survey. Specific information relating to the use of critical nuclear reactors was reported in either Sections 2.4.1, 2.4.2, or 2.4.3 of the survey.

TABLE 6.4A CRITICAL REACTORS PRODUCING NUCLEAR WASTE SHIPPED FROM
NORTH CAROLINA

Facility	Number	%	Cumulative %
MEDICAL	0	0	0
EDUCATIONAL	0	0	0
INDUSTRIAL	0	0	0
CRITICAL NUCLEAR REACTOR Commercial Power Reactor	1	100.0	100.0
FEDERAL GOVERNMENT	0	0	0
STATE GOVERNMENT	0	0	0
TOTAL	1		

Table 6.5 Millicuries of Nuclear Waste Shipped by Facility Type

Table 6.5 represents those respondents to the survey who reported shipping nuclear waste produced from all sources and categories during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of millicuries reported shipped. When a specific category was not reported by any licensee, a 0 is shown for that particular category. Each isotope reported on pages 3, 4, and 5 of the survey was included in this table. Isotopes and totals for the three years are shown in millicuries. By using a validation program, multiple reporting of the same isotope and quantity has been corrected in the totals; i.e., respondents were found to report duplicated data in both the Medical category and Educational categories.

TABLE 6.5 MILLICURIES OF NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1978 BY FACILITY TYPE

Facility	Millicuries	% Of Total
MEDICAL		
Medical School	72	0.00
Other	538	0.02
EDUCATIONAL		
University/College	273	0.01
High School	0	0.02
INDUSTRIAL		
Manufacturing	125075	5.63
Engineering	1200	0.05
R & D	14202	0.64
CRITICAL NUCLEAR REACTOR		
Commercial Power Reactor	2080000	93.61
FEDERAL GOVERNMENT		
Non-Military	632	0.03
STATE GOVERNMENT		
Other	72	0.00

TABLE 6.5 MILLICURIES OF NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1979 BY FACILITY TYPE

Facility	Millicuries	% Of Total
MEDICAL		
Medical School	165	0.00
Other	280	0.01
EDUCATIONAL		
University/College	166	0.00
High School	0	0.01
INDUSTRIAL		
Manufacturing	128175	2.78
Engineering	7800	0.17
R & D	8467	0.18
CRITICAL NUCLEAR REACTOR		
Commercial Power Reactor	4453000	96.61
FEDERAL GOVERNMENT		
Non-Military	11127	0.24
STATE GOVERNMENT		
Other	165	0.00

TABLE 6.5 MILLICURIES OF NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1980 BY FACILITY TYPE

Facility	Millicuries	% Of Total
MEDICAL		
Hospital	31717	0.40
Medical School	89	0.00
Other	3478	0.04
EDUCATIONAL		
University/College	17560	0.22
High School	0	0.04
INDUSTRIAL		
Manufacturing	128010	1.61
Engineering	20000	0.25
R & D	4997	0.06
Other	20	0.00
CRITICAL NUCLEAR REACTOR		
Commercial Power Reactor	7725000	97.11
FEDERAL GOVERNMENT		
Non-Military	24300	0.31
STATE GOVERNMENT		
Other	89	0.00
TOTAL MILLICURIES FOR ALL 3 YEARS:		14786670

Table 6.6 Cubic Meters of Solid Nuclear Waste Shipped by Facility Type

Table 6.6 represents those respondents to the survey who reported shipping nuclear waste produced from all sources and categories during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of cubic meters reported shipped. When a specific category was not reported by any licensee, a 0 is shown for that particular category. Each isotope reported on pages 3, 4, and 5 of the survey was included in this table. Isotopes and totals for the three years are shown in millicuries. By using a validation program, multiple reporting of the same isotope and quantity has been corrected in the totals; i.e., respondents were found to report duplicated data in both the Medical category and Educational categories.

TABLE 6.6 CUBIC METERS OF SOLID NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1978 BY FACILITY TYPE

Facility	Cubic Meters	% Of Total
MEDICAL		
Medical School	2.46	0.01
Other	39.50	0.12
EDUCATIONAL		
University/College	2.56	0.01
High School	0.00	0.12
INDUSTRIAL		
Manufacturing	1.40	0.00
R & D	84.48	0.26
Other	0.39	0.00
CRITICAL NUCLEAR REACTOR		
Commercial Power Reactor	33000.00*	99.61*
FEDERAL GOVERNMENT		
Non-Military	39.50	0.12
STATE GOVERNMENT		
Other	2.46	0.01

* It is unlikely these figures are correct. The respondent either misplaced a decimal point, or more likely, reported cubic feet rather than cubic meters.

TABLE 6.6 CUBIC METERS OF SOLID NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1979 BY FACILITY TYPE

Facility	Cubic Meters	% Of Total
MEDICAL		
Medical School	3.56	0.01
Other	4.00	0.01
EDUCATIONAL		
University/College	3.66	0.01
High School	0.00	0.01
INDUSTRIAL		
Manufacturing	3.00	0.01
R & D	93.58	0.23
Other	0.45	0.00
CRITICAL NUCLEAR REACTOR		
Commercial Power Reactor	37000.00*	99.74 *
FEDERAL GOVERNMENT		
Non-Military	4.00	0.01
STATE GOVERNMENT		
Other	3.56	0.01

* It is unlikely these figures are correct. The respondent either misplaced a decimal point, or more likely, reported cubic feet rather than cubic meters.

TABLE 6.6 CUBIC METERS OF SOLID NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1980 BY FACILITY TYPE

Facility	Cubic Meters	% Of Total
MEDICAL		
Hospital	14.40	0.02
Medical School	6.08	0.01
Other	47.50	0.06
EDUCATIONAL		
University/College	6.29	0.01
INDUSTRIAL		
R & D	46.97	0.06
CRITICAL NUCLEAR REACTOR		
Commercial Power Reactor	80000.00*	99.86*
FEDERAL GOVERNMENT		
Non-Military	47.50	0.06
STATE GOVERNMENT		
Other	6.08	0.01

TOTAL CUBIC METERS FOR ALL 3 YEARS: 150338.20**

* It is unlikely these figures are correct. The respondent either misplaced a decimal point, or more likely, reported cubic feet rather than cubic meters.

** Because the commercial reactor volumes reported for all three years are apparently far too great, this total volume is also incorrect. If one assumes the commercial reactor volumes were reported in cubic feet, the reported three years cubic meter total would be about 4,260.

Table 6.7 Liters of Liquid Nuclear Waste Shipped by Facility Type

Table 6.7 represents those respondents to the survey who reported shipping nuclear waste produced from all sources and categories during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of liters reported shipped. When a specific category was not reported by any licensee, a 0 is shown for that particular category. Each isotope reported on pages 3, 4, and 5 of the survey was included in this table. Isotopes and totals for the three years are shown in liters. By using a validation program, multiple reporting of the same isotope and quantity has been corrected in the totals; i.e., respondents were found to report duplicated data in both the Medical category and Educational categories.

TABLE 6.7 LITERS OF LIQUID NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1978 BY FACILITY TYPE

Facility	Liters	% Of Total
MEDICAL		
Medical School	3505.00	12.65
Other	3700.00	13.35
EDUCATIONAL		
University/College	3520.00	12.70
High School	0.00	13.35
Other	0.00	0.01
INDUSTRIAL		
R & D	9793.00	35.30
Other	2.72	0.01
CRITICAL NUCLEAR REACTOR	0	0
FEDERAL GOVERNMENT		
Non-Military	3700.00	13.35
STATE GOVERNMENT		
Other	3505.00	12.65

TABLE 6.7 LITERS OF LIQUID NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1979 BY FACILITY TYPE

Facility	Liters	% Of Total
MEDICAL		
Medical School	4862.70	21.17
Other	1200.00	5.22
EDUCATIONAL		
University/College	4863.70	21.17
High School	0.00	5.22
	0.00	0.02
INDUSTRIAL		
R & D	5976.70	26.02
Other	3.64	0.02
CRITICAL NUCLEAR REACTOR	0	0
FEDERAL GOVERNMENT		
Non-Military	1200.00	5.22
STATE GOVERNMENT		
Other	4862.70	21.17

TABLE 6.7 LITERS OF LIQUID NUCLEAR WASTE SHIPPED FROM NORTH CAROLINA
FOR 1980 BY FACILITY TYPE

Facility	Liters	% Of Total
MEDICAL		
Hospital	1663.00	4.97
Medical School	5115.80	15.29
Other	5500.00	16.44
EDUCATIONAL		
University/College	5126.80	15.32
High School	0.00	16.44
INDUSTRIAL		
R & D	5436.66	16.25
CRITICAL NUCLEAR REACTOR	0	0
FEDERAL GOVERNMENT		
Non-Military	5500.00	16.44
STATE GOVERNMENT		
Other	5115.80	15.29

TOTAL LITERS FOR ALL 3 YEARS:

84143.22

Table 6.8 Percent Responses to the Survey

Table 6.8 represents all licensees responding to the survey. When a respondent reported no waste shipped during the three years of the study period (1978, 1979, and 1980), the respondent's survey was divided into one of two major separations in the computer processing. This table illustrates the two groups: no waste generated and waste generated.

STATE	NO WASTE GENERATED	WASTE GENERATED	CUMULATIVE FIGURE
North Carolina	61	39	126

Table 6.9 Nuclear Waste Shipped in Millicuries Isotopes

Table 6.9 represents those respondents to the survey who reported shipping nuclear waste produced from all sources and categories during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of millicuries reported shipped. When a specific category was not reported by any licensee, a 0 is shown for that particular category. Each isotope reported on pages 3, 4, and 5 of the survey was included in this table. Isotopes and totals for the three years are shown in millicuries. By using a validation program, multiple reporting of the same isotope and quantity has been corrected in the totals; i.e., respondents were found to report duplicated data in both the Medical category and Educational categories.

TABLE 6.9 NUCLEAR WASTE SHIPPED IN MILLICURIES FOR NORTH CAROLINA IN 1978

Isotope	1	2	3	4	5	6	7	8
H3	403	133	3872	0	370	33	0	4375
C14	73	123	3520	0	97	23	0	3740
NA22	3	1	0	0	2	1	0	3
P32	6	0	3294	0	6	0	0	3300
S35	110	0	21	0	110	0	0	132
CR51	6	6	179	0	12	6	0	197
I125	10	10	3316	0	0	10	0	3325
RA226	0	0	63	0	0	0	0	63
CS137	0	0	12	0	0	0	0	12
NI63	0	0	0	0	25	0	0	25
IR194	0	0	126200	0	0	0	0	126200
MN54	0	0	0	0	1	0	0	1
Other	0	0	0	2080000	8	0	0	2080008
TOTAL	610	273	140478	2080000	632	72	0	2221382

NOTE: SOME RESPONDENTS REPORTED IN MORE THAN ONE CATEGORY. THE CUMULATIVE TOTAL DOES NOT REFLECT DOUBLE ENTRIES.

1=Medical	5=Federal Government
2=Educational	6=State Government
3=Industrial	7=Not Specified
4=Critical Reactor	8=Cumulative Total

TABLE 6.9 NUCLEAR WASTE SHIPPED IN MILLICURIES FOR NORTH CAROLINA IN 1979

Isotope	1	2	3	4	5	6	7	8
H3	81	82	2866	0	10700	81	0	13648
C14	95	35	2999	0	69	35	0	3103
P32	27	7	1211	0	50	7	0	1268
S35	40	0	5	0	40	0	0	45
CA45	0	0	8	0	54	0	0	62
CR51	3	3	154	0	7	3	0	164
SE75	0	0	3	0	0	0	0	3
SR90	0	0	10	0	0	0	0	10
I125	189	39	1219	0	180	39	0	1438
RA226	0	0	114	0	0	0	0	114
CS137	0	0	486	0	0	0	0	486
NI63	0	0	0	0	27	0	0	27
IR194	0	0	132800	0	0	0	0	132800
AM241	0	0	2565	0	0	0	0	2565
Other	0	0	0	4453000	0	0	0	4453002
TOTAL	445	166	144442	4453000	11127	165	0	4608735

NOTE: SOME RESPONDENTS REPORTED IN MORE THAN ONE CATEGORY. THE CUMULATIVE TOTAL DOES NOT REFLECT DOUBLE ENTRIES.

1=Medical	5=Federal Government
2=Educational	6=State Government
3=Industrial	7=Not Specified
4=Critical Reactor	8=Cumulative Total

TABLE 6.9 NUCLEAR WASTE SHIPPED IN MILLICURIES FOR NORTH CAROLINA IN 1980

Isotope	1	2	3	4	5	6	7	8
H3	22453	5067	21	0	24100	66	0	43175
U234	428	389	2703	0	45	8	0	3136
NA22	600	600	0	0	0	0	0	600
P32	2010	2000	126	0	11	0	0	2137
S35	1020	1000	81	0	20	0	0	1101
K42	200	200	0	0	0	0	0	200
CA45	1000	1000	1	0	18	0	0	1019
CR51	1812	1804	33	0	12	4	0	1849
FE59	290	290	0	0	0	0	0	290
CO57	200	200	0	0	0	0	0	200
CO60	0	0	3000	0	0	0	0	3000
SE75	0	0	1781	0	0	0	0	1781
I125	4270	4010	251	0	0	10	0	4520
I131	1000	1000	0	0	7	0	0	1007
CS137	0	0	10	0	0	0	0	10
NI63	0	0	0	0	87	0	0	87
IR194	0	0	145000	0	0	0	0	145000
TOTAL	35284	17560	153027	7725000	24300	89	0	7934133

NOTE: SOME RESPONDENTS REPORTED IN MORE THAN ONE CATEGORY. THE CUMULATIVE TOTAL DOES NOT REFLECT DOUBLE ENTRIES.

1=Medical	5=Federal Government
2=Educational	6=State Government
3=Industrial	7=Not Specified
4=Critical Reactor	0=Cumulative Total

Table 6.10 Nuclear Waste Shipped Classified by Hazard

Table 6.10 represents those licensees reporting the use of nuclear materials in all forms who reported shipping hazardous forms of nuclear waste during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of licensees reporting shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. The number of times a shipment took place is represented in this table. Each hazardous classification reported in Sections 10, 16, and 22 of the survey are reported in this table. Potentially hazardous materials such as corrosive, toxic, flammable, volatile, and explosive materials are reported.

TABLE 6.10 NUCLEAR WASTE SHIPPED CLASSIFIED BY HAZARD FROM NORTH CAROLINA

Facility	HAZARD CLASS					
	Corros.	Toxic	Flamm.	Volat.	Exp.	N.S.
MEDICAL						
Hospital	0	1	1	0	0	0
Medical School	0	0	18	0	0	0
Physician	0	0	0	0	0	2
Other	0	18	0	0	0	0
EDUCATIONAL						
University/College	0	0	21	0	0	0
INDUSTRIAL						
R & D	0	1	25	1	0	0
Other	16	0	1	0	0	0
CRITICAL NUCLEAR REACTOR	0	0	0	0	0	0
FEDERAL GOVERNMENT						
Non-Military	0	21	0	0	0	0
STATE GOVERNMENT						
Other	0	0	18	0	0	0
TOTALS	16	41	84	1	0	2

Corros.=Corrosive

Toxic=Toxic

Flamm.=Flammable

Volat.=Volatile

Exp.=Explosive

N.S.=Not Specified

Table 6.11 Nuclear Waste Shipped Classified by Container Type

Table 6.11 represents those licensees using nuclear materials who reported the types of shipping containers used for transporting nuclear waste during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of licensees reporting shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. The number of times a shipment took place is represented in this table. Each container type classification reported in Sections 10, 16, and 22 of the survey are reported in this table. Shipping container types include Kraft containers, 55 gallon drums, 30 gallon drums within 55 gallon drums, and types not specified.

TABLE 6.11 NUCLEAR WASTE SHIPPED CLASSIFIED BY CONTAINER TYPE FROM
NORTH CAROLINA

Facility	CONTAINER CLASS			
	Kraft	55-Gal. Drum	30-55 Gal. Drum	Type Not Specified
MEDICAL				
Hospital	2	13	1	0
Medical School	0	0	18	0
Physician	0	0	0	2
Other	0	18	0	0
EDUCATIONAL				
University/College	0	11	27	0
INDUSTRIAL				
Manufacturing	0	5	0	7
R & D	0	33	6	0
CRITICAL NUCLEAR REACTOR	0	0	0	0
FEDERAL GOVERNMENT				
Non-Military	0	41	0	0
STATE GOVERNMENT				
Other	0	0	18	0
TOTALS	2	121	70	9

Corros.=Corrosive
Toxic=Toxic
Flamm.=Flammable

Volat.=Volatile
Exp.=Explosive
N.S.=Not Specified

Table 6.12 Nuclear Waste Shipped Classified by Physical Form

Table 6.12 represents those licensees using nuclear materials who reported the specific forms of waste shipped during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the number of licensees reporting shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. The number of times a shipment took place is represented in this table. Each physical form classification reported in Sections 10, 11, 16, 17, 22, and 23 of the survey have been tabulated in this table. The waste forms reported were dry solids, solid liquids, non-solid liquids, scintillation vials, biological, gaseous, and sealed sources.

TABLE 6.12 NUCLEAR WASTE SHIPPED CLASSIFIED BY PHYSICAL FORM FROM
NORTH CAROLINA

Facility	PHYSICAL CLASS							
	1	2	3	4	5	6	7	8
MEDICAL								
Hospital	0	0	0	0	0	0	0	20
Medical School	0	0	0	0	0	0	0	18
Physician	0	0	1	0	0	0	1	0
Other	0	0	0	0	0	0	0	18
EDUCATIONAL								
University/College	1	1	0	0	0	0	0	37
INDUSTRIAL								
Manufacturing	1	0	0	0	0	0	11	0
R & D	1	0	1	1	2	0	3	28
Other	3	0	5	6	0	0	0	2
CRITICAL NUCLEAR REACTOR	0	0	0	0	0	0	0	0
FEDERAL GOVERNMENT								
Military	0	0	0	0	0	0	0	18
STATE GOVERNMENT								
Other	0	0	0	0	0	0	0	18
TOTALS	6	1	7	7	2	0	15	159

1=Dry Solids

2=Solid Liquids

3=Non Solid Liquids

4=Scintillation Vials

5=Biological

6=Gaseous

7=Sealed Source

8=Type Not Specified

Table 6.13 Nuclear Waste Shipped Classified by Reduction Process Used

Table 6.13 represents those licensees using nuclear materials who reported the reduction process of the waste shipped during one or more years of the study period (1978, 1979, and 1980). The categories of facilities are the same. The numbers reported in the Total Column represent the total number of licensees reporting shipping nuclear waste. Percentages were computed for each category to equal 100 percent. When a specific category was not reported by any licensee, a 0 is shown for that particular category. The number of times a shipment took place is represented in this table. Each reduction process classification reported in Sections 9, 15, and 21 of the survey have been tabulated in this table. The reduction processes reported were compaction, solidification, evaporation, absorption and incineration.

TABLE 6.13 NUCLEAR WASTE SHIPPED CLASSIFIED BY REDUCTION PROCESS USED BY
NORTH CAROLINA

Facility	REDUCTION PROCESS						
	1	2	3	4	5	6	7
MEDICAL	0	0	0	0	0	0	0
EDUCATIONAL	0	0	0	0	0	0	0
INDUSTRIAL Manufacturing	0	0	0	0	0	31	8
CRITICAL NUCLEAR REACTOR	0	0	0	0	0	0	0
FEDERAL GOVERNMENT	0	0	0	0	0	0	0
STATE GOVERNMENT	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	31	8

1=Compaction

2=Solidification

3=Evaporation

4=Adsorption(Ion Exchange)

5=Absorption

6=Incineration

7=Method Not Specified

APPENDIX A: Annotated Bibliography

ANNOTATED BIBLIOGRAPHY FOR NORTH CAROLINA

Agenda, Introduction, Committee Membership and Report on the Processing of Institutional Low-Level Radiological Wastes. Draft Copy.
North Carolina. Technical Advisory Committee on Low-Level Radioactive Waste. Raleigh, NC. July 1980.

"No facilities for the disposal of hazardous or low-level radioactive wastes exist in North Carolina...If SC, NV and WA were to shut us off...we would be in a severe dilemma." A recommended approach is outlined. The report covers characterization of LLW, processing and disposal alternatives, a central incineration facility, centralized vs. local incineration; health and environmental aspects, siting, permitting, and licensing. The conclusion dwells on the use of incineration for LLW processing and disposal.

Control of Radioactive Material in North Carolina Transportation Accidents. Final Report. by F.A. Bryan, Jr. Research Triangle Institute; North Carolina State Board of Health. June 1973. FR-24U-754.

"Ninety-five percent of current radioactive cargoes are industrial and medical items." This report deals with routes for transport of all types of nuclear materials; agencies available to take action in case of transport problems; medical facilities to handle transport emergencies; assistance available from out-of-state sources; needs analysis and resource evaluation. "It is recommended that a contingency operational system for dealing with transportation accidents involving radioactive materials be developed...as the agency having the maximum expertise and technical development in the area, the Radiological Health Section be designated as the agency responsible for coordination and direction of the emergency operation."

Identification of Socioeconomic and Institutional Barriers to Radioactive Materials Transportation. Project One. Draft Two.

Southern States Energy Board Radioactive Materials Transportation Study. Atlanta, GA. October 6, 1980.

In the summary of relevant state statutes and regulations and state agency responsibilities for North Carolina, Chapter 104E, "North Carolina Radiation Protection Act" designates the State Department of Human Resources as the state radiation protection agency. 104E-15 authorizes the RPC to regulate the transport of radioactive materials.

Letter from H. Oakley of Chem-Nuclear Systems, Inc. to K. Nemeth,
Southern States Energy Board. January 21, 1981.

Attachment to letter shows computer print out of data relevant to volume of low-level nuclear waste generated by nine states, including North Carolina, for the years 1978-1980. A breakdown is also given for cubic feet of institutional wastes. Volume increases are shown in chart format.

List of DOE Radioisotope Customers With Summary of Radioisotope Shipments. J.S. Burlison. Pacific Northwest Laboratory; U.S. Department of Energy. Office of Health and Environmental Research. June 1980. (PNL-3274).

NC organizations listed include two in Winston-Salem (p. 6 & 13), two in Durham (p. 7 & 23), two at Research Triangle Park (p. 15 and 19), and one each located at Greenville, Hickory, and Chapel Hill.

Low-Level Waste: A Program for Action. Final Report. National Governors' Association Task Force on Low-Level Radioactive Waste Disposal. Washington, DC. August 1980.

"A regional solution, where disposal site would be determined by groups of states negotiating cooperatively, is the Task Force's preferred approach." "Six regional conferences should be organized as soon as possible." The alignment of states for the conference places North Carolina in the Southeast Regional Conference.

Low-Level Waste Management. Issue Brief. National Conference of State Legislatures. Office of Science and Natural Resources. August 1, 1980. (EV/WR/LO).

Table 2 showing waste volume distribution by state (1978) gives figures for volume/cubic meters and percent of total U.S. volume.

The 1979 State-by-State Assessments of Low-Level Radioactive Wastes Shipped to Commercial Burial Grounds. NUS Corporation. November 1980. (NUS-3440, Rev.1).

North Carolina tabulations for total low-level radioactive waste disposed of at commercial facilities are given in percentages by source. Commercial power reactor wastes, institutional wastes, industrial wastes, and government and military wastes (disposal of at commercial sites) are included.

North Carolina Governor's Task Force on Waste Management (Draft Report)

Raleigh, NC. February 1981.

"North Carolina ranks as the...fourth largest generator of low-level radioactive waste in the nation." "The Governor's Task Force on Waste Management recommends...the private sector be required to give title to the state for land... for...low-level radioactive waste...the Dept. of Human Resources and Natural Resources and Community Development develop additional siting criteria for the development and operation of low-level radioactive waste management facilities...the State of North Carolina pursue the regional compact approach with its neighboring states for the safe management of low-level radioactive waste...the Industrial Revenue Bond Act be amended...to make revenue bonds available for... low-level radioactive waste facilities."

Preliminary State-by-State Assessment of Low-Level Radioactive Wastes

Shipped to Commercial Burial Grounds. Rockville, MD: NUS

Corporation. February 1980. (NUS-3440).

For North Carolina tabulations are given for total low-level radioactive waste generated within the state by source. These include commercial power reactor wastes, institutional wastes from medical facilities and universities, industrial wastes, and government/military wastes (buried at commercial sites).

Report to the Governor's Task Force on Waste Management. Low-Level

Radioactive Waste Management in North Carolina (Draft). Technical

Advisory Committee on Low-Level Radioactive Management. Raleigh, NC.(?). September 1980.

Report reviews the problems of low-level radioactive wastes in the U.S., specifically relating to NC's low-level radioactive wastes, technology and strategy for waste management, risks and benefits, and licensing and regulatory responsibilities. Three recommendations: "develop an in-state disposal capability...pursue possible regional solution through interstate compacts...develop a plan for decentralized emergency interim storage."

Response to Radioactive Materials Transport Accidents. Interim Edition.

U.S. Department of Transportation. 1979. (DOT/RSPA/MTB-79/8).

Case history #3 covers train wreck near Rockingham, NC.

A Selected, Annotated Bibliography of Studies Relevant to the Isolation of Nuclear Wastes. Oak Ridge National Laboratory. Ecological Sciences Information Complex. September 1980. (ORNL/EIS-156/V1).

Item #366 (p.143) is an abstract of a report entitled "Geologic Evaluation of Waste - Storage Potential in Selected Segments of the Mesozoic Aquifer System Below the Zone of Fresh Water, Atlantic Coastal Plain, North Carolina through New Jersey."

Stable Isotope Sales: Mound Facility Customer and Shipment Summaries, FY 1979. Monsanto Research Corp., Mound Facility; U.S. Department of Energy. October 24, 1980. (MLM-2718).

Several divisions at Duke University as well as the Duke Medical Center at Durham are listed, along with the Research Triangle Institute, the University of North Carolina, and North Carolina State University.

APPENDIX B: General Bibliography

GENERAL BIBLIOGRAPHY

Addressing Public Concern in Siting a Regional Low-Level Radioactive Waste Facility. Waltham, MA: Energy Research Group, Inc. February 1981.

A Classification System for Radioactive Waste Disposal - What Waste Goes Where? Ford, Bacon & Savid Utah; U.S. Nuclear Regulatory Commission, July 1978. (NUREG-0456;FBDU-224-10).

Docket Book, (Fourth Meeting, Arlington, VA: September 8-9, 1980); (Fifth Meeting, Phoenix, AZ: January 8-9, 1981); (Interim Report, February 24, 1981). State Planning Council on Radioactive Waste Management. Washington, DC.

Evaluation of Alternative Methods for the Disposal of Low-Level Radioactive Wastes. U.S. Nuclear Regulatory Commission. Low-Level Waste Branch. July 1979. (NUREG/CR-0680).

Identification of Technical Problems Encountered in the Shallow Land Burial of Low-Level Radioactive Wastes. Evaluation Research Corporation; Oak Ridge National Laboratory. March 1980. (ORNL/SUB/80-13619/1).

Low-Level Radioactive Waste Management. Proceedings of Health Physics Society, 12th Midyear Topical Symposium. February 11-15, 1979. U.S. Environmental Protection Agency. Office of Radiation Programs. May 1979. (EPA 520/3-79-002).

Low-Level Radioactive Waste Management Report. Response to Public Law 96-573, the Low-Level Radioactive Waste Policy Act. U.S. Department of Energy. March 13, 1981.

Low-Level Radioactive Waste Technology. A Selected, Annotated Bibliography. Vol. 2. Oak Ridge Laboratory. October 1980. (ORNL/EIS-133/V2).

Low-Level Waste Management: A Compilation of Models and Monitoring Techniques. Volume 1-3. Science Applications, Inc.; Oak Ridge National Laboratory. April 1980. (ORNL/SUB-79/13617/2; SAI/OR-565-2).

Low-Level Waste: a Program for Action. Final Report of the National Governors' Association Task Force on Low-Level Radioactive Waste Disposal. National Governors' Association. August 1980.

Management of Low-Level Radioactive Waste. Volumes 1 and 2. Edited by M.W. Carter, et al. Based on papers presented at a symposium sponsored by Georgia Institute of Technology and others. May 23-27, 1977. Atlanta, GA. New York: Pergamon Press. 1979.

Managing Low-Level Radioactive Wastes: a Proposed Approach. EG&G Idaho, Inc; U.S. Department of Energy. August 1980. (LLWMP-1).

NRC Task Force Report on Review of the Federal/State Program for Regulation of Commercial Low-Level Radioactive Waste Burial Grounds. U.S. Nuclear Regulatory Commission. Office of Nuclear Material Safety and Safeguards. March 1977. (NUREG-0217).

NRC Task Force Report on Review of the Federal/State Program for Regulation of Commercial Low-Level Radioactive Waste Burial Grounds. Analysis of Public Comments. U.S. Nuclear Regulatory Commission. Office of Nuclear Material Safety and Safeguards. October 1977. (NUREG-0217. Supp.1).

Need for Greater Regulatory Oversight of Commercial Low-Level
Radioactive Waste. Report by the U.S. General Accounting
Office. August 16, 1978. (EMD-78-101).

The 1979 State-by-State Assessment of Low-Level Radioactive
Wastes Shipped to Commercial Burial Grounds. San Francisco,
CA: NUS Corporation. November 1980.

The Nuclear Regulatory Commission Low-Level Radioactive Waste
Management Program. U.S. Nuclear Regulatory Commission.
Office of Nuclear Material Safety and Safeguards. Septem-
ber 1977. (NUREG-0240).

Nuclear Waste Disposal. Hearings before the Subcommittee on
Nuclear Regulations. Part I. U.S. Congress, Senate. Com-
mittee on Environment and Public Works. 96th Congress, 1st
Session, September 11 and December 11, 1979. (Serial No.
96-H27).

Nuclear Waste Disposal. Hearings before the Subcommittee on
Nuclear Regulations. Part II. U.S. Congress, Senate. Com-
mittee on Environmental and Public Works. 96th Congress, 2nd
Session, January 23-24, 1980. (Serial No. 96-H27).

Nuclear Waste Facility Siting. Oversight Hearing before the Sub-
committee on Energy and the Environment. Session on Public
Participation and Equity in Nuclear Waste Facility Siting.
U.S. Congress, House, Committee on Interior and Insular
Affairs. 96th Congress, 1st Session, June 28, 1979. (Serial
No. 96-8, part V).

Preliminary State-by-State Assessment of Low-Level Radioactive
Wastes Shipped to Commercial Burial Grounds. Rockville, MD:
NUS Corporation. February 1980.

Programmatic Assessment of Radioactive Waste Management. Nuclear Fuel and Waste Programs. Gilbert/Commonwealth; Oak Ridge National Laboratory. June 1980. (ORNL/SUB-80/13837/3).

The Problem of Disposing of Nuclear Low-Level Waste: Where Do We Go From Here? U.S. General Accounting Office. Report to the Congress by the Comptroller General of the United States. March 31, 1980. (EMD-80-68).

Report of the Task Force on Low-Level Radioactive Waste. United States Radiation Policy Council. August 1980. (RPC-80-004).

Screening of Alternative Methods for the Disposal of Low-Level Radioactive Wastes. Ford, Bacon & Davis Utah, Inc; U.S. Nuclear Regulatory Commission. October 1978. (NUREG/CR-0308).

Shallow Land Burial of Low-Level Radioactive Waste. A Selected, Annotated Bibliography. Vol 1. Oak Ridge National Laboratory, Ecological Science Information Center. September 1978. (ORNL/EIS-133/V1).

A State-of-the Art Report on Low-Level Radioactive Waste Treatment. Oak Ridge National Laboratory. Chemical Technology Division. September 1980. (ORNL/TM-7427).

State-of-the-Art Review of Alternatives to Shallow Land Burial of Low-Level Radioactive Waste. Gilbert/Commonwealth; Oak Ridge National Laboratory. April 1980. (ORNL/SUB-79/13837/1).

Study of Chemical Toxicity of Low-Level Wastes. Main Report, Vol.1; Monographs, Vol.2. General Research Corporation; U.S. Nuclear Regulatory Commission. November 1980. (NUREG/CR-1793).

System Analysis of Shallow Land Burial. Code Manual. Vol. 1;
Technical Background, Vol. 2; Appendix, Vol.3. Science
Applications, Inc. U.S. Nuclear Regulatory Commission.
March 1981. (NUREG/CR-1963).

Technology, Safety and Costs of Decommissioning a Reference
Low-Level Waste Burial Ground. Main Report and Appendices.
Vols. 1 & 2. Battelle-Pacific Northwest Laboratory; U.S.
Nuclear Regulatory Commission. June 1980. (NUREG/CR-0570).

Understanding Low-Level Radioactive Waste. EG&G Idaho, Inc; U.S.
Department of Energy. November 1980. (LLWMP-2).

APPENDIX C: Selection of Newspaper Articles

Apr. 10, 1981

Hunt Offers Legislation On Wastes

*Bill Allows Treatment,
Storage Of Material*

By STEPHEN R. KELLY
Observer Raleigh Bureau

RALEIGH — After months of studying, weeks of writing and days of shoring up support, Gov. Jim Hunt revealed controversial legislation Thursday that he hopes will allow North Carolina to treat, store and perhaps reduce its own hazardous wastes and low-level nuclear wastes.

The legislation is designed to enable private developers to build disposal sites for the toxic byproducts of modern industries that Hunt said now are being shipped halfway across the country or, in some cases, dumped illegally.

North Carolina is the country's 11th largest producer of hazardous wastes and the fourth largest producer of low-level radioactive waste, but currently has no disposal sites.

Hunt said the legislation was necessary if the state intends to attract new industry, or keep the industry it already has.

"Unless we have a bill of this kind in place, we're going to start losing jobs," Hunt said Thursday. "Many industries have told us that if this (bill) doesn't happen, they are not going to be able to continue operations in this state."

Although Hunt stressed that the bill does not permit the state itself to build and operate disposal sites, it does contain a number of provisions to make that easier for private developers.

One would allow the state to condemn private land for use as a hazardous waste site if a developer finds land suitable for a disposal site, but can't find a willing seller.

Another would allow the state to override local ordinances that may zone out waste disposal sites as long as benefits have been clearly established, the developer has obtained the required permits and the governor approves.

Hunt said he expected the provisions to be used rarely, but said both were necessary to keep sites from being arbitrarily excluded.

They are also expected to be the most controversial portions of the bill, whose Senate sponsor, Sen. Russell Walker, D-Randolph, said would probably be formally introduced next week.

Hunt also said he expected the bill, if passed, to override local bills such as one introduced by Rep. Foyle Hightower, D-Anson, that would forbid hazardous waste sites in Anson County where the water table is less than 75 feet underground, the situation in most of the county.

Anson County is being explored by a Bellevue, Wash., company for a possible disposal site.

Besides the override and condemnation sections, Hunt's bill would set up a 15-member Waste Management Board to coordinate and oversee the disposal of hazardous wastes in the state.

The board also would help schedule hearings when a site is proposed for a disposal plant, and have the power to review any special taxes the bill allows cities or counties to levy to pay for any extra costs a plant might cause.

Other provisions allow the state to charge a fee that would pay to monitor a site after it is closed, and any other problems that might develop.

The bill also contains tax incentives to companies that find ways to reduce the hazardous wastes they produce.

Hunt's bill grew out a February report of the Task Force on Waste Management, which Hunt appointed last year to explore ways for North Carolina to dispose of its own hazardous wastes.

As the bill was being drafted, Hunt aides circulated draft copies of the bill to members of the task force such as local government and environmental representatives, potential opponents of some provisions who say they are now satisfied with the bill.

Nuclear Waste!

Investigation reveals trucks haul it through Burke without letting officials know

BY ANDY BRUCE

The 10-wheeler rolled through the town about half past 10 that morning. The truck, which had just made its way in from Wrens, braked at the crossing of 6th and Liberty, turned right and headed south.

As the lumbering vehicle neared the turnoff onto State Hwy. 24, the top of its over-sized load snagged a set of power cables, toppling two utility poles and uprooting nearby highway signs.

The driver was uninjured and his tractor-trailer undamaged. Power company officials estimated the cost of repair at \$800. All in all, a minor mishap.

There had been no traffic violation, so the driver simply filled out an incident report, listing his company's insurance handler and started off toward the highway toward Sardis and his destination beyond.

Normally, an accident of this type would be recorded in police logs and promptly forgotten. There was nothing about it worth remembering. No injuries, no charges, little damage.

Yet, there was something different about this accident. Not the driver. Not the truck. But the load, the contents of the load.

Nuclear waste.

The accident, which occurred Feb. 24, is in itself insignificant. The True Citizen overheard a comment about the accident and started an investigation which revealed the truck was carrying material with a low level of radiation. Its load represented no apparent threat to the health or safety of the community.

But the incident did serve a purpose. It documented the transportation of radioactive materials through Burke County.

For more than a year, some local officials, including Civil Defense Director Wilbur Singley and Police Chief Ray Broston, have been claiming that nuclear waste was being regularly carried through the county's populated areas as often as once a week. But repeated checks turned up no hard evidence to support their suspicions.

Neither Kem-Nuclear Services Inc., a commercial burial grounds for nuclear debris in Barmwell, S.C., nor the federal Nuclear Regulatory Commission nor the Department of Energy knew of any waste shipments routed through Burke at that time.

The Feb. 24 shipment proved the existence of at least one such load. But subsequent investigation by The True Citizen turned up still others.

The shipment in question was traced back to the Oconee Nuclear Facility at Seneca in northwest South Carolina, a generating plant owned and operated by the Charlotte, N.C.-based Duke Power Co.

According to Duke Power spokesman Mary Cartwright, nine separate shipments of low-level nuclear materials went from Seneca to Kem-Nuclear since January this year, all traveling routes through Burke County.

Two more waste transports are headed this way after April 1, Cartwright said. The exact shipping date is yet to be decided.

Despite the number of shipments brought through Burke in the last two months, Georgia Department of Transportation (DOT) officials say the routing of trucks hauling nuclear or hazardous materials through the area is a rare occurrence.

Spokesmen for the DOT's Enforcement Division say the Oconee shipments were brought through this area due to their size.

The trucks were carrying empty "spent fuel racks" too high to fit under overpasses crossing the South Carolina roadways leading from Seneca to Barmwell.

So they were routed into the state, taking Ga. Hwy. 17 at Lavonia and down through Elberton, Washington, Thomson and Wrens, then Hwy. 80 to Waynesboro and Hwy. 24 through Sardis to the road's junction with Hwy. 73. From there, it was over to U.S. Hwy. 301 and back into South Carolina.

As the name implies, a spent fuel rack is used to hold depleted fuel from a nuclear reactor. The rack is a box-like frame with gridded slots, designed to contain the thin, long fuel cartridges.

According to Cartwright, such racks are normally constructed of hollow metal rods, easily broken down for transportation. But the racks used at Seneca are made of solid materials and are difficult to dismantle. Thus, they are shipped intact.

Though they have been contaminated by their proximity with the nuclear fuel, the racks are considered low-level waste, which implies little hazard to those coming into contact with them.

Cartwright, however, says the classification "low-level" for waste is broad, encompassing everything from the gloves and boots of nuclear plant workers to actual parts of the reactor.

David Evenbach with Kem-Nuclear said the amount of radiation emitted by the racks is "minimal."

"Legally, under DOT regulations, you can transport waste giving off a maximum of 200 millirems per hour at the surface and 10 millirems per hour at a distance of six feet. The shipment sent in Feb. 24 had four exterior millirems per hour and half a millirem from six feet away, well below government standards," Evenbach said.

Putting the figures in perspective, he said the average annual dosage of radiation a person from this area might expect to receive is 120 millirems, a rem being the standard measure for radiation.

"When you're having an X-ray taken, you're getting 25-50 millirems per shot," Evenbach said.

Thus, government, power company and trucking officials explain the transportation of the racks through Burke as a rare situation brought about by special circumstances.

Chuck Mayer, vice-chairman of the nuclear division for Tri-State Trucking Co., one of the nation's largest transportation firms with headquarters in Joplin, Mo., said company-owned trucks carried more than 6,000 loads of nuclear materials last year.

The spent fuel racks brought through Burke were loaded on trucks leased from Tri-State by George Rhoads of Barmwell, an owner/operator of eight tractor-trailer rigs.

Of the 6,000 loads transported, Mayer said nearly all were taken along interstates and other major highways, a comment echoed by spokesmen for the NRC and the DOT.

However, the issue isn't all that clear at times.

When inquiring at the enforcement division about the shipments through the county, one official said that the office "would have never routed it through that way."

But after checking with colleagues, the official returned to the telephone with the clerk in the division's bridge department who had done the actual routing.

Of course, none of this explains the consistent assertion of local officials that trucks loaded with radioactive materials are a common sight on city and county roads.

According to Ray Wallace Jr., a radio dispatcher with the DOT's

radioactive or oversized loads are required to contact his office when moving such materials inside or into the state.

Wallace said drivers must supply detailed information as to their origin, destination, time of departure, estimated time of arrival, route, type of load, size of load and so on.

Further, if the drivers do not reach their destination within a reasonable time after they had planned to, they can face a fine of up to \$20,000 and 30 days in prison.

Wallace says all of this is to insure that the state has a good idea of where the vehicles are at all times.

But there is no restriction on the use of smaller, two-lane highways, providing the trucks have a good reason for traveling those routes, he said.

Wallace said, "If they're not oversized, they will take the interstates. But if they had pick-ups (to make), naturally, they'd leave the highway. You can't get to Baxley or Jesup on an interstate."

However, despite his claims of heavy restrictions on the transportation of nuclear materials, Wallace admits that drivers could take routes other than those laid out by DOT workers and that some trucks could enter the state without the department's knowledge.

Further, Mary Ann Robertson with the Enforcement Division, adds that while vehicles carrying high-level waste are required to have a special permit for each load they transport, the same restrictions are not placed on low-level waste.

"If they plan to carry low-level waste, all they have to do is file a letter of intent with the department annually," she said.

So there's really no easy way of knowing how much low-level material is transported through the county or even the state each year.

These statements don't exactly lend credence to the claims of local officials, but they don't detract from them either.

In other words, there is no readily-available evidence to support the claims, which leaves it pretty much where it was.

The only thing clear now is that nuclear waste does pass through Burke County.

Feb. 4, 1981

Residents hope for responses

By DOUGLASS DAVIDOFF

Staff writer

Western Wake County activists critical of a draft report by the Governor's Task Force on Waste Management say they hope the panel will start responding to their criticism when it meets tonight, Wednesday, February 4.

The area residents interviewed Sunday by The Cary News have spoken at several recent meetings, including a public forum in Raleigh last month sponsored by the state task force.

Gov. James Hunt appointed the task force last summer to

study problems of hazardous and low-level radioactive waste management in North Carolina.

The forum in Raleigh was one of several held by the task force to hear citizen comment on a draft set of recommendations on how the state should deal with hazardous wastes.

"I think the Governor's task force should take very seriously the public response to its draft report by extensively re-writing the document," said James Henderson of Apex, spokesman for the Western Wake for Energy Alternatives (WWEA). WWEA, concerned with nuclear power generation and

the waste produced by that industry, is three years old and has about 50 members, Henderson said.

Among the strongest-held opinions of Henderson and other area residents interviewed was that Hunt's task force should investigate storage of hazardous wastes in above-ground structures, rather than burying wastes in the ground.

"I think they're going to have to look at above-ground storage, research it and see where it's been done," said Alice Tanner of Cary, a member of the Wake chapter of the League of Women Voters.

The task force, which meets at 6:30 p.m. today in the Jane S. McKimmon Center at N.C. State University, is expected to begin analyzing citizen reaction from the week-long series of public forums in preparation for writing its final report to Hunt.

Henderson was one of about a half-dozen Cary, Apex and Morrisville residents who spoke during the task force's forum last month at Raleigh's Athens Drive High School.

Similar suggestions voiced at the forums should be compiled in print by the task force and given responses "so citizens will

feel their input is taken seriously," Ms. Tanner said.

The work of the task force could be important to area residents because a separate panel set up by the regional Triangle J Council of Governments has begun to look into the possibility of area disposal or storage sites for the wastes.

Wake County Commissioner Betty Ann Knudsen of Raleigh is a member of Hunt's task force and also chairs the Triangle J panel which spawned the group looking into hazardous and low-level radioactive waste problems in the Triangle.

Henderson, Ms. Tanner and

from waste panels

scientists David DeMaster and Thomas Rose of Cary have spoken at public meetings about the hazardous and radioactive waste problem.

Among the concerns voiced by them in separate telephone interviews Sunday were:

That the state should encourage reductions in hazardous and low-level radioactive waste production using economic incentives to recycle wastes or using incentives to lower waste generation.

That the N.C. Department of Commerce analyze potential new industries for the state with respect to their hazardous

waste production.

That industrial liability for production and storage or disposal of hazardous waste be extended beyond the 30 years recommended by the task force in its draft report.

Rose, an environmental scientist, said above-ground storage of hazardous wastes would allow for eyeball inspection for leaks and would encourage recycling of wastes by having them easily available for use in new manufacturing processes.

"What is considered a toxic waste today could be an invaluable resource five years

from now," said Rose.

He said the state was wise to consider how to manage the wastes now before more complex problems develop in the future.

DeMaster, a marine geochemistry professor at N.C. State University, said the task force should recommend the state collect data on the environment now, so officials in the future will know what air and soil conditions were now, prior to introduction of hazardous waste facilities.

"I don't think they've considered that at all," DeMaster said.

Feb. 4, 1981

Regional panel sets goals

A new regional hazardous and low-level radioactive waste planning committee met for the first time last week to set goals for its work.

About 45 people drawn from government, business and environmental groups met together Jan. 27 at the offices of the Triangle J Council of Governments at Research Triangle Park.

Triangle J is a regional planning agency covering Wake, Durham, Orange, Chatham, Johnston and Lee counties.

Hazardous wastes are either toxic, corrosive, or flammable.

Wake Commissioner Betty Ann Knudsen of Raleigh introduced Orange County Commissioner Donald Willhoit as the chairman of Triangle J's new subcommittee on hazardous and low-level radioactive waste management planning.

Mrs. Knudsen is chairman of Triangle J's solid and hazardous waste committee — the parent body of the new panel.

Many of the 45 people at the meeting were members of either the parent committee or the new subcommittee, but not necessarily both.

Among the goals discussed by the group would be means of choosing possible sites in Region J for disposal of hazardous or low-level

radioactive wastes generated in the region.

The panel will continue its work with a noon meeting Thursday at the Triangle J offices.

From Western Wake County, those attending the meeting included Don Huisingh of Cary, an N.C. State University environmental scientist; John Ogle of Route 4, Apex, an environmental engineer for International Business Machines Corp.; Thomas Rose of Cary, an environmental scientist for Eastern Technical Associates of Raleigh; Lavon Page of Swift Creek Township, representing the Conservation Council of North Carolina; Dick Wilson of Apex; James Henderson of Apex, representing the Western Wake for Alternative Energy group; and Alice Tanner of Cary, a League of Women Voters member.

Mrs. Knudsen described the body as a "roomful of experts."

Among the goals discussed by the panel were:

Determining types and quantities of hazardous wastes generated in Region J.

Determining ways to dispose of the wastes, including recycling, reducing waste output or identifying sites for disposal.

Public education on the topic and establishing an in-

tergovernmental relationship with the state government.

Willhoit said the Triangle J panel could refine for local use a report being completed by the Governor's Task Force on Hazardous Waste.

Mrs. Knudsen is a member of the panel set up by Gov. James

Hunt last year.

Bradley Barker, executive director of Triangle J, said the regional group could be influential if a waste disposal site is slated by state officials for the area.

DOUGLASS DAVIDOFF

MOORE COUNTY NEWS, Carthage, N.C.

Feb. 4, 1981

BRIEFS

WASTE TASK FORCE

The Governor's Task Force on Waste Management will meet from 6:30 to 10:30 p.m. Wednesday, Feb. 4, at McKimmon Center on Western Boulevard in Raleigh.

The task force will review the public comments and recommendations made at seven regional meetings held throughout the state in January on the draft report of the task force on how North Carolina should proceed to handle its hazardous and low-level radioactive waste problems.

ENVIRONMENT REPORTER - CURRENT DEVELOPMENTS
(Bureau of National Affairs)

Feb. 13, 1981

North Carolina

**STUDY GROUP ADVISES LEGISLATURE
TO GIVE PRIORITY TO WASTE MANAGEMENT**

RALEIGH, N.C. — (By a BNA Staff Correspondent) — A North Carolina legislative research commission Jan. 14 recommended that the state General Assembly give "high priority" to waste management legislation in its 1981 session.

The commission recommended the legislature enact laws governing the siting of disposal facilities for both hazardous and low-level nuclear wastes.

The group also recommended that the General Assembly, which convened Jan. 14, pass any other laws necessary to implement a comprehensive plan for managing hazardous and low-level radioactive wastes in the state.

In its report, the commission also advised that:

► The executive branch of state government should make necessary changes to assure an integrated approach to environmental management. Better coordination is needed between state agencies, the commission said.

► The General Assembly should enact laws to extend the fuel tax refund now allowed for concrete mixing vehicles to solid waste vehicles which compact solid waste while in motion.

► The legislature pass laws to define clearly the regulatory jurisdiction of local health departments and of the Environmental Management Commission concerning sanitary sewage disposal systems.

The commission said in some parts of North Carolina, developers of condominiums, apartment complexes, and large motels are using several sewage systems, rather than one.

The practice allows the developments to be regulated by local health departments rather than the Environmental Management Commission which has more stringent requirements in coastal areas.

Jan. 28, 1981

Radioactivity means a cross

By DOUGLASS DAVIDOFF
Staff writer

Hanford, Wash., and Beatty, Nev., — towns in the sparsely-settled American west — are hardly glamour capitals of America.

But what goes on in those far-away towns is the stuff debates in North Carolina are made of.

In a typical year, more than 1,400 55-gallon drums containing low-level radioactive wastes are shipped to Hanford or Beatty from laboratories in the Research Triangle of North Carolina, interviews conducted by The Cary News show.

Hanford and Beatty are locations of low-level radioactive waste burial sites, two of only three such sites in the United States.

The third site, at Barnwell in South Carolina, is not often used by Research Triangle labs because many lab materials used locally are not suited for burial in the soil at Barnwell.

Lab wastes typically include glassware, paper towels, animal carcasses — anything in a modern laboratory that could come in contact with radioactive materials used in experimentation.

The wastes are placed in drums and packed with absorbent materials to soak radioactive liquids.

In the Triangle, much of the radioactive material is used to trace the progress of drugs as they pass through the bodies of laboratory animals.

Shipping the drums out west is an expensive operation costing about \$200 per drum, said a spokesman for Duke University, one of the major waste producers in Wake and Durham counties.

But the drums may not be shipped to Washington much longer. A statewide referendum passed last November will gradually close the Hanford location over the next two years to all except in-state producers of low-level radioactive waste.

Political actions such as those has resulted in a movement among some industrial and public officials to explore the possibility of a low-level radioactive waste burial site in the Triassic Basin — a band of dense clay running through Western Wake County, Durham County, Orange County, Chatham County and Lee County.

Such a burial site could be a solution, government and private officials say, to a problem which threatens the area's research economy.

Establishment of a site could also boost the state's prestige when looking for industry, one industrial official said.

But environmental groups said at a public meeting in Raleigh last week that the state should discourage hazardous and low-level waste producing firms from settling in North Carolina.

In Wake and Durham counties, 13 facilities hold 15 state-issued licenses to handle radioactive materials which could result in generation of low-level radioactive waste.

In practical circumstances, though, only eight facilities actually produce low-level waste in the two-county area.

But those facilities include major employers in the Triangle, like Duke, N.C. State University, state government and a host of facilities at Research Triangle Park.

Duke, for example, ships about 100 barrels per month to Hanford, said Dave Jorgensen, an assistant radiation safety officer.

Duke is also the agent for the Piedmont Carolina region of the American Red Cross, based in Durham, said Don Bennett, the Red Cross's technical director in Durham.

The Red Cross produces about 12 drums a year of low-level radioactive waste in the course of its testing for hepatitis at the Durham facility, Bennett said.

A third license-holder in Durham is N.C. Central University, but the school produces a minimal amount of low-level radioactive waste — less than one cubic foot in a year — said Dayne Brown, head of the state's Radiation Protection Section.

In Wake County, there are three license-holders permitted to use the materials which could result in low-level radioactive waste.

But one of the license holders, DuPont, actually uses its materials on a test farm in Johnston County near Clayton, said Chuck Evans, a member of Brown's staff.

Herbicides and pesticides are tested on the Johnston County farm by the DuPont chemical firm, Evans said.

The two other license-holders

-country journey for wastes

in Wake County are both branches of state government.

The state Department of Human Resources uses several radioactive materials in its divisions of health and mental health, said Willie Lee, a health physicist.

But he said little radioactive waste is generated.

But N.C. State University is a major waste producer, shipping out about 220 drums of radioactive waste per year, according to figures provided by Brown.

Many waste producers are located in Research Triangle Park.

But two firms in the park —

Monsanto and Northrop — hold licenses to use the radioactive materials but do not produce much waste, spokesmen said.

Other firms do ship out waste. Chemical Institute of Toxicology ships about two drums of radioactive waste per month to Hanford, said a spokesman.

Becton-Dickinson produces about five cubic feet per month of low-level radioactive waste and ships it to Hanford or Beatty, a spokesman said.

A spokesman for Research Triangle Institute declined to specify how much low-level radioactive waste is produced by the research facility.

Jan. 21, 1981

Hazardous Waste Procedure At University Will Be Affected

By TODD COHEN
Staff Writer

As a generator of hazardous and radioactive wastes, the University will be affected directly by whatever hazardous waste management program emerges from the N.C. General Assembly.

Meanwhile, as the Governor's Task Force on Waste Management prepares to submit its final report — which will serve as the basis for eventual legislation — the University continues its current methods of waste disposal, postponing any changes until the state adopts a comprehensive plan.

The task force, which last week released a draft report, this week is holding public hearings throughout the state. The panel expects in mid-February to submit to Gov. James H. Hunt Jr. a final report incorporating the public response.

A country-wide problem that mushroomed into public consciousness several years ago with the Love Canal

tragedy in upper New York State, questions about the generation, disposal, and environmental and health effects of hazardous wastes have become priority agenda items for many states, including North Carolina.

With its rapid population and economic growth, North Carolina — now the tenth most populous state — has become a major producer of hazardous wastes, ranking fourth in the U.S. in low-level radioactive waste generation and 11th in hazardous waste.

According to the task force's draft report, medical, institutional and research facilities in the state — including the University — accounted for about 12 percent of the 202,000 cubic feet of low level radioactive waste generated here in 1979.

The total figure is expected to increase by a rate of 10 to 15 percent per year, the report estimates.

DONALD G. Willhoit, director of the University's Health and Safety Office, said that last year the campus.

(Continued on page 14A)

(Continued from page 1A)

generated about 8,800 gallons of hazardous wastes and 16,000 gallons of low-level radioactive waste.

Willhoit, who also serves on the Orange County Commissioners, believes that waste treatment and disposal facilities should be located near where hazardous materials are generated, to reduce both the potential risks and the economic and energy costs tied to transporting wastes.

He also feels that if a region wants to attract industry and the "plum" of economic growth, it should be prepared to handle the problems associated with the hazardous wastes that industry generates.

While the task force's draft report declared the need for at least one hazardous waste landfill, North Carolina at present has no sites for treating or disposing of hazardous and radioactive wastes. The task force left open the question of whether the state needs a landfill for low-level radioactive wastes.

The University — and other hazardous waste generators — thus must ship their wastes to the handful of disposal sites in the U.S.

Shipment can be a costly affair.

THE UNIVERSITY ships its radioactive wastes to a disposal site in Nevada, paying the Kentucky-based Nuclear Engineering Co. about \$135 per barrel. Willhoit said \$35 of the per barrel cost finances the purchase and shipment from Nevada of a special clay used to pack smaller containers in the barrels before shipment back to Nevada.

The University pays \$135 per barrel to Triangle

Resources Inc. to ship its hazardous waste to a disposal site in Alabama.

Willhoit said the University has taken several steps to reduce the volume and hazard of wastes that it ships.

By compacting, the University cuts in half the volume of its solid wastes, which comprise about two-thirds of the radioactive waste generated by the University, Willhoit said.

He said that to reduce the level of radioactivity in the waste it ships, the University stores temporarily radioactive materials with half-lives of 60 days or less (the period of time in which the radioactivity decreases by half).

He noted, however, that the chemical "bunker" behind Venable Hall, with a storage capacity equivalent to about 100 barrels, is about near to capacity, so that the University will be shipping all wastes for the foreseeable future.

The University eventually hopes to incinerate its wastes, but Willhoit emphasized that any move toward incineration should be tied to whatever statewide plan the General Assembly adopts, including a possible regional plan that might encompass several states.

Willhoit said incineration would be an "ideal" method for disposing of both radioactive and flammable liquids.

Willhoit also noted a major difference between the University and industrial generators of hazardous waste. While an individual industry generally produces a limited number of products on a fairly uniform assembly line, he said, the University's research efforts generate hazardous waste at about 800 to 1,000 locations, all of which pose unique disposal problems.

Establishing a uniform system for processing wastes thus is difficult, if not impossible, Willhoit said.

Jan. 21, 1981

Hazardous waste study causes big stink to local municipalities

By KATHY BRYANT
O-N-E Staff Writer

A state study of hazardous and low-level radioactive wastes will receive local opposition tonight at a public hearing in Charlotte.

"The majority of local governments would be in opposition," to a specific provision which may preempt local zoning ordinances, said Dee Blackwell, planning director for the Western Piedmont Council of Governments (WPCOG).

If a suitable site for hazardous waste disposal is found within a municipality, the state could override local zoning laws and establish the site, under the proposed provision.

"The cities have previously opposed the state whenever it wanted to override local zoning," said Blackwell. "If this is the appropriate time, we want to voice opposition."

Blackwell plans to attend the Charlotte meeting tonight, along with J. Ed Robinette, city manager of Conover, who will be representing the solid waste committee for the WPCOG and Conover.

"The City of Conover has in its zoning ordinance a section which says you cannot locate a site to store or dispose of hazardous waste within our jurisdiction that is classified as a hazardous waste under state or federal law," said Robinette, who is opposed to the provision.

Municipalities within the four-county Unifour area, represented by WPCOG, were polled by Blackwell and all opposed the provision which would allow hazardous waste to be deposited within city limits despite zoning laws.

The solid waste committee of WPCOG plans to take the same position as the North Carolina League of Municipalities, said Robinette. This po-

sition is "the ultimate authority to regulate land uses through zoning and related ordinances must remain with local governments and must not be supplanted, superseded, or circumvented by state law."

"We have used this position also in the 1980 General Assembly to kill a bill that would have done the same thing by permitting the secretary of human resources to permit group homes anywhere in the town or county, regardless

of zoning or any other laws," said Robinette.

Planning to attend the meeting in addition to Robinette and Blackwell are Worth Killian and James Hardin, representing the Catawba Soil and Water Conservation District supervisors.

The meeting, one of seven scheduled throughout the state, will begin at 7 p.m. at Ranson Junior High School, 5850 Statesville Road, Highway 21, near the

Continued on page 8

intersection of I-85 and I-77 in Charlotte.

Apparently little or no publicity has been given municipalities and counties in North Carolina about the study. "It seems that no one has gotten this memo about these hearings," wrote Robinette to members of the Conover City Council.

Blackwell is apparently the only person in the Unifour area who received a copy of the 70-page draft of the waste management study.

The study was created by the Governor's Task Force on Hazardous Waste Management and offers suggestions for solution of hazardous waste problems.

A final draft of the study will be presented to Governor Jim Hunt in February, following the public meetings.

According to the study, North Carolina ranks as the eleventh largest

generator of hazardous waste and the fourth largest generator of low-level radioactive waste in the nation.

"In the past, North Carolina generators have depended upon facilities in other states to treat and dispose of their waste materials, said the study. "These states are reducing the amount of out-of-state waste they will accept, and North Carolina must now take responsibility for managing its own waste. The state's future depends on its ability and commitment to seek an acceptable solution for this problem."

"A well-conceived and strictly enforced waste management system that provides for in-state treatment and disposal of these wastes will enable North Carolina to prevent Love Canals and future dumpings of PCB along its highways," said the study.

Jan. 11, 1981

Nuclear wastes

If you think New Hanover County has trouble getting rid of milk cartons and hambones, think about the problems of the states, which have to figure out what to do with nuclear garbage.

This is not the radioactive materials from bombs, but items such as clothing or cleaning materials that get slightly hot in hospitals, nuclear power plants, laboratories and so on.

As far as we know, these things are not terribly dangerous, but they have to be handled carefully and disposed of in ways that won't cause problems later. In the Southeast, most of these wastes are now being shipped to a landfill in South Carolina.

South Carolina's facilities are starting to get full, however, and it and eight other states in the region are trying to figure out a cooperative plan for disposing of such wastes in the future.

North Carolina is going to have to do its part, although that part is not yet determined. Like regular wastes, nuclear wastes can be burned carefully to reduce the volume that must be buried.

The prospect of burying radioactive trash in your county is not very cheering. But if we want the benefits we get from radioactive substances in medicine, research and power generation, we have to pay the price.

South Carolina has been paying it until now. It's time for the rest of us in the region to do our part.

THE CHARLOTTE NEWS

Jan. 21, 1981

County residents can discuss hazardous wastes at meeting

FROM NEWS STAFF REPORTS

Mecklenburg County residents will discuss hazardous and low-level radioactive wastes at a meeting at 7 tonight at Ranson Junior High School, 5850 Statesville Road. The school is north of the junction of Interstate 85.

Sponsored by Gov. Jim Hunt's Task Force on Waste Management, the meeting is designed to study the problems of waste management in the state.

Present will be members of the governor's 17-member task force — representatives from environmental and citizen groups, industry, the university system and state and local governments.

North Carolina ranks fourth in the nation in the production of low-level wastes, and 11th in the production of hazardous wastes.

Jan. 15, 1981

Letter To The Editor

Resident Opposes Radioactive Dump Site

To the Editor:

Recent news events and official reports indicate that Wake County or a nearby area will be the likely site for the storage of low-level radioactive wastes.

I have heard only two arguments in favor of this from any local citizens or officials. One is that every county has the duty to take care of its own wastes, and the second is that a radioactive waste dump generates a good deal of revenue for the local economy. Neither justification appeals to me.

For each county to take care of its own wastes is a responsible philosophy - no one wants to live with his neighbor's wastes - but the proposed site would be for a whole region, not just one

county. The concept of a regional site does make more sense than innumerable local sites because of the many problems of licensing, monitoring, etc., but a regional site, because of its potential danger, need not be placed in the midst of a rapidly urbanizing area.

A regional waste dump might inject two or three hundred million dollars into the economy over the next few decades, but is it worth the risk? What is a fair price tag for the possible loss of health, safety, and happiness?

Personally, I don't think we should put these up for sale at any price!

Peggy Blake
Rt. 2, Apex

Jan. 29, 1981

Citizens Must Do More Than

By Al Childress
Soil Conservation Service

Between 250-300 people attended a public meeting on managing low-level and radioactive waste in North Carolina, Tuesday, Jan. 20, at Greensboro. This meeting was one of seven held throughout the state by the Governor's Task Force on Waste Management. The purpose of the meeting was to provide the opportunity for public discussion of the task force recommendations and to receive the public's comments and recommendations.

Some of those providing the leadership for the session were: Forrest Campbell, chairman of the Guilford County Board of Commis-

sioners; Bill Meyer, environmental engineer, N.C. Department of Human Resources; Dr. Richard Witcoski, professor of radiology at Bowman Gray School of Medicine; Martan Nichols, president, League of Women Voters.

After several brief informative presentations the 300 people attending split into smaller groups of approximately 30 to provide the opportunity for each individual to have a chance to comment. The small groups had a cross section of the public with everyone from the housewife to the chemical company and power company represented. The discussion was brisk and heated at times.

The concern of the small

group needs to spread to the entire population of Stokes County. Since this meeting there have been rumors of a waste handling company seeking land in Stokes County. The rumors have been confirmed as truth.

Why should all be concerned? In the past North Carolina has depended on other states to treat and dispose of waste. These states are cutting back acceptance of out of state waste. North Carolina is 11th in the nation in generating hazardous waste and the fourth largest generator of low-level radioactive waste in the nation.

Hazardous wastes are everyone's problem; we either generate them or use them in a lot of our jobs. Each year

approximately 120 million gallons of hazardous wastes and 200,000 cubic feet of low-level radioactive wastes are generated in North Carolina. Some of the producers of hazardous wastes are the textile, furniture, printing, paper, chemical, and agricultural industries.

Stokes County tobacco production is highly dependent on the use of agriculture chemical production which generates hazardous waste as by-products. So even though we are not the producers, we are the users of a product, agricultural chemicals, and are not totally separated from the problem. At least one hazardous waste landfill is needed now in North Carolina

Say 'No, Not Here' To Dumps

and can be justified economically, the reason for the need being there are 1441 companies registered in North Carolina as generators of more than 2,200 pounds of hazardous waste each month. These firms employ 361,926 people and pay more than \$5 billion dollars in annual wages.

The hazardous waste issue will be with us from now on. The economy depends too heavily on a multitude of products we all use. The wise disposal of the waste is the problem now.

There are several possibilities: use of the by-products recycling; reduction in volume produced; burial (landfills); incineration; compaction; biological treat-

ment by micro-organisms.

There were 16 recommendations made by the Governor's Task Force on Waste Management. Several of those which may be of particular interest are listed below in abbreviated form.

No. 5 - The council of State be given the authority to condemn land for acquisition of suitable sites.

No. 6 - State laws be amended to override local zoning laws pertaining to siting of waste treatment, storage, and disposal facilities.

No. 2 - The Governor's Waste Management Board, composed of a representative group of people and chaired by the secretary of Human Resources, be created ...

No. 16 - Should the state legally impose a standard of strict liability for damages by generators, transporters, and operator of waste facilities?...

The problem needs your response to the Task Force, legislators, the Governor in the form of informed, concerned citizens.

Just saying no, not here, does not appear to be enough.

A copy of the draft report of the Governor's Task Force on waste management is on file at the local Soil and Water Conservation District office. You are welcome to come by and read the proposals and background information. Facts stated in this report are taken from the Governor's Task Force Report on Waste Management.

Jan. 28, 1981

Residents consider disposal

Western Wake County residents' opinions on how the state should deal with disposal of hazardous and low-level radioactive wastes were heard at two meetings early last week.

At least 20 Cary, Apex and Morrisville residents signed a roster of attendees at a Jan. 19 public meeting at Raleigh's Athens Drive High School sponsored by the Governor's Task Force on Waste Management.

The next night, 18 Cary and Apex residents discussed their opinions at a League of Women Voters meeting at a Cary home.

At both meetings, recommendations formulated in a draft report by the governor's task force were debated and criticized.

The task force's recom-

mendations could be important locally because a geological formation known as the Triassic Basin — running through Western Wake, Durham, Orange, Chatham and Lee counties, could be a suitable location for burial of low-level radioactive wastes, some area officials have said.

A concern of environmental groups is that ultimately, drinking water resources in the ground could be contaminated by toxic chemicals or radioactivity contained in the burial sites.

Two area groups at last Monday's meeting — Protect Our Piedmont Coalition and Western Wake for Alternative Energy — said wastes should not be buried, but should be stored in specially-constructed above-ground structures which can be easily monitored.

Bibby Moore of Morrisville pressed the above-ground storage view for Western Wake for Alternative Energy.

Jim Henderson of Apex, another Western Wake for Alternative Energy member, said state officials should be asked to discourage waste-producing industries from locating in North Carolina.

Wake Commissioner Betty Ann Knudsen, a member of the governor's task force and chairman of the Athens Drive meeting, said she was "delighted" at a turnout of about 400 people.

In an interview, she said she had heard the above-ground storage proposal before: "I was just surprised to hear it from so many people."

At the League of Women Voters meeting last Tuesday, an Apex resident said industries

— rather than government — should be encouraged to pay for disposal because the disposal cost would then be passed on to consumers.

Cary resident Marilyn Miller said the state government should be empowered to override local zoning laws to establish a waste disposal site.

"It's a neat way to keep it (establishment of a waste site) from happening, lobbying for local zoning veto," Ms. Miller said. "But it doesn't solve the problem."

The League of Women voters meeting in Cary was one of four such meetings sponsored in Wake by the League's Wake County chapter. The League has about 25 members in Cary.

The meeting last Tuesday was at the home of Pat Nedwidek, 947 Manchester Drive.

DAILY TAR HEEL, Chapel Hill, N.C.

Jan. 16, 1981

Public forum planned to discuss disposal

By DEAN LOWMAN
Staff Writer

How does a state dispose of a substance that may remain hazardous hundreds of years after its usefulness has been exhausted? Is there a safe method for hazardous and low-level waste disposal?

A series of seven town meetings across the state, sponsored by a task force appointed last year by Gov. James B. Hunt Jr., has been set up to allow citizens to comment on the task force's findings concerning the problems of waste management in the state.

The first meeting will be held at 7 p.m. Monday at Athens Drive High School in Raleigh. The school is located on Athens Drive off Advent Ferry Road, about 1 1/4 miles from the intersection of Western Boulevard and Advent Ferry Road at Mission Valley.

Hunt has said that the management of hazardous and low-level radioactive wastes is one of the most important issues of the decade. North Carolina ranks fourth in the nation in the production of low-level

wastes and 11th in the production of hazardous wastes.

Dr. Bernard Greenberg, chairman of the task force and dean of the UNC School of Public Health, said the town meetings were vital to his group's efforts.

The locations of the meetings were selected so that anyone in the state could attend at least one of them without having to travel a great distance from home. "We want to encourage everyone who possibly can to come," Greenberg said. "If we are to develop a system for safely managing our potentially dangerous wastes, we'll need the cooperation and involvement of almost everyone in the state."

But Bill Cummings, a leader of a citizen's group questioning the efforts of the task force, said the meetings were part of a "public relations" game.

"We have to consider the long-range effects rather than just the immediate effects like jobs or a stronger economy," he said. "The state is going to be faced

with an ever-increasing problem until we begin to look at both the benefits and detriments of new industries we're trying to get to locate plants here."

Cummings said the task force's report was issued only a couple of days ago. "How can the public speak intelligently about a subject it hasn't had the opportunity to study?" he said.

"Some of the task force members claim they don't want to alarm the public with a lot of technical information. Sure, some of it's technical, but it also affects our political, social and economic future."

A carpool is being organized by the citizens' group to go to Monday's meeting. It will leave from the Looking Glass Cafe in University Square at 3 p.m. For additional information call 929-8621 or 967-2356.

Jan. 6, 1981

States To Pursue Regional Pact On Nuclear Waste

By CLARK SERRATT
Environmental Affairs Editor

Representatives of nine southeastern states agreed Monday to pursue on a formal basis the establishment of an interstate compact to handle burial of low-level nuclear waste.

The Columbia meeting was arranged by Gov. Dick Riley and is the first such gathering in the nation to discuss forming compacts under an authorizing law passed by Congress last month.

David Reid, Riley's energy aide, said participants agreed to go back to their states

and secure the formal authorizations necessary to work toward a multi-state pact. Authorizing legislation by each participating state is required, along with an act of Congress, to ratify a compact.

"We agreed that as soon as possible each state ought to come back in a formal way, empowered to suggest legislation to form a compact," Reid said.

Two of the states represented Monday, Virginia and Kentucky, might not end up in a compact that would include South Carolina.

Reid said Virginia is hosting a meeting of its own to talk with some other states and that

Kentucky might ultimately be one of the states to form a compact with Virginia.

Other states represented in the Columbia meeting were Alabama, Georgia, North Carolina, Tennessee, Florida and Mississippi.

The meeting also included state and federal officials and representatives of Chem-Nuclear Systems Inc., operators of the burial ground near Barnwell where most of the low-level nuclear waste from the eastern part of the nation is now buried.

Low-level nuclear wastes are those less toxic radioactive materials generated by hospitals, laboratories, industries and power plants.

As he has preached for months, Riley told the representatives prior to the meeting that other states shouldn't depend on South Carolina to handle all their wastes indefinitely just because this state already has an operable burial site.

"No area is, nor should any area be, immune from sharing in that responsibility," said Riley. "This is a multi-state effort, and if everyone contributes, then no one will have a dangerous, undesirable situation."

Any state that feels that just because South Carolina has a site, South Carolina is the answer to the region's problems is not looking

at the entire situation," the governor said.

The new federal law makes each state responsible for disposing of its low-level nuclear wastes, including a veto power effective in 1985 on importing wastes from other states. But the law also allows for multi-state agreements on disposing of wastes.

Reid said the group did not get into the prospects of forming a compact to handle chemical and other hazardous wastes.

He said the state representatives agreed to meet again about March 1.

"Gov. Riley will notify each state's governor of our decision to proceed in a more formal manner," Reid said after the meeting.

Jan. 7, 1981

9 southeastern states OK pact on nuclear waste

COLUMBIA (AP) — Nine southeastern states have tentatively agreed to form a compact to handle disposal of low-level nuclear waste.

The state officials attended a meeting in Columbia hosted by Gov. Dick Riley on Monday. They agreed to meet again about March 1.

South Carolina currently has the only nuclear waste disposal site in the East in Barnwell. But Riley warned the other officials not to expect this state to shoulder that burden forever.

"Any state that feels that because South Carolina has a site, South Carolina is the answer to the region's problems ... is not looking at the entire situation," Riley said.

The meeting was the first in the nation to discuss forming interstate compacts under a new law passed by Congress last month.

David Reid, an aide to Riley, said representatives of the states agreed to return to their states and seek authorizations to work toward a regional pact.

Two states, Virginia and Kentucky, might opt for another compact, he said. Virginia is holding a meeting to talk with other states and Kentucky might enter the Virginia compact, Reid said.

Other states represented at the meeting were Alabama, Georgia, North Carolina, Tennessee, Florida and Mississippi.

Federal officials and representatives of Chem-Nuclear Systems Inc., operators of the Barnwell disposal site, also attended the meeting.

Riley said that all states in the region must participate if they decide to form a compact. "No area is ... immune from sharing in that responsibility," Riley said. "This is a multi-state effort and if everyone contributes, then no one will have a dangerous, undesirable situation."

THE CHARLOTTE OBSERVER

Dec. 17, 1980

Footnotes

Radioactive Wastes: State officials in the Carolinas have begun informal discussions of a possible two-state agreement to handle the disposal of low-level radioactive wastes. Such a compact, which could exclude other states, was authorized by legislation approved by Congress on Saturday. The legislation would become effective Jan. 1, 1986.

ENVIRONMENTAL SCIENCE & TECHNOLOGY

Dec. 1980

In-state landfill disposal will be pushed in North Carolina for low-level radioactive waste and for hazardous waste if the recommendations of 2 advisory committees are adopted by the Governor's Task Force on Waste Management. The committees recommended that the state develop shallow-land burial sites for radioactive waste, that regional solutions be pursued—particularly with South Carolina, whose nuclear power reactors serve North Carolina in part—and that a plan for emergency, on-site storage of low-level waste be developed to deal with a possible closing of currently available disposal facilities. They also recommended, for hazardous wastes, setting up in-state landfills and emphasizing prevention, recycling, and reduction of the waste burden. The full task force is to report to the governor on the first of next year.

Dec. 18, 1980

Waste Disposal Meeting Planned

By CLARK SURRATT
Governmental Affairs Editor

Representatives of nine states will meet in Columbia next month to talk about a regional program for disposal of low-level nuclear waste and hazardous chemical wastes. Gov. Dick Riley said Wednesday.

Riley said at a news conference the representatives will begin talking about a state compact for waste disposal. Such arrangements were authorized in legislation passed by Congress last week.

RILEY The other states involved in this meeting are North Carolina, Georgia, Florida, Tennessee, Virginia, Alabama, Mississippi and Kentucky. "We now have recognition by law to create a compact here in the Southeast," said Riley. "We will talk about low-level nuclear wastes and then hazardous chemical wastes."

The idea is to get states or regions around the nation to assume more responsibility for their own wastes, an issue Riley has been pushing for months.

South Carolina, with the state-licensed Chem-Nuclear Systems facility near Barnwell, now buries most of the low-level waste produced in the eastern half of the country.

Under the new law, individual states can begin refusing shipments from other states as of Jan. 1, 1986.

RILEY SAID HE had sought to get an earlier date, preferably 1984, for this important trigger mechanism in the law.

On other subjects, Riley said he will meet with representatives of the Carolina Brown Lung Association today to discuss recommendations by him and the South Carolina Industrial Commission to speed up the handling of byssinosis (brown lung) claims.

Riley said a major recommenda-

tion in the report is to have brown lung claimants get a state-paid medical examination immediately after filing for benefits. The examinations would be conducted by doctors at state medical schools, which can be done now but only after a lengthier process.

NOW, BROWN lung claimants must first pay for their own medical examinations. Then if there is a medical evidence dispute between the claimant and the employer, the evidence may be reviewed by a state medical school doctor.

Riley said it will cost about \$7,500 a year to pay for the examinations, and he will seek the funds from the State Budget and Control Board's contingency fund. He said when claims are upheld by the Industrial Commission, employers would reimburse the state for the initial medical exams.

The CBLA, which works on behalf of textile workers seeking compensation for lung damage from cotton dust, has been protesting the length of time it takes the Industrial Commission to process claims.

The governor said he will not name a special panel to study brown lung benefits, as Gov. James Hunt did in North Carolina, because "I chose to study it myself."

RILEY ALSO acknowledged Wednesday that the State Budget and Control Board, which he chairs, probably erred in approving money for staff operations for the State Board of Chiropractic Examiners last spring, two months before the board members were appointed.

"Technically, that might have been a bad decision," said Riley. "It was done a couple of months early."

Therefore, said Riley, the state Reorganization Commission did the right thing in requesting the attorney general to investigate the funding.

Riley said he did not recall the budget board's "going through a decision-making process on this; we have so many items on the agenda."

He said he didn't think the issue is "a situation of a high moral question."

Nuclear Waste

Major Problems Still Unresolved

WASHINGTON

By **ANDY PLATTNER**
Congressional Quarterly

Congress has decided to give the states the responsibility for burying low-level radioactive trash.

But it adjourned without deciding what to do about high-level nuclear waste or the mounting quantities of radioactive spent fuel burned by the nation's nuclear reactors.

Although radioactive garbage has been piling up in the United States for over 35 years, Congress had never developed a national policy for dealing with it. When it did finally pass its first nuclear waste bill in the last days of the recent session, it dealt with only one part of the problem—contaminated trash from hospitals, industries and power plants that use radioactive materials.

Efforts to pass a more comprehensive bill fell apart because key senators could not agree on how much say state governments should have—if any—over the burial of military nuclear waste within their borders.

Low-level wastes include radiation-contaminated paper, plastics, construction materials, tools, protective clothing, vials, solutions and industrial waste. They are generated in every state.

Under the bill that was passed, each state will be forced to deal with the problem of burying low-level wastes. States can build their own dumps or form regional compacts to establish mutual burial sites, the option most are expected to choose.

After 1985, these regional groups will be permitted to exclude waste from states that don't join the compact.

The federal government will continue to bury its own considerable production of nuclear garbage. The regional compacts could not make policies affecting federal waste, which comes mostly from making atomic weapons.

The only states with dumps where low-level nuclear waste can be buried now are Washington, Nevada and South Carolina, and they're getting tired of accepting the entire nation's output.

Washington residents voted Nov. 4 to close the disposal site at Hanford to out-of-state nuclear garbage starting next summer. The governor of Nevada has vowed to close that state's dump at Beatty. And South Carolina Gov. Richard W. Riley, whose state accepts the bulk of the nation's radioactive trash, has said it will accept less of it in the future.

Nuclear waste legislation appeared dead in the waning days of the 96th Congress, until Riley's office let it be known that the governor was considering closing the Barnwell, S.C., dump to out-of-state waste if Congress did not pass at least the low-level portion of the bill.

Riley's ally in Congress, Rep. Butler Derrick, D-S.C., put together an unusually forceful effort to secure passage of the low-level waste provisions in the midst of Congress' end-of-session debate over a pay raise for itself.

Derrick camped on or just off the Senate floor for more than nine hours on a December Saturday, grabbing key senators, persuading them that the low-level portion of the bill was needed. The Senate passed it that afternoon, and the House followed suit a few hours later.

While the nuclear industry, the utility lobby and the Carter administration were not unhappy to see the enactment of the low-level waste bill, they were disappointed with Congress' failure to set a national policy for the disposal of high-level wastes and spent nuclear fuel.

Nov. 5, 1980

Map shows Triassic Basin - with borders marked by dotted lines - cutting a swath through Durham, Wake, Chatham and Lee counties. The basin, made of thick clay which is practically impermeable to water, is thought to be suitable for a low-level radioactive waste burial site. The basin's border runs just west of Cary.

Burial site issue may be confusing

By DOUGLASS DAVIDOFF
Staff writer

In a laboratory at Duke University in Durham, a zoologist is finishing her experiment to trace aspects of blood circulation through a white mouse.

She places the mouse, the vials which contained a radioactive fluid injected to trace blood flow, and other materials used in the experiment in a special container. Anything which could be radioactive is placed aside.

The scene is the product of a reporter's imagination, but use of radioactive materials in research facilities at Triangle-area universities and in Research Triangle Park are daily occurrences, officials said last week.

Research institutions and medical facilities in North Carolina annually produce about 20,000 cubic feet of low-level radioactive wastes, according to state estimates.

North Carolina is the fourth largest producer of such wastes in the nation, according to the N.C. Department of Human Resources.

Most of the low-level radioactive wastes in the state are produced in the Triangle, a product of the research emphasis which has caused the area to blossom economically.

Dealing with low-level radioactive wastes in the past has been a fairly simple matter—at least in the public's mind—officials said.

The wastes were sealed in barrels and shipped to burial sites in Barnwell, S.C., Beatty, Nev., or Hanford, Wash.

"The problem as it now exists (is) these are the only three sites operating" in the country, said Capt. Bill Briner, an associate professor of radiology at Duke.

And the three sites have problems. They're filling up, or can't accept certain kinds of wastes or—in a couple of years—just won't accept any wastes except those from neighboring states, officials said in interviews last week.

This has led government, university and industrial officials in North Carolina to begin looking at how the state can dispose of its own low-level radioactive wastes.

Among the possibilities are shipping the wastes to sites that could serve a region of several states.

This has been suggested for the South Carolina site, the officials said, but the materials that Barnwell can accept are limited.

For example, according to Briner, a former Navy public health officer, about 50 percent of materials used in medical research at Duke can't be sent to South Carolina because medically useful solvents would seep through the soil at Barnwell and spread radioactivity.

State and local officials are also considering burial sites for low-level waste close to home. A committee of the Triangle J Council of Governments is

looking into the possibility of a burial site in the Triassic Basin—a geological location which runs through Wake and Durham counties.

A University of North Carolina at Chapel Hill geologist, Dan Textoris, has told the Triangle J committee that areas of the Triassic Basin may be suitable for burial of low-level radioactive wastes.

But officials say that a combination of politics and ignorance by members of the public will have to be addressed before a site can finally be established.

Establishing a site in the Triangle area may be easier politically, because local residents are aware of the importance of local research facilities, said Dayne Brown, chief of the N.C. Department of Human Resources' Radiation Protection Section.

"But it would still be a difficult task," Brown said.

Surprisingly, most low-level radioactive waste material produced in the area looks—more or less—just like ordinary garbage, Brown said.

The waste is lab animals, lab plants, lab equipment, empty containers that once contained radioactive material, paper towels and anything else associated with radioactive experimentation, he said.

"It's not particularly exotic by appearance," Brown said.

Other radioactive wastes—such as the under-publicized problems of used fuel rods from

nuclear power plants—are high-level radioactive waste, disposal of which is the federal government's responsibility, Brown said.

A low-level radioactive waste burial site in the Triangle area would probably consist of several trenches 500-1000 feet long. The material, sealed in barrels, would be buried as deep as 20-40 feet, Brown said.

Federal regulations require that possible burial sites be monitored for two years to determine their latent radioactivity.

Nov. 1, 1980

Nuclear waste shipping halted

CHARLOTTE — Duke Power must not ship highly radioactive nuclear wastes through North Carolina and South Carolina, a Nuclear Regulatory Commission licensing panel ruled Friday.

In an unprecedented decision, the panel said there is no guarantee that an accident will not release dangerous radioactivity along the 140-mile route from the Oconee, S.C., plant to the McGuire plant 17 miles northwest of Charlotte.

It said the commission staff failed to analyze adequately what nuclear opponents argued was a Duke master plan that could mean perhaps thousands of waste shipments between nuclear plants.

Specifically, the panel told Duke it couldn't send 300 shipments by truck from Oconee for storage at McGuire. Duke proposed the shipments three years ago to relieve overcrowded storage pools at the Oconee plant near Seneca, S.C.

The board found "there is not a reasonable assurance that the activities authorized or encompassed by the plan can be conducted without endangering the health and safety of the public."

The shipments would have followed highways I-85 and I-77, passing through northwest Charlotte, Gastonia, Greenville, S.C., and Spartanburg.

GREENSBORO DAILY NEWS

Nov. 5, 1980

Waste makes haste

A Nuclear Regulatory Commission panel has issued an order preventing the shipment of highly radioactive waste from one nuclear reactor to another for storage. Duke Power Co. is trying to counter that order by asking to truck expended but highly toxic fuel in 25-ton casks from its Oconee, S.C. plant to the McGuire nuclear plant near Charlotte. The shipments would be made in 300 separate bundles.

Meanwhile, Duke Power officials are searching for means to improve Oconee's waste storage capacity. They have begun the process of enlarging one storage area at Oconee. If the NRC approves the plan, Duke's Oconee's plant could operate until 1986. If the NRC prevents waste shipments beyond that time, Duke Power notes that its Oconee plant would have to shut down.

But its alternatives are, in fact, numerous. Duke could, for instance, build a new storage pool at its Oconee plant. Or, pending a change in current bans on commercial reprocessing, it could reprocess the waste at the Barnwell plant.

The commission's decision to block the planned shipment has pleased many folks who were worried about nuclear waste being trundled dangerously near their homes in North Carolina and South Carolina. The nuclear voyage was planned along Interstates 85 and 77 and N.C. 73 — a 140-mile route.

There was some speculation that the NRC did not take into account a Duke Power plan to shuttle waste shipment over the next 20 years. Duke Power denies that there is such a plan.

Duke Power spokesman Ira Kaplan noted, "The cumulative effect of additional shipments should be considered only if we should ask to go beyond 300 shipments. There's been 4,000 shipments since 1964 without any danger to anyone's health."

There is no "foolproof" method of nuclear storage. But the less distance the material has to be hauled, the better. Any steps which advocate the safest possible storage of this most hazardous of all wastes are, by definition, the best.

Nov. 27, 1980

Coalition Questions Reports

By MARY MARKELL
Staff Writer

A local citizens' group called two technical reports issued to the Governor's Task Force on Hazardous Waste Management "incomplete, inadequate and misleading" in a written statement Tuesday.

Bill Cummings of the Protect Our Piedmont Coalition said today the task force is not allowing enough public input and is more concerned with deadlines than "real issues like health and safety."

Bryant Haskins, staff to the task force, said today the coalition "seems to have genuine concerns but made a number of incorrect statements" in its statement presented to the task force.

Gary Pearce, press secretary to Gov. Jim Hunt called the coalition "totally uninformed," and said their four-page typed statement was "absolutely incorrect."

Cummings of the newly-formed coalition said today the task force is "trying to sneak something by the public. They've been moving very quickly. They claim we have an emergency with hazardous waste and we have to have sites for disposal immediately."

Haskins said the task force, which began work in July, is trying to prepare proposed legislation by February. But, he said, the group has spent "a fairly long time" studying the problem of low-level and hazardous nuclear waste in the state.

The task force has not issued a draft report yet, Haskins said, but had planned six to eight public hearings statewide on a draft report in January — before the coalition demanded such hearings Tuesday.

Haskins also said the task force mailed copies of the two technical advisory reports to more than 2,000 agencies and individuals for comments, and has compiled 20-30 pages of comments from environmental groups and other interested persons.

Cummings charged that the task force is, in effect, meeting in secret, as it meets during the day, when most working people cannot attend.

"The price of progress may be more than the people of North Carolina want to pay in terms of health and safety," he said.

Haskins contended, "But you can't have an all-day meeting if you meet at night." He said most or all of the January public hearings would be at night.

Cummings said the task force is saying most low-level nuclear waste in the state comes from medical and research uses, whereas task force figures show 88 percent of the low-level waste is generated by nuclear power and fuel fabrication plants.

Haskins said the coalition is confusing the task force with a Triangle J Council of Governments report that most waste in the Triangle area comes from research and medical uses.

Statewide, "most of it probably comes from power plants," Haskins, public affairs director for the state hazardous waste program, said.

The task force has not neglected health and safety aspects, Haskins said. One of the advisory reports included "six to 10 pages" on health impacts and an appendix with comments from an environmental epidemiologist.

Cummings said the Piedmont area is targeted as a likely place for a nuclear waste dump and the Orange-Durham-Wake counties area is being considered by the task force.

Haskins emphasized the task force has not yet issued a draft report or recommendations.

Cummings said the coalition is also working on stopping the Triangle J Council of Governments from locating possible waste dump sites in the Triangle area. A motion by Bev Kawalec tabled discussion of the item at Triangle J for a month, Cummings said.

Nov. 12, 1980

Nuclear Waste

North Carolina Should Dispose Of Its Own

United Press International

RALEIGH — The head of the Radiation Protection Section says the vote in Washington state to ban the importation of non-medical nuclear waste makes it even more important for North Carolina to find its own in-state dump.

More than an eighth of the 200,000 cubic feet worth of low-level radioactive waste produced in North Carolina annually goes to the site at Hanford, Wash., Dayne Brown said Tuesday. Although he did not know

much of that was medically related, he guessed it was about half.

By an overwhelming margin, Washington state's residents voted last week to shut out non-medical nuclear waste after July 1, unless otherwise permitted by interstate compact. The measure will keep Washington from becoming America's nuclear waste dump, its supporters argued.

Only two other sites in America, one in Nevada and the other in South Carolina — can handle non-medical radioactive wastes.

CP&L, GE cited as prime N-waste sources

To the Editor: The Wake County Commissioners have informed the Governor's Task Force on Waste Management that Wake County is willing to accept a storage facility for low-level radioactive wastes from across the state.

Public acceptance of such a facility will depend on public perception of the problem. I have noticed that whenever the news media report on the low-level radioactive waste problem in North Carolina, medical research and hospitals are almost always the first-cited sources of such wastes.

Where do these low-level wastes really come from? According to the task force's draft report, Carolina Power & Light Co.'s Brunswick nuclear reactors account for the lion's share (55 percent by volume, 95 percent by radioactivity). The General Electric nuclear fuel fabrication facility at Wilmington produces about 33 percent of low-level wastes by volume. So these two industries alone account for 88 percent of such wastes by volume and more than 95 percent by radioactivity.

Yet even the task force, in describing sources of low-level wastes, lists medical diagnostic and therapeutic procedures first and biomedical and pharmaceutical research second. No doubt both CP&L and GE, both of which are represented on the task force, prefer to obscure the source of these wastes. But the other members of the task force are providing no public service by letting them get away with it.

Moreover, the citizenry of Wake County may be willing to make some sacrifices for medical research and hospitals, but it's unlikely that they are in a mood to sacrifice much more for CP&L nuclear ventures.

LAVON B. PAGE
President
Conservation Council
of North Carolina

Raleigh

June 28, 1980

Duke Power Mistakenly Ships Radioactive Oil

CHARLOTTE (UPI) — About 40 gallons of slightly radioactive oil from Duke Power Co.'s Oconee Nuclear Station was delivered to a used oil dealer by mistake last week, Duke Power reported Wednesday.

Duke Power said that plant personnel discovered the error within hours of the shipment Friday and that the oil was being returned Wednesday to the Oconee Nuclear Station.

W.O. Parker, a Duke Power vice president, said that at no time did the radiation levels of the oil pose a health risk to the dealer, his employees or the public.

"Someone would have to sit on the oil tank truck for 422 hours to receive the equivalent radiation dose of one chest X-ray," Parker said.

The oil was removed from the Oconee Nuclear Unit No. 2 during maintenance. Although it was slightly radioactive it was marked as "clean oil" and taken to the plant tank for non-radioactive used oil, Duke Power said.

The oil was pumped into the oil dealer's truck along with about 2,200 other gallons of used, non-radioactive oil. The truck drove to a storage tank and 2,000 more gallons of oil was then picked up. All of the now-contaminated oil — 4,240 gallons — was being returned

to the Oconee Nuclear Station for storage Wednesday.

Duke Power said that the dealer's truck and storage tank would be cleaned to remove all traces of radioactivity.

The dealer asked that his company not be identified, Duke Power said.

In a prepared statement, Duke Power blamed the mistake on a technician at the plant who failed to follow Oconee's procedures for handling contaminated oil.

Parker said that station procedures were being reviewed to prevent a recurrence of the incident.

Duke Power said that the S.C. Department of Health and Environmental Control agreed to check the dealer's truck and tank to ensure that all traces of radioactivity had been removed.

In a related matter, the No. 2 unit at Oconee was returned to service Wednesday after nearly four months out of service for refueling and modifications required as a result of the Three Mile Island accident.

Ira Kaplan, a Duke Power spokesman, said that it would be a couple of days before the unit would reach full power.

Unit No. 3 of the three-unit plant was taken out of service June 15 because of a leak of small amounts of radioactive water. That unit is expected to be back in service early next month.

June 18, 1980

Watts Meets Requirements

State Wants to Test Buried Nuclear Wastes

By Charlene Havner
Journal Staff Writer

WILKESBORO — A state radiation protection official said yesterday that the state wants to monitor buried radioactive wastes that remain at a former waste-processing plant here.

Dayne Brown, head of the radiation protection branch of the Department of Human Resources, said his office is seeking an easement to the plant site so that it can periodically test the soil and water to ensure that the wastes do not contaminate them.

Brown said he expects to terminate Dr. Finley C. Watts' license to operate the plant this week. He said Watts has met the state's requirements by removing all unburied radioactive

materials and shutting down the plant. Watts must provide, however, one document proving that some materials were carried off before the license can be terminated, Brown said.

The state does not have the authority to require Watts to give it an easement to the property, Brown said, but has asked him to grant it.

Watts, a Winston-Salem physicist, said in a telephone interview that he is willing to give an easement to the property where the state says some 639 barrels of wastes are buried.

Watts closed the plant as part of a settlement to a lawsuit Wilkes County had filed against him after the county officials realized that he had

opened the plant without their knowledge. The county and the town of Wilkesboro agreed to pay Watts \$35,000 to close the plant.

Brown said the state did not require Watts to unearth the barrels because tests have shown that neither the radioactive wastes nor the toxic chemicals in the wastes pose a danger.

It wants to monitor them to ensure that the materials don't seep from the barrels into the soil or water, he said. The monitoring would be done quarterly at first and then, if no problems were found, less frequently, he said.

"It's a precaution," Brown said. "We want to be able to determine there is not and will not, in the future, be any problem with the buried materials."

The easement also would allow the state to mark the burial area to ensure that no one digs there and to record the area on the deed to the land, he said.

Brown said that state radiation officials inspected the plant last week and found that all radioactive materials above the ground had been removed.

Brown said that as soon as Watts provides the state documentation that he had the materials removed the license will be terminated. Watts said he planned to mail the document yesterday.

Watts still faces a lawsuit filed by 39 residents who live near the plant site. They are seeking \$185,000 in damages.

Oct. 16, 1980

Deadly Wastes Worry Laymen.

By KEN RIPLEY

The need for safe disposal of hazardous and low-level radioactive wastes is not an exciting topic around the family table, but the problem is an emerging social issue that affects the health and safety of all North Carolinians. How can we safely dump our wastes without poisoning our country?

The illegal PCB dumping two years ago along North Carolina highways, including several Nash County roads, gave North Carolinians a glimpse of the horrors that worry many scientists and public officials. The toxic chemicals embedded in the roadside remain a serious potential health hazard.

The PCB dumping, however, was minor compared to other ecological dangers surfacing around the nation. The emergency evacuation of hundreds of families near the Love Canal in Niagara Falls, New York, first focused national attention on the hazardous waste problem. Several tons of highly poisonous chemicals

were deliberately dumped in the sewer system in Louisville, Ky., closing the city's main sewage treatment plant for two months.

Within the state, Kernersville officials last week voted, against citizen opposition, to reuse the town's large 50-acre reservoir as a water supply source almost three years after the reservoir was contaminated by a major chemical spill and closed. Last week's news also included reports that more than 28 wells in eastern North Carolina showed signs of small but unacceptable levels of radioactivity.

The dangers of unsafe waste disposal are clearly not just hypothetical. Communities are already being threatened, and lives being destroyed, by the wastes that have already been improperly dumped—and tons of additional dangerous wastes are being generated every day. Where is it to go? And what would Spring Hope, Bailey, and Middlesex residents do if the groundwater supply under the towns was contaminated "untraceably"?

by improperly disposed hazardous wastes?

The problem is especially acute in North Carolina. According to state and federal officials, North Carolina is the nation's fourth largest producer of low-level radioactive wastes and 11th in generation of hazardous wastes. In low-level radioactive wastes alone, the state produces about 200,000 cubic feet of waste each year. The state's 1,300 generators of hazardous wastes produce about 1,000 cubic feet of waste per month.

What makes these wastes so frustrating is that they are so often inevitable and unavoidable. The low-level radioactive wastes, for example, are produced by facilities that provide health care, research, medical diagnoses, electricity, and other industrial products and processes. These wastes are the destructive by-products of a constructive society.

But we can't just ignore these wastes, either. Whether they are classified as radioactive, flammable, corrosive, reactive, or toxic, these wastes can destroy property and kill

Scientists Alike

people if they are not safely eliminated. And North Carolina is not yet able to handle its own wastes. As O.W. Strickland, head of the state's hazardous waste program, admitted, "For a long period of time we did nothing but bury our head in the sand."

Right now, North Carolina has no large-scale burial sites for either hazardous or low-level radioactive wastes. The state disposes all but a fraction of its radioactive wastes at three sites in South Carolina, Nevada, and Washington state. Some hazardous wastes are incinerated in Caldwell, and there are dozens of small-volume recycling centers for oils and solvents, but the closest burial site for hazardous wastes is in Pinelands, S.C.

Within a few years, moreover, North Carolina may have nowhere outside the state to dump its wastes. South Carolina is increasingly unwilling to accept any out-of-state wastes and is phasing down the amount of low-level radioactive wastes it will accept. There are strong moves in

Nevada and Washington to shut down their disposal sites altogether.

It is hard to blame these states for being unwilling to be the nation's dumping ground. So while the state should investigate a regional approach to waste disposal, North Carolina is really faced with the need to formulate a plan for the safe disposal of hazardous and radioactive wastes within its own borders. As one state scientist said, "The most sure system we can come up with is relying on ourselves."

That is exactly the recommendation released last week by two advisory committees to the Governor's Task Force on Waste Management, which proposed at least one hazardous landfill be located in the state. The task force will make its final recommendations for the disposal of hazardous wastes to Gov. Hunt by the end of the year.

These recommendations will need to answer many safety and health questions before they are adopted. The state is also exploring ways to safely incinerate or recycle hazardous

wastes to reduce the amount of wastes that need to be dumped.

But the problem of hazardous and radioactive wastes, while immense, is not unsolvable. As one task force leader said earlier this month, "The technologies are known, and these technologies are available." Safe landfills can be constructed. The questions scientists and public health officials now face do have answers.

What is important now, as the task force finishes its recommendations, is that all of us be aware of the seriousness of the problem and be willing to help in its solution, whether through more conscientious compliance with laws on waste disposal, reporting immediately all incidents of illegal "midnight dumping" like the PCB spill, or in the willingness of counties to accept a properly constructed landfill when a site is sought.

North Carolina really doesn't have any choice. Hazardous waste disposal may not be an earth-shattering social issue, but it is an earth-destroying problem we have to solve.

Deadline is given for handling waste

By CHARLES JEFFRIES
Sun Staff Writer

RALEIGH — Gov. Jim Hunt has given his 17-member Task Force on Hazardous Waste Management until Jan. 1 to make recommendations on how North Carolina should deal with its growing hazardous waste disposal problems.

But members of the task force's public participation and education committee feel that won't give them enough time to gauge public reaction to the problem and its solu-

tion, so they are hoping the governor can be convinced to give them more time.

At the fourth meeting of the task force yesterday, lack of time was mentioned by several members of the group as a major obstacle to giving the public input into the task force's recommendations.

Those recommendations eventually are to be shaped into legislation for consideration by the General Assembly, which convenes in early January.

John Curry of Carrboro is chair-

man of the public participation and education committee.

He told the task force yesterday his committee has concluded "that full and broad public participation will be a difficult task."

Curry said the committee has approved a number of television "spots" encouraging the public's participation in the task force's deliberations and those will be seen "in a couple of weeks."

But Curry, former president of the N.C. Conservation Council, sug-

gested that a number of public meetings should be held across the state to give residents direct contact with members of the task force.

"We have essentially a month to work on public participation," said Curry, "but we won't get it with normal channels of communication." He said he believes the public meetings will put the matter before the public.

Curry said the committee needed additional manpower to make sure the task force gets public feedback

on the recommendations made last month by its two technical advisory committees.

Those two committees, on hazardous and low-level radioactive wastes, suggested a number of ways the state can cope with its wastes, including building its own disposal site and entering into a compact with neighboring states.

Curry said the public should also be allowed to make comment on the final recommendations the task force will make to the governor, but

there appears to be little time to do both.

Another task force member, Wake County Commissioner Betty Ann Knudsen, suggested the early January deadline be extended to late January "in order to allow better public participation."

She suggested that perhaps the governor should be approached on extending the deadline by two of his appointees to the task force, Transportation Secretary Tom Bradshaw and Dr. Quentin Lindsey, his science and policy adviser.

Oct. 24, 1980

Nuclear Energy

ADVISORY GROUPS URGE ESTABLISHING IN-STATE WASTE DISPOSAL FACILITIES

RALEIGH, N.C. — (By a BNA Staff Correspondent) — North Carolina should begin to develop in-state disposal facilities for low-level radioactive waste and for hazardous wastes, according to draft reports from two advisory committees.

The committee reports will be the technical basis for final recommendations from the Governor's Task Force on Waste Management, appointed last summer by Gov. James. B. Hunt, Jr.

The 17-member group will report to the governor by Jan. 1, 1981 on the development of a comprehensive plan for safely managing and disposing of hazardous and low-level radioactive wastes generated in North Carolina.

Regional Solutions

In its report released Oct. 14, the advisory committee on low-level radioactive waste recommended that North Carolina also explore regional solutions to managing low-level wastes through pacts with neighboring states.

North Carolina ranks fourth in the United States in total volume of low-level radioactive wastes generated, but has no in-state disposal facility. Wastes are sent to facilities in South Carolina, Washington, and Nevada.

Slightly more than half of the low-level wastes produced in North Carolina come from nuclear power generation; 33 percent come from nuclear fuel fabrication; and 12 percent come from hospital and university research and treatment activities.

The committee said North Carolina needs its own comprehensive disposal program because "further reliance on the uncertain availability of the three operating disposal sites is unwise and not in the best interest of North Carolina's citizens."

The North Carolina system must be designed so that the state has continuous access to disposal, treatment, and storage facilities, the report said.

Regional Approach Favored

Regional arrangements would be less expensive and equally safe, compared to establishing a complete system of management within the state, the committee said. It cautioned, however, that a pact should stipulate that North Carolina waste generators could not be cut off from facilities outside the state's borders except for safety violations.

The report also stated that the regional compact should be developed quickly enough to assure use of regional facilities before present facilities used by North Carolina generators are closed or become less available.

The committee recommended that the state:

- Develop in-state disposal capacity by establishing a shallow-land burial disposal site for all low-level wastes. It said the state would take necessary legislative action and expand current regulations to provide specific licensing requirements.

- Pursue possible regional solutions by beginning negotiations with South Carolina and other states in the region. The committee recommended an option under which North Carolina would centrally incinerate all combustible wastes as well as wastes from South Carolina reactors serving North Carolina. Ash and noncombustible waste would be buried at incinerator locations.

- Develop a plan for decentralized emergency interim storage of low-level waste by generators onsite in the event that current facilities are closed or become less available.

Landfill, Recycling Urged

The advisory committee on hazardous waste management also advocated establishing an in-state disposal facility, but recommended that the state emphasize prevention, recycling for reuse, and reduction technologies to minimize the volume of waste to be buried in a landfill.

Although North Carolina is the eleventh-largest generator of hazardous waste in the nation, generators send their waste outside the state for disposal. The report estimated that the 4,000 to 6,000 industries in the state generate 120 million gallons of hazardous waste annually.

The committee recommended that state and local governments develop a comprehensive waste management system which emphasizes prevention, recycling, and waste reduction, and which ensures the protection of human health and the environment. It urged the state to continue to strengthen its ability to protect health and the environment through permits and regulations. Strong partnerships among all levels of government and the public and private sectors must be developed, the report said.

Oct. 12, 1980

Toxic Trash Our Own Responsibility

Not surprisingly, some people dislike the idea of establishing a storage site in the Triangle for low-level radioactive waste. Some will even be appalled if the idea gets to the stage of serious planning.

This is not surprising because the attitude is widespread and it is not by any means limited to nuclear waste.

Everybody wants the benefits of this and that, but everybody wants somebody else to pay the price in inconvenience, risk, esthetic loss or whatever. Prisons are deemed to be necessary, but no one wants a prison in the neighborhood. People want the jobs and prosperity that an industry brings, but no one wants the industrial plant next door. We want something done for our retarded people, but we shudder at the thought of having them housed where they intrude on us—where we have to look at them.

We want the convenience and commercial advantages of air travel, but no one wants the planes flying over his house. We want water and sewer service, we want our trash taken care of—but don't you dare build the sewer plant near our nice neighborhood, don't inflict the landfill on us.

This is a selfish, short-sighted attitude. It is an attitude that ultimately may be the undoing of us. It may not be an exaggeration to say that if we wake up some day and find ourselves back in the Stone Age, it will be because we were too selfish and immature to face our responsibilities in-

stead of endlessly shuffling them off onto someone else. We want the goodies, but we are unwilling to pay for them.

North Carolina ranks high in the generation of low-level nuclear wastes and other forms of toxic wastes. We can't keep on shipping our garbage off to other people to handle.

If the wastes cannot be handled safely here—if they pose too great a threat for our precious hides—then what moral right do we have to ask someone else to take the risk for us? If nuclear wastes cannot be handled safely here, then they should not be produced in the first place. We should be willing either to face up to our responsibility to handle our own garbage, or we should be willing to forgo the benefits of nuclear power production and medical uses of radioactive materials.

This newspaper believes that the wastes can be handled with relative safety. (There is no such thing as absolute safety—in anything.) This paper believes that the benefits to be derived from the peaceful uses of the atom outweigh the risks.

The establishment of a waste-treatment site in the Triangle—carefully managed and monitored—would not be a cause for clamor. If we had such a site here, we would still be much safer, in all probability, than people in such places as Goldsboro, a city cheek-by-jowl with an Air Force base where planes are armed with nuclear weapons. ■

Counties Told to Help Pick Sites for Waste

By Michael Skube
Journal Raleigh Bureau

RALEIGH — Sooner or later, counties must help decide where the state will dump hazardous and radioactive wastes.

That's the view of Sen. Russell G. Walker, D-Randolph, a member of the Governor's Task Force on Waste Management.

Walker said that hazardous wastes are a byproduct of things counties usually want — industry and jobs. Now, he said, counties must help the state do something about those wastes.

"They've put it off as long as they can," said Walker. "If

they (the states) want the jobs and the plants to be where they are, they're going to have to face up to that responsibility."

Walker said that rural Piedmont counties are likely places for landfills for radioactive and other hazardous wastes because of their soil conditions.

He and other members of the task force heard two committees recommend yesterday that North Carolina prepare to create those landfills. The committees did not recommend locations.

Only three sites in the country have federal approval to bury low-level radioactive wastes. One of those, in Washington state, is at the center of a referendum vote next month that could close it to almost all out-of-state shipments.

North Carolina now sends its low-level radioactive wastes to a site in Barnwell, S.C., but that state's governor has said that South Carolina cannot continue burying indefinitely radioactive wastes from other states.

Similar problems surround the disposal of hazardous wastes. Only two sites in the country have federal approval for burial, and the U.S. Environmental Protection Agency has told states they should become responsible for their own wastes.

Low-level radioactive wastes generally are residues from nuclear power plants or medical and scientific research facilities. Normally, they do not contain enough radioactivity to be dangerous, but the wastes must be dis-

Pick Sites for Waste

Continued From Page 19
burial, incineration or some other means.

About 400 companies or individuals in the state are licensed to produce low-level radioactive wastes, but none are doing so now, according to Dayne H. Brown of the Department of Human Resources.

Hazardous wastes are non-radioactive chemicals that are potentially toxic, explosive, flammable or corrosive. The state says that 4,000 to 6,000 companies are producing hazardous wastes.

As of Aug. 15, anyone

producing more than 1,000 kilograms of hazardous wastes a month must notify the U.S. Environmental Protection Agency and the state. As of Nov. 19, anyone transporting them must record on an EPA form the kind and amount.

As the amount of wastes increases and space to dump them decreases, states are looking for solutions — including the possibility of compacts among states to create regional sites.

The problem of waste disposal is acute for North Carolina because the state ranks fourth nationally in the production of low-level radioactive wastes and 11th in the production of hazardous wastes.

The Governor's Task Force, which Hunt named in July, will make recommendations to the governor in January and will suggest legislation to create sites for both radioactive and hazardous wastes.

The committee on hazardous wastes said that the state needs at least one landfill to put wastes that can no longer be recycled or compacted. It recommended that the state sound out private companies that might be interested but said the state should be prepared to acquire and operate a site on its own.

The committee on radioactive wastes left committee members and others thinking that it was making a parallel recommendation. Officials of the Department of Human Resources said later, however, that the committee was only recommending that the state be ready should no regional site be available.

The committee's report says, "North Carolina should begin work immediately on developing an in-state disposal capability."

Russell Edmonston of the Department of Human Resources said that the committee meant only that the state should go through the legal mechanics. "Initially, we went into it thinking the idea was for North Carolina to be able to handle its own," Edmonston said. "Then, as we looked at it, the regional compact looked better and better."

Oct. 7, 1980

County Land 'Prime' For Nuclear Dump

By BARBARA FRIEDMAN
Herald Staff Writer

Durham County's land is the best available in North Carolina for burying low-level radioactive waste, a geologist said Monday.

Durham County Commissioner William Bell, who has heard the geologist before, said that "Durham County looks like a prime area as storage area."

The county commissioners listened Monday to Dr. Daniel Textoris, assistant dean of the geology department at the University of North Carolina, and Mark Burnham, a planner with the Triangle J Council of Governments.

North Carolina ranks fourth in generation of low-level radioactive waste, Burnham said. He said nearly all the waste is produced in the Research Triangle Park or at area universities, particularly Duke.

Textoris said the guiding rule is the buried material "has to be kept dry." If it gets wet, it increases the possibility of waste getting into drinking water, he said.

The area's non-porous soil—such as clay—would help prevent that, Textoris said, and the terrain lends itself to the type of runoff considered desirable.

Textoris talked briefly of how the sites would have clay liners. Burnham said the waste would be buried in drums in sites run according to federal rules.

Burnham referred to a Triangle J memorandum that said monitoring of possible sites should begin. The memorandum said the area under consideration also extends into Wake, Lee, Chatham and Orange counties. (Triangle J consists of these, and Johnston and Durham counties.)

Two years of monitoring the sites for suitability is required under federal rules.

Burnham talked about the Triangle J memorandum as "an initiative" rather than "a response" to dealing with the problem of disposing of such waste. He said no sites have been chosen.

The memorandum said "a monitoring program for several sites, with perhaps two or three on CP&L (Carolina Power and Light) acreage near Shearon

Harris (Nuclear Plant) should be undertaken.

"Another appropriate area for monitoring of potential sites would be the Research Triangle Park and its environs," the memorandum said.

Durham County appeared to be the largest entity on the geologist's map describing the suitable land.

Burnham noted the shutdown of dumps around the country, and that only three are left—in Washington state, South Carolina and Nevada. He said the future of those is uncertain.

Locating the site in this area would save much of the approximately \$1 million North Carolina universities and companies spend on disposal each year, Burnham said. He said "a large portion" of that pays for transporting the waste long distances.

Burnham said the county with the burial site would earn considerable revenue.

William Briner, an associate professor of radiology at Duke, said 202,000 cubic feet of low-level radioactive waste were produced in the state in 1979. Briner also heads an advisory committee on low-level radioactive waste management that will report to the Governor's Task Force on Hazardous Wastes.

Briner said "it's very premature" to point to Durham County as a likely site for burying low-level radioactive waste. "The actual siting is still ahead," he said.

Briner disagreed with Burnham on the source of most of the waste. He said 55 percent comes from Duke Power's nuclear power plants. That waste isn't the high-level waste from spent fuel rods, he said.

Conrad Knight, radiation safety officer for Duke, said the medical center and university produce 9,000 cubic feet of low-level waste each year and spend about \$90,000 to transport it to Washington state for disposal.

Sept. 16, 1980

Southern Governors Want Regional N-Dump Sites

By Free Press
Constitution Staff Writer

WILLIAMSBURG, Va. — Southern governors called for federal legislation Monday to permit compacts between states to create regional dumping sites for low-level nuclear wastes in an effort to put an end to long-distance shipping of radioactive materials.

The governors, attending the 46th annual meeting of the Southern Governors Association, also heard widely conflicting reports on the effectiveness of existing energy legislation. A University of Texas professor blamed federal legislation for energy shortages, while federal experts said the fault lies with industries reluctant to spend the money to create new energy supplies.

Meeting with the Regional Energy Advisory Board, the governors unanimously approved a motion by South Carolina Gov. Richard Riley calling for interstate compacts to set up regional centers for the disposal of low-

level radioactive wastes.

Existing federal law now prohibits states with nuclear waste sites from stopping other states from dumping their nuclear wastes, because such action would limit interstate commerce.

Georgia, and most other Eastern states, now dump their low-level nuclear wastes at a facility known as the Savannah River Plant in Barrow, S.C., just across the

Georgia border.

But South Carolina, reluctant to become the nuclear dumping ground of the nation, has just passed state legislation limiting the amount of low-level radioactive waste that can be dumped in the state.

The nation's other two low-level nuclear dumping sites are located in Washington and Nevada — but both sites are the subjects of heated local

debate.

In Washington, a referendum has been proposed to forbid transportation of low-level nuclear waste into the state after 1984 unless the other states have entered into an interstate compact with Washington.

Energy experts explained to the governors that nuclear waste can be disposed of in several ways, ranging from burial under several feet of

dirt to incineration — the latter for less hazardous waste.

The governors suggested states involved in compacts could share responsibility for waste disposal, with the state having an incentive for burning radioactive waste, another having a dump site for low-level waste, and a third having the capability to dispose of high-level nuclear waste.

Most of the high-level nu-

clear waste currently generated in the United States is being produced by nuclear power plants and is being stored on site at the plants, although such storage space is running out.

Gov. James Hunt of North Carolina predicted that nuclear waste generated in medical fields will soon "back up in every hospital in the nation" unless low-level dumping sites are created.

THE CHARLOTTE
OBSERVER

Oct. 17, 1980

N.C. Advised To Plan Its Own Waste Dump

North Carolina should get on with plans for its own low-level

radioactive waste burial site in the event it can't depend on South Carolina or other states to accept N.C. wastes.

That is one of several recommendations made by an advisory committee to the Governor's Task Force on Waste Management. The committee

didn't suggest any sites for a facility.

"We just want to get everything in place (in case other options fall through)," said Russ Edmonston of the Department of Human Resources.

ENVIRONMENT REPORTER - CURRENT DEVELOPMENTS
(Bureau of National Affairs)

Aug. 15, 1980

Nuclear Energy

**NRC FINES UTILITY FOR IMPROPER HANDLING
OF LOW-LEVEL RADIOACTIVE WASTE AT PLANT**

RALEIGH, N.C. — (By an Environment Reporter staff correspondent) — The Nuclear Regulatory Commission August 1 levied an \$89,000 fine against Carolina Power & Light Company for improperly handling low-level radioactive waste at its Brunswick Nuclear Plant in Southport.

An NRC inspector in April discovered low-level material from the plant buried in the Brunswick County public landfill. Contaminated material also was discovered at two salvage yards (Current Developments, May 9, p. 51).

Federal officials said the levels of radioactivity observed in the recovered material were not hazardous to public health.

In a letter notifying CP&L of the fines, NRC Enforcement Director Victor Stello said, "Although the actual quantities

of radioactive material found in unrestricted areas (the landfill and salvage yards) were relatively small, the public health and safety could have been adversely affected had some of these articles found their way into personal use in the private sector."

The \$89,000 fine was for 16 incidents of improper handling of radioactive waste from mid-1978 to April 1980; for eight infractions of rules pertaining to protection of plant personnel; and for three violations of rules on posting warning notices in work areas.

A CP&L spokesman August 4 told Environment Reporter the company had not had time to review the fine and had not decided on a response. The company has 25 days to decide whether to pay or to protest all or part of the fines.

NUCLEAR NEWS

Sept. 1980

By far the largest fine amount—\$89 000—was aimed at Carolina Power and Light Company. An April inspection brought out an allegation that the utility had, on at least 16 separate occasions dating back to mid-1978, failed to screen adequately materials disposed of at the Brunswick plant. Some material from the plant, delivered to a sanitary landfill near Southport, N.C., was found to be radioactive. The utility had previously made shipments to landfills in Goldsboro and Wilmington as well, also with radioactivity too high to permit unrestricted use. The fine also includes 11 radiation protection infractions concerning the plant site and personnel. Earlier this year, other radiation protection shortcomings at Brunswick led to a fine of \$24 000, which the utility has paid. CP&L had until August 26 to decide whether to pay or protest the larger fine, and at press time had not decided.

NUCLEONICS WEEK

May 15, 1980

NRC IS INVESTIGATING WASTE HANDLING PROCEDURES AT THE BRUNSWICK nuclear plant following the discovery that low-level nuclear waste from that plant had been deposited in one landfill and two scrap yards. NRC headquarters staff is examining the generic implications of the chain of events that led to the dispersal of radioactive material. It may issue an informational paper for all licensees pointing out the problems at the Carolina Power & Light plant.

The NRC investigation was triggered by an agency radiation specialist who noticed high background radiation in the loading area where radioactive material was sorted out from uncontaminated waste. The utility, it was found, had been using the area for storing low-level radioactive refuse pending shipment to the burial site, says the source. This meant background readings were too high for inspectors to be able to detect all radioactive material.

Upon making this discovery, NRC officials went to the local dump and began digging operations. A plastic bucket giving a reading of 30 to 50 millirems an hour was dug up. Ten more spots with radioactive readings were also found and are being uncovered. NRC found that, in addition to the dump ground, the utility had been sending contaminated scrap to local junkyards. One junkyard had two contaminated spools which registered readings of 1 mr/hr. In another scrap yard, several items were discovered with readings of 1-2 mr/hr.

Most of the material is not hazardous to handle, but it is radioactive and should be disposed of in special burial sites, the NRC source says. NRC has issued an action letter to the utility to cease shipment of all materials until new controls of its waste surveying procedures are in place. The utility is trying to trace and pick up all contaminated materials.

Six NRC inspectors and a mobile lab are stationed at the plant. It's still too early to determine if the utility will be fined, the source notes.

Apr. 3, 1980

N.C. facility burns its nuclear wastes

By MONTE BASGALL

Staff Writer

The Chemical Industry Institute of Toxicology, a Research Triangle Park research institution, is the first facility in the state to be permitted to burn its low-level radioactive wastes.

Garris D. Parker Jr., the institute's radiation, chemical and safety officer, told a N.C. State University seminar Tuesday that the institute received an amendment to its incineration license last December to burn such wastes. It had been licensed since March 1979 to burn non-radioactive hazardous chemical wastes.

Both kinds of wastes are burned together in the institute's incinerator. Most of the radioactive elements in the mixture escape into the atmosphere as carbon dioxide and water vapor, Parker said.

The amount of released radiation is so slight as to be undetectable from radiation in the natural environment, said Parker and Dayne Brown, the radiation protection head for the state Department of Human Resources.

Parker described the institute's \$100,000 incineration plant at part of a three-day conference on the disposal and shipping of radioactive and toxic chemical wastes. The conference ended Wednesday in Raleigh.

About 60 participating businessmen, scientists, government officials and environmentalists toured the facility Tuesday afternoon.

Before installing its incinerator, the institute shipped about five 55-gallon drums of hazardous waste a month to a licensed disposal site in Alabama. It sent 15 more drums of low-level nuclear wastes to a site in Washington state, Parker said.

Science
and
medicine

Currently, it ships out about three drums of ash and seven drums of unburned, radioactive liquid-filled glassware to Washington state every month, he said.

Research has expanded since the burning program began, so the institute is now shipping out about 20 drums fewer a month than it would be without incineration. It also is saving about \$2,000 per month in disposal costs, Parker said.

He is on a state task force formed last year to search for a long-range solution to disposal of low-level radioactive wastes other than continued dependence on out-of-state sites.

Although it has not made specific recommendations, the task force is said to favor construction of incineration facilities in North Carolina.

Still unresolved by the task force is whether waste generators should build their own incinerators or whether the state should buy the land for a central incineration plant, said Quentin Lindsey, Gov. James B. Hunt's science adviser.

Parker believes the solution is a combination of central and individual incinerators, he said.

Plant state's first waste burner

RALEIGH (AP) — The Chemical Industry Institute of Toxicology in the Research Triangle Park is the first facility in the state to be allowed to burn its low-level radioactive wastes.

Garris D. Parker Jr., the institute's radiation, chemical and safety officer, said the plant received permission in December to dispose of radioactive wastes at its \$100,000 incineration plant.

Before the permission was granted, Parker said, the institute shipped about five 55-gallon drums of hazardous waste a month to a licensed disposal site in Alabama. It sent 15 more drums of low-level nuclear wastes to a site in Washington state.

It currently ships out about three drums of ash and seven drums of unburned, radioactive liquid-filled glassware to Washington state every month, Parker said.

Parker said both radioactive and

non-radioactive hazardous chemical wastes are burned together in the institute's incinerator. Most of the radioactive elements in the mixture escape into the atmosphere as carbon dioxide and water vapor, he said.

Both Parker and Dayne Brown, head of the radiation protection division of the state Department of Human Resources, said the amount of released radiation is so slight as to be undetectable from what is normally found in the environment.

Parker, who said the burning program is saving the institute about \$2,000 a month in disposal costs, serves on a task force that is searching for long-range solutions to disposal of low-level radioactive wastes. The group is seeking to reduce or eliminate entirely North Carolina's continued dependence on out-of-state disposal sites.

While the task force has yet to make specific recommendations, it is said to

favor construction of incineration facilities in the state. It must decide, however, whether waste generators

should build their own incinerators or whether the state should provide a central incineration plant.

APRIL 4, 1980

Apr. 4, 1980

RTP Firm Incinerates Its Radioactive Wastes

By The Associated Press

In an effort to reduce dependence on out-of-state waste dumps, a firm in the Research Triangle Park has become first in the state to burn its own low-level radioactive wastes.

The Chemical Industry Institute of Toxicology received permission in December to dispose of radioactive wastes at its \$100,000 incineration plant.

Garris D. Parker Jr., the institute's radiation, chemical and safety officer, said that before the incinerator was used, the institute shipped about five 55-gallon drums of hazardous waste each month to a licensed disposal site in Alabama. It sent 15 more drums of low-level nuclear wastes to a site in Washington state.

Parker said that with the incinerator, the firm

now ships out about three drums of ash and seven drums of unburned, radioactive liquid-filled glassware to Washington state every month. He said the reduction in shipments saves up to \$2,000 a month.

Radioactive and non-radioactive hazardous chemical wastes are burned together in the institute's incinerator. Parker said most of the radioactive elements in the mixture escape into the atmosphere as carbon dioxide and water vapor.

Some radiation is released, but that amount is

undetectable from radiation normally found in the environment, said Parker and Dayne Brown, head of the radiation protection division of the state Department of Human Resources.

Parker is a member of a task force that is searching for long-range solutions to disposal of low-level radioactive wastes. He said the group hopes to reduce or eliminate the state's dependence on out-of-state sites.

The task force is reported to favor construction of incineration facilities in the state.

Apr. 4, 1980

incinerating wastes blasted

ANVIL STAFF & WIRE REPORTS

Low-level radioactive wastes from North Carolina hospitals, universities and medical research firms may be incinerated rather than shipped out of state, according to a state official.

But the state's proposed plans are likely to run head-on into environmental and community opposition no matter where the incinerator is located.

Quentin Lindsey, science advisor to Gov. Jim Hunt, discussed alternatives for waste disposal last week at a seminar in Raleigh but focused on incineration. He is chairman of a state task force studying low-level waste disposal.

"We have to find a solution to our waste problem," Lindsey said.

After studying the problem for nine months, Lindsey's task force is about to release a report which will suggest the idea of having a centralized incinerator to burn the low-level wastes in North Carolina. An alternative would be to have local incinerators in various communities, he said.

Lindsey said preliminary studies show when low-level radioactive wastes are incinerated, most of the radioactivity is released into the air.

Although more study is needed, he said, indications are radioactivity released into the air this way would be "far below federal safety standards."

He added, "We do have to find a solution and this is the best way to go about it, based on our information at this point."

Durham environmentalist Wells Eddleman disputed Lindsey's comments. "Burning radioactive wastes is ridiculous. It's not safe. While the state contends about five percent of the radioactive wastes would escape into the air, our figures from EPA researchers at the Research Triangle Park put the percentage at up to 60."

Beth Bishop of the Butner Alliance, which successfully opposed locating a radioactive waste storage area on state property in Butner, said state officials argue that burning it will be safe, but they ignore the fact that the particles are going to land somewhere, probably in someone's lungs. "Some materials like tritium don't burn, plus it's said to be very dangerous to tissues," she charged.

"I don't want nuclear wastes, no matter where they're from, in the air I breathe," added Eddleman.

Lindsey said some 180,000 gallons of low-

level radioactive wastes are produced annually in the state, mostly by research organizations which use radioactive materials in their studies. These wastes, he pointed out, are much less hazardous than the highly radioactive wastes generated by nuclear power plants. The wastes are similar to those discovered two years ago by the Anvil in a radioactive tree growing adjacent to a radioactive waste dump in Duke Forest (Anvil, Feb. 24, 1978).

These wastes are no longer buried, they're shipped to disposal sites in the state of Washington at a cost of about \$200 a barrel, he added. A closer disposal site in Barnwell, S.C., was closed last year at the height of national controversy over what should be buried where.

Lindsey said he may propose some type of incinerator project to the 1981 session of the General Assembly.

"If we do it, the state would have to be helpful in bringing it about," he said. He added, however, the state's role probably should be to help "foster a solution" and not actually operate the incinerator.

A major problem facing such a project would be acceptance of an incinerator plant by a North Carolina community, Lindsey said. Strong public participation in the project would be needed, he said. And strong public opposition would be generated, said Bishop.

Apr. 3, 1980

State Allows Plant To Incinerate Waste

RALEIGH, N.C. (AP) — The Chemical Industry Institute of Toxicology in the Research Triangle Park is the first facility in the state to be allowed to burn its low-level radioactive wastes.

Garris D. Parker Jr., the institute's radiation, chemical and safety officer, said the plant received permission in December to dispose of radioactive wastes at its \$100,000 incineration plant.

Before the permission was granted, Parker said, the institute shipped about five 55-gallon drums of hazardous waste a month to a licensed disposal site in Alabama. It sent 15 more drums of low-level nuclear wastes to a site in Washington state.

It currently ships out about three drums of ash and seven drums of unburned, radioactive liquid-filled glassware to Washington state every

month, Parker said.

Parker said both radioactive and non-radioactive hazardous chemical wastes are burned together in the institute's incinerator. Most of the radioactive elements in the mixture escape into the atmosphere as carbon dioxide and water vapor, he said.

Both Parker and Dayne Brown, head of the radiation protection division of the state Department of Human Resources, said the amount of released radiation is so slight as to be undetectable from what is normally found in the environment.

Parker, who said the burning program is saving the institute about \$2,000 a month in disposal costs, serves on a task force that is searching for long-range solutions to disposal of low-level radioactive wastes.

NEWS HERALD, Morganton, N.C.

Apr. 3, 1980

N.C. institute burns its radioactive wastes

RALEIGH, N.C. (AP) — The Chemical Industry Institute of Toxicology in the Research Triangle Park is the first facility in the state to be allowed to burn its low-level radioactive wastes.

Garris D. Parker Jr., the institute's radiation, chemical and safety officer, said the plant received permission in December to dispose of radioactive wastes at its \$100,000 incineration plant.

Before the permission was granted, Parker said, the institute shipped about five 55-gallon drums of hazardous waste a month to a licensed disposal site in Alabama. It sent 15 more drums of low-level nuclear wastes to a site in Washington state.

It currently ships out about three drums of ash and seven drums of unburned, radioactive liquid-filled glassware to Washington state every month, Parker said.

Parker said both radioactive and non-radioactive hazardous chemical wastes are burned together in the institute's incinerator. Most of the radioactive elements in the mixture escape into the atmosphere as carbon dioxide and water vapor, he said.

Both Parker and Dayne Brown, head of the radiation protection division of the state Department of Human Resources, said the amount of released radiation is so slight as to be undetectable from what is normally found in the environment.

Dec. 7, 1979

Nuclear Energy

**NORTH CAROLINA PLANS INTERIM SITE
FOR LOW-LEVEL RADIOACTIVE WASTES**

RALEIGH, N.C. — (By an Environment Reporter staff correspondent) — North Carolina in January will begin operating a temporary disposal site for low-level radioactive waste.

Quentin Lindsey, science advisor to Governor James B. Hunt, Jr., told Environment Reporter that the state will use existing state-owned warehouses at Butner to store the waste until a permanent facility is built.

Low-level radioactive waste consists of materials, such as clothing or containers, which have been in contact with a radioactive source.

Lindsey said 20,000 square feet of storage space is needed to house the steel-sealed drums filled with radioactive waste, which are expected at the rate of 5,000 a year.

North Carolina medical and research institutions have been accumulating low-levels waste since nuclear disposal sites in other states placed new restrictions on out-of-state waste (Current Developments, November 9, p. 1510).

Third Largest Producer

North Carolina is the nation's third largest producer of low-level radioactive waste, following New York and Pennsylvania. Eighty percent of the state's low-level radioactive waste is produced at Research Triangle Park (RTP).

RTP research facilities, which include four Environmental Protection Agency laboratories and the National Institute for Environmental Health Sciences, generate more than 275,000 gallons of radioactive waste each year.

Lindsey said a task force is planning a permanent facility to dispose of low-level radioactive waste through incineration and recycling.

Selection of a site will depend on design and size of the facility, the location of low-level waste, and the geological and atmospheric conditions of the area, he said.

Lindsey said the task force is convinced that "the real long-run solution that ought to be followed is a combination of incineration and recycling. There are liquids and liquid chemicals here that can be recycled," he added.

The combination of techniques is preferable "to trying to ship this waste across the country somewhere and running the risk that a facility might be closed down," he said.

Lindsey said people need to realize the difference between the low-level radioactive waste to be stored at Butner and high-level nuclear waste associated with reactors and atomic weapons.

Dec. 19, 1979

State To Decide N-Wastes Fate

WILKESBORO (AP) — The future of almost 670 barrels of radioactive wastes buried at a Wilkes County plant will be decided by state radiation protection officials next month.

The wastes are buried at a plant owned by Dr. Finley Clay Watts, a Winston-Salem physicist.

Dayne Brown, head of the radiation protection branch of the Human Resources Department, said the burden will be on Watts to show that the buried materials don't need to be dug up. The state has said Watts wasn't licensed to bury some of the materials.

Watts said he has removed all unburied materials from the plant and that he will give the state the right to dig up the barrels. But he said he has no intention of digging them up.

The department also will decide whether to terminate Watts' license to operate the radioactive-waste processing plant, Brown said.

Watts surrendered his license to operate the plant and has requested that it be terminated. But Brown said a decision must be reached first on the buried wastes.

Watts agreed to close the plant, in the Purlear community, and surrender the license as part of a settlement in a lawsuit the county filed against him. The county and the town of Wilkesboro agreed to pay Watts \$35,000, but officials say they plan to withhold \$23,000 of that until the license is revoked.

State officials estimate that it could cost about \$200,000 to dig up the materials and ship them to disposal sites in other parts of the country.

Meanwhile, the future of suits and

countersuits filed by residents and Watts remain up in the air. Residents who filed the suit against Watts and the state say they want the barrels dug up and will wait to see what the state does before deciding whether to pursue the lawsuit.

Watts also has suits pending against two of the residents who sued him, one for slander and trespassing and the second for trespassing.

A \$1.5-million lawsuit Watts filed against Brown and Brown's assistant is also pending. In the suit, Watts claims state employees harassed him.

Yadkin Ordinance Prohibits Receipt of Hazardous Waste

By Dennis Whittington
Staff Reporter

YADKINVILLE — The Yadkin County Board of Commissioners adopted an ordinance yesterday that prohibits anyone from receiving hazardous wastes in the county without the knowledge and permission of the board.

The ordinance is designed to prevent a situation such as the one in Wilkes County last year in which a Winston-Salem physicist built a low level radioactive-waste processing plant without the knowledge of the Wilkes commissioners or his neighbors.

The Yadkin County ordinance makes it illegal for anyone to receive ionizing radioactive wastes with the intent to process, store or bury them.

Dr. Finley Clay Watts recently agreed to close his Wilkes County plant after a year of legal maneuvering. He had been accepting low-level wastes from hospitals and laboratories and compacting them for shipment to a legal burial site in South Carolina. State officials said, however, they found that Watts had been burying barrels of waste at his plant and recommended that his license to operate be revoked for that and other alleged irregularities.

The Yadkin ordinance has been under con-

sideration since August when a county resident, Linda Sue Baziuk, suggested an ordinance to ban the shipment of hazardous wastes through the county.

The commissioners said they felt that they did not have legal authority to regulate traffic on federal and state highways.

The ordinance was based largely on information gathered from the N.C. Department of Labor and from ordinances already passed in neighboring Wilkes and Surry counties.

The ordinance contains a self-protection clause. It says that if any section of the ordinance is held to be unconstitutional that ruling would not affect the rest of the ordinance.

Anyone who violates the ordinance will be guilty of a misdemeanor and subject to a \$500 fine.

Also yesterday, the Yadkin commissioners selected a new chairman and vice chairman.

Billy H. Williams, chairman for five of the seven years he has served as a commissioner, nominated Grady Hunter to succeed him as chairman. Hunter, a livestock and tobacco farmer who has served two years of a four-year term on the board, was unanimously elected chairman for a one-year term.

Williams, who has one more year to serve on his four-year term, was elected vice chairman.

NOV. 14, 1979

Butner Waste Site Rejected

By JACK HOLMES
Herald Staff Writer

RALEIGH — State plans to use an empty frame warehouse in Butner as a temporary storage place for low-level radioactive wastes were dumped Tuesday.

Leaders of a community movement against storage of the wastes were notified unofficially Tuesday morning that the site in this small community probably would be dropped as they girded to begin their fight against it at a public hearing tonight.

Jim Shepherd, a spokesman for Dr. Quentin Lindsey, science and policy advisor to Gov. Jim Hunt, confirmed in a telephone interview Tuesday afternoon that the plans for the Butner warehouse have been dropped and the public hearing canceled.

A prepared statement from Lindsey, who was unavailable for additional comment, said, "We told the people of Butner we would not put this facility there if it weren't completely safe."

He said that the plans for use of the building for temporary storage of low-level radioactive wastes from medical research institutions, particularly those in the Research Triangle area, were abandoned because "inspectors from the State Property Insurance Division found the building isn't safe for this purpose and so we're not going to put the material there."

State officials said that among findings of the inspectors were:

- The warehouse is a frame building, making it inadequate for a low-level radioactive waste storage facility since some of the chemicals are flammable.

- The building doesn't have a sprinkler system.

- The building's nearness to a watershed that would require an earthen dike around the warehouse area.

Some of the reasons for dropping the Butner plans were similar to reasons opponents advanced for opposing it. The opponents' main contention was that the warehouse was a frame building while a solid concrete building such as one that now exists at Research Triangle Park is needed to be safe.

Also, Butner residents opposed use of the warehouse because it was near a residential area, which they said was of a density double the state average.

Shepherd said that Lindsey, who is heading a state task force seeking a temporary storage site for low-level radioactive waste, had already begun looking for another site

Tuesday afternoon.

State officials said they will try to find a suitable site immediately. They said that establishment of such a site in North Carolina is urgent because of moves by other states—namely South Carolina, Washington and Nevada—to close their disposal sites.

Lindsey's statement said, "This puts us back to square one in locating a temporary, low-level radioactive waste storage facility. We must find a suitable place to store this material so that our medical research institutions can continue to do their work."

"If we don't, these institutions face the very real possibility of having to cut back their vital medical research."

Shepherd said that some research institutions, such as Duke Medical Center in Durham, are "hurting" now from the lack of ade-

quate storage facilities for their low-level radioactive waste.

State officials say that two-thirds of the low-level radioactive waste produced in North Carolina is generated by research institutions in the Research Triangle area, the reason a temporary storage facility in the area is desired.

"The warehouse would have been used to store up to 5,000 barrels of wastes, including such items as rubber gloves, chemical containers and other items used in work with radioactive substances. It is located on fenced-in, state-owned property that is several blocks from any homes."

Wastes would be stored in the temporary facility for a maximum of 18 to 24 months while a long-range, more permanent solution to the storage problem is found.

Hospital Plans Nuclear Practice In Lexington

By DOUG CLARK
Enterprise Staff Writer

LEXINGTON — Lexington Memorial Hospital is about to begin practicing nuclear medicine, pending approval by the regional Health Systems Agency.

While not a new technology, it is one with new connotations since the potential danger of nuclear power has become a public issue.

According to Lexington Memorial Chief of Diagnostic Radiology Dr. Kirk Dixon, it involves weighing proven immediate results against unknown future risks.

"That is horrifying to the public," Dr. Dixon said today, but "we accept that as modern day medicine."

The hospital wants to spend about \$95,000 to buy equipment that is able to record the images of body organs on film. The process is similar to taking X-rays, but it involves a radioactive isotope injected into or ingested by the patient.

It enables doctors to see the thyroid, detect brain tumors or find liver and kidney clots, among other uses.

The process is safer than an X-ray, Dixon said.

Nevertheless, "Any kind of exposure is dangerous," he said, calling the risks for this process "minimal."

Whether or not it is safe is a question no one can answer, Dixon said, and, as such, it is one that is seldom asked.

"No one weighs that anymore," he said. "It is a simple diagnostic procedure."

Because radiology is a relatively new field, no one knows what its long-term affects might be, Dixon said. A century from now, people might develop cancer from X-rays. Basically, he said, "we hope we're doing the right thing."

"It's a very tricky, tough area, no

matter how sophisticated the procedure is, to tell people the risk involved," Dixon said. "It's awfully easy to scare them off, make them afraid of a diagnostic test that may help them."

The procedures should be carefully examined, Dixon said, "but if it comes down to me and I need to run a diagnostic test, I say, 'good God, run it if it will help me know.'"

Nuclear medicine does involve nuclear waste, both for the patient and the hospital, Dixon said. However, the isotopes used for diagnoses have relatively short half-lives — most are 13 hours or less. That means that in 13 hours the material will lose half its radioactivity, and half again after another 13 hours, and so on.

The hospital keeps those wastes in lead-lined containers until they are reduced to background radioactive levels, Dixon said. That usually takes 10 to 15 half-lives.

The material in the patient is also broken down and excreted.

Lexington Memorial will begin its nuclear medicine service if the Health Systems Agency approves the plan. The approval will be based on its cost versus the demonstrated need for it. The agency's project review committee is meeting in Greensboro today to consider the proposal.

According to Dixon, the equipment is relatively inexpensive and there are few — and those more expensive — alternative methods of performing the same functions.

Patients who have needed the procedure have been sent to other hospitals, Dixon said. High Point Memorial is one hospital that already utilizes nuclear medicine.

The hospital, which recently moved into a new facility, has made a similar proposal to begin ultrasound procedures.

Nov. 30, 1979

U.S. Can Allow Waste Shipments In Spite of Bans

By Michael Skuba
Journal Staff Writer

RALEIGH — An official of the U.S. Department of Energy told the N.C. Radiation Protection Commission yesterday that the federal government can override local ordinances prohibiting shipment of radioactive materials.

A.R. McLain told the commission that "final authority for transportation of radioactive material lies with the U.S. Department of Transportation."

The U.S. Nuclear Regulatory Commission, he said, deals only with the packaging of radioactive materials.

Many cities and counties across the country have passed ordinances that prohibit or restrict the movement of radioactive materials within their boundaries, McLain said.

McLain said the Transportation Department is working on a plan that would delegate to states the authority to route radioactive materials within their boundaries.

Part of the plan's intent, he said, would be to meet the problem created by the growing number of local ordinances. "These ordinances shouldn't be allowed to become a free-for-all," he said.

The commission is scheduled to vote today on a hearing panel's recommendation to revoke the license of Finley Clay Watts of Winston-Salem to process low-level radioactive wastes.

But the commission's chairman, Dr. Aaron Sanders of Duke University, said that action might not be needed. He said the commission might table the recommendation if it is satisfied that a dispute between Watts and Wilkes County has been settled out of court.

Watts has agreed to close his processing plant in Wilkes County in exchange for \$35,000 put up by the county and the town of North Wilkesboro.

He has said, however, that he will not dig up materials already buried on the property. Thirty-nine residents of the area, who were partners with

See U.S. Can, Page 18

U.S. Can Override Bans

Continued From Page 15
the county in a suit against Watts and the N.C. Department of Human Resources have said they will not drop their suit until that matter is settled.

The Department of Human

Resources, which licensed Watts, says it will not dig the material up, either.

Neither Watts nor his attorney, Fred Crumpler of Winston-Salem, was available last night for comment to the Winston-Salem Journal.

Nov. 26, 1979

Opinion of the Times

Store our hot stuff here

Because it's almost 3,000 expensive and dangerous highway miles from the Research Triangle to Hanford, Washington, the sighs of relief heard in this area at news of the Washington low-level radioactive dump's reopening are hard to understand.

Low-level waste is dangerous, certainly. But experts know how to handle it and how to store it while it gradually loses its radioactivity. Its danger, even at the start, even by the truckload, is light-years away from the terrifying hazards posed by such high-level nuclear waste as spent power-plant fuel rods.

The Research Triangle area produces two-thirds of this state's 180 barrels a month of low-level waste—much of it so low in emissions that as one lab spokesman says, a few pieces of paper would stop it.

A lot of it consists of tiny amounts of "hot" material dissolved in toluene, whose name model-building hobbyists will recognize because it's in that kind of glue you don't want to sniff very much or light a match around.

In fact, the toluene is more dangerous on the road than the radioactive stuff mixed with it, because it's so flammable and so toxic. These properties make transportation probably the most hazardous part of low-level waste disposal.

The highway-accident risk is one reason shipping North Carolina's largely toluene-dissolved radioactive junk all the way to the West Coast seems ridiculous. Getting a

Carolina westward toward Washington involves more in-state highway miles than getting it to a dump in-state or in South Carolina. Either of the latter would lessen the danger not only to the rest of the country but to Tar Heels themselves.

Another argument, and a strong one, is the difference in cost. To send the stuff to Washington costs the Triangle's companies and universities and hospitals \$100 a barrel. Every truckload contains more than 100 barrels.

Sending it to Barnwell, S.C., would cost only \$32 or so per barrel—not to mention the saving in gas as well as the reduced accident danger. Sending it still shorter distances would cost still less.

Yet some Butner residents' hostile response to a recent state proposal, since dropped, to store low-level waste there shows we're not very sophisticated yet about these questions. Most of us still mentally put low-level radioactive trash in the same compartment with the high-level waste from power plants and weapons—the kind no one in his right mind would want in his back yard.

If we all stopped doing that and got practical about nearby disposal for the low-level stuff, we'd be doing ourselves a favor.

And we'd probably start clamoring for North Carolina to hurry up its plans for an in-state low-level waste disposal site—instead of breathing easy at the prospect of

Nov. 9, 1979

Butner Not Welcoming Waste Dump Proposal

RALEIGH (AP) — A proposal to use an empty warehouse in Butner as a temporary storage facility for low-level radioactive wastes is certain to meet with opposition from residents of the small community, a town official said Thursday.

"There are many who are afraid," said Butner business manager Leon Perkins. "They feel this is going to be detrimental to the development of the community and to their own welfare, and I believe there's going to be lot of reaction to it."

A special task force, headed by Dr. Quentin Lindsey, announced Tuesday that it had recommended Butner as the site of the temporary storage facility because of its proximity to the Research Triangle. Medical and research facilities in the Triangle generate two-thirds of all low-level radioactive waste produced in the state.

Plans for a disposal site have been under way for several months but were

stepped up in the wake of recent moves by other states — notably South Carolina, Washington and Nevada — to close their disposal sites.

"It is important that we have a facility like this because it is important that medical and other types of research involving low-level radioactive wastes continue," Lindsey said.

The selection of Butner for the site hinges on approval by community residents. The state will hold a hearing Wednesday at 8 p.m. at the Butner-Stem Elementary School to hear public opinions on the issue.

The warehouse being eyed by the state is located on fenced-in, state-owned property that is several blocks away from the nearest residences. Lindsey called it a "natural site for storage."

Lindsay said the facility would not be a permanent site and that wastes would be stored no longer than 18 to 24 months.

Nov. 2, 1979

Would burn, recycle

N.C. considers N-waste plant

By PAUL T. O'CONNOR
Times staff writer

North Carolina is considering construction of a half-million dollar low-level nuclear waste incineration and recycling plant, possibly in the Triangle area.

Quentin Lindsey, Gov. James B. Hunt Jr.'s science adviser, said at a press conference this morning that the governor's task force on low-level radioactive waste will recommend construction of the plant and the establishment of a temporary storage facility for the 18 to 24 months until it is completed.

The state is seeking sites for the above-ground storage facility.

Firms that handle radioactive wastes have been contacted about the possibility of managing it. Plans for the storage facility will be released Wednesday, Lindsey said.

A site for the incinerator has not been chosen, but task force members said that from an economic standpoint it should be in the Triangle area where 80 percent of the state's low-level radioactive waste is produced. Task force members said, however, that geographic characteristics such as geology, surface water flow, hydrology and population density probably would outweigh economic considerations.

Research and medical

facilities in North Carolina and across the country face a shortage of storage space for their radioactive waste since commercial waste disposal sites in Nevada and Washington state were closed and a South Carolina site cut back its operations.

Lindsey said the task force has been assured by local research and medical institutions that they have enough storage space available to maintain their research until January when the temporary facility should be ready. Local researchers have complained they are running out of space to store their low-level radioactive wastes.

The radioactivity is confined largely to traces that show up as contaminants in test animals and on laboratory clothing and equipment. Although the waste is not considered harmful to humans, law requires its careful disposal.

Lindsey said incineration of the low-level radioactive garbage would allow the state to use the Barnwell, S.C., radioactive waste disposal site. He said he has contacted South Carolina Gov. Richard Riley's office and has been assured the Barnwell site would be accessible to the incinerated residue of North Carolina low-level nuclear waste.

There are no funds currently budgeted for either the long or short term facilities, Lindsey said.

See N.C., page 2-A

N.C. considering N-waste facility

Continued from Page 1

"I think we will have to move toward contingency or supplemental funds," he said.

The state has no estimate of how much the temporary storage facility would cost but Lindsey said the task force will recommend the institutions responsible for the waste pay for the storage.

Even if the Nevada and Washington facilities are reopened to North Carolina waste, the state will

pursue plans to build the recycling and incineration plant, Lindsey said.

"Ecologically, it makes more sense to incinerate and recycle than it does to bury the waste," Lindsey said. "And, secondly, North Carolina currently is facing a situation where it is uncertain of what other states will do. We can't be that vulnerable to decisions made outside of our area of control."

Nearly 30,000 cubic feet of waste is generated each year in North Carolina.

Nov. 13, 1979

RALEIGH-- The state task force on low level radioactive waste has learned that the warehouse in Butner being considered for a temporary storage facility has been found inadequate for that purpose.

Dr. Quentin Lindsey, science and policy advisor to Governor James B. Hunt Jr. and head of the task force, said the building in Butner is inadequate from a fire safety standpoint and does not meet state building code specifications for storing low level radioactive waste.

"We told the people of Butner we would not put this facility there if it were not completely safe," Dr. Lindsey said. "Inspectors from the State Property Insurance Division found the building is not safe for this purpose, and so we're not going to put the material there."

Among the findings of the inspectors were:

- The warehouse is a frame building, making it inadequate for a low level radioactive waste storage facility since some of the chemicals are flammable.
- The building does not have a sprinkler system.
- The building's nearness to a watershed would require an earthen dike around the warehouse area.

The decision to locate the temporary storage facility in Butner had been based upon the size and availability of the building, but the decision was subject to a number of inspections of the building and site.

"This puts us back to square one in locating a temporary low level radioactive waste storage facility," he said. "We must find a suitable place to store this material so our medical research institutions can continue to do their work."

"If we don't, these institutions face the very real possibility of having to cut back their vital medical research."

As a result of the decision, the public meeting scheduled for 8 p.m. Wednesday in Butner to answer questions about the storage facility has been canceled.

Nov. 9, 1979

N-Waste Plan Seen Drawing Butner's Wrath

RALEIGH (AP) — A proposal to use an empty warehouse in Butner as a temporary storage facility for low-level radioactive wastes is certain to meet with opposition from residents of the small community, a town official said Thursday.

"There are many who are afraid," said Leon Perkins, business manager of John Umstead Hospital in Butner. "They feel this is going to be detrimental to the development of the community and to their own welfare, and I believe there's going to be a lot of reaction to it."

A special task force, headed by Dr. Quentin Lindsey, announced Tuesday that it had recommended Butner as the site of the temporary storage facility because of its proximity to the Research Triangle. Medical and research facilities in the Triangle generate two-thirds of all low-level radioactive waste produced in the state.

Plans for a disposal site have been underway for several months but were stepped up in the wake of recent moves by other states—notably South Carolina, Washington and Nevada—to close their disposal sites.

"It is important that we have a facility like this because it is important that medical and other types of research involving low-level radioactive wastes continue," Lindsey said.

The selection of Butner

for the site hinges on the approval of community residents. The state will hold a hearing Wednesday at 8 p.m. at the Butner-Stem Elementary School to hear public opinions on the issue.

The warehouse being eyed by the state is located on fenced-in, state-owned property that is several blocks away from the nearest residences. Lindsey called it a "natural site for storage."

Lindsay said the facility

would not be a permanent site and that wastes would be stored no longer than 18 to 24 months while a long-range, more permanent solution to the problem was being developed.

The warehouse would be used to store up to 5,000 barrels of wastes that would include such things as rubber gloves, chemical containers and other items used in work with radioactive substances.

Oct. 22, 1979

State Moves On N-Waste Burial

RALEIGH, N.C. (AP) — Following the recommendations of the Nuclear Regulatory Commission, the North Carolina Department of Human Resources will take steps to prohibit the burial of low-level radioactive waste on privately owned land.

The department will ask the state Radiation Protection Commission on Nov. 29-30 to adopt regulations prohibiting the private burial of the waste.

The proposal grew out of a controversy concerning the burial of radioactive vials and other material used in medical research at a processing plant in Wilkes County. Residents of the nearby Purlear community complained that the waste posed health hazards.

After investigating the reports, the state suspended the license of the owner, Finley Clay Watts of Winston-Salem, to operate the plant because he buried materials which he was not licensed to bury.

The NRC later investigated the state's radiation control program. It said the state's program is adequate but the department needs to update its regulations and increase its staff.

Dayne Brown, chief of the department's radiation-protection section, said if the proposal is approved, it would not restrict the commercial burying of nuclear wastes.

"Someone wanting to run a commercial operation like Watts' could acquire the land, then give it to the

state and federal government — or sell it for \$1 — on the condition that the state lease it back for waste disposal. This is what is done in most states," he said.

The Department of Human Resources will also ask the Radiation Protection Commission to approve regulations affecting dentists and truckers.

The department wants to phase out the use of cone-shaped X-ray guns used by some dentists. Such a move, the department said, will reduce exposure to radiation.

It will also recommend that it have the authority to inspect trucks carrying commercial cargoes of radioactive materials from one state to another.

Oct. 28, 1979

Nuclear dump hunt now growing critical

From Staff and Wire Reports

WASHINGTON — With two of the nation's three low-level nuclear waste dumps closed, the government is planning to ask governors to provide temporary storage sites for radioactive waste produced in their own states, officials said last week.

That could mean establishment of temporary storage sites in at least a dozen states in which nearly 70 percent of the country's low level nuclear waste is produced. North Carolina, one of those states, produces about 7 percent of the nation's waste.

Two of the three U.S. 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. A Nevada site was closed after radioactive

waste was discovered outside dump boundaries.

The third site, in South Carolina, remained open Thursday, but officials said none of the wastes that would normally go to Nevada or Washington could be sent there.

Dayne H. Brown, North Carolina's chief of radiation protection for the Department of Human Resources, said Saturday that a task force created by Gov. James B. Hunt Jr. was studying short and long-term nuclear waste storage facilities in the state.

"Right now, we're operating on the premise that a North Carolina facility might have to include (low-level nuclear waste) burial, but I'm hoping we can still rely on regional facilities like the one in South Carolina," Brown said.

Brown said Wake Forest University in Winston-Salem and North Carolina State

University in Raleigh operate the state's only active waste dump sites for their own low-level waste. Duke University in Durham and the University of North Carolina at Chapel Hill have closed their dumps and ship their wastes out of state, Brown said.

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 Department of Energy will urge governors in the states where the wastes are produced to establish interim above-ground storage facilities, administration officials said.

Asked how hard the NRC would push the governors to adopt such a plan, NRC spokesman Frank Ingram 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.

A spokesman for the National Governor's Association, which also had a representative 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.

US NRC, OFFICE OF PUBLIC AFFAIRS

Aug. 28, 1979

**NRC HEARING ON TRANSPORT OF USED FUEL FROM
SOUTH TO NORTH CAROLINA TO RESUME SEPTEMBER 10**

The Nuclear Regulatory Commission public hearing on Duke Power Company's application to transport used nuclear fuel from its Oconee Nuclear Power Station near Seneca, South Carolina, for storage at its McGuire Nuclear Power Station near Cowans Ford Dam, North Carolina, will resume September 10 in Bethesda, Maryland.

The hearing will resume at 8:30 a.m. on Monday, September 10, in the Nuclear Regulatory Commission Hearing Room, 5th floor, East-West Towers Building, 4350 East-West Highway, Bethesda. It is expected to continue throughout the week.

June 18, 1979

Disposal of nuclear waste poses costly N.C. problem

By JERRY ALLEGOOD

Staff Writer

As many as 330 businesses and research centers in North Carolina are facing higher costs in disposing of low-level radioactive material.

The institutions were able to ship their liquid waste — packed in double-wall containers similar to 55-gallon drums — to a burial ground in South Carolina until that facility recently began refusing to handle it.

Now, the estimated 180 barrels of waste produced in North Carolina each month must be shipped at a higher cost to Texas, Nevada and Washington. Most of the waste is liquid from vials used to determine radiation levels.

Dayne H. Brown, chief of the radiation protection section of the N.C. Department of Human Resources, said all 330 institutions "would ultimately have a need for a site ... each would have from a very slight to very serious need."

The problem is not yet critical, state environmental officials said, but it could affect the cost of biomedical research.

The liquid waste is produced when researchers mix test materials with a solvent and place it into a scintillation counter that measures the radiation. The vials, sometimes called "Nuclear Cocktails," usually have low radia-

tion levels. But, the material must be handled like more hazardous nuclear waste.

Conrad Knight, radiological safety officer at Duke University, said the institution produced about 600 cubic feet of material a month, most of it as liquid.

Knight estimated the disposal cost for fees alone at \$30,000 this year, but having to ship the material to a more distant location than South Carolina would double that amount.

At the University of North Carolina at Chapel Hill, radiation officer Francis DeFriess said cost for treatment would increase probably from \$30 to \$40 a barrel to \$75 to \$100.

"This kind of thing affects the cost of doing our medical research," he said.

DeFriess said the university shipped out 280 barrels last year, about one-third of it as liquid.

UNC confronted a related problem with radioactive material last week after the State Bureau of Investigation received a report that some radium, a radioactive element, had been stolen.

The university said no radium was missing, but the state ordered UNC to improve its procedures on the handling of such material.

Although Brown said no evidence had been found that any waste was

missing from UNC, he could not guarantee that every cask of radium used in laboratories, the medical school and hospital had been accounted for.

The developing medical school at East Carolina University in Greenville produces about 25 cubic feet of material a month, ECU officials said.

Radiation protection officers from throughout the state met informally at the Research Triangle Park on Wednesday to discuss the problem. But specific action was not approved.

Officials said the liquid material could be destroyed by burning in power plants or by incineration. One state official said no facilities in the state were licensed to burn the material, but he said requests could probably be expected.

"At this point, we're just sort of seeing what the options are and seeing what the state could do (to help)," said Thack Brown, a spokesman for the Burroughs Wellcome Co., who attended the session.

Brown declined to give the amount of material produced by the company. But he acknowledged that the South Carolina decision could raise the cost of research.

He said all companies involved in research using low-level radiation could be seriously hampered if a long-term solution were not developed.

May 31, 1979

Radioactive waste passes through NC

RALEIGH — Nearly every day, trucks carrying radioactive waste pass through North Carolina on their way to Barnwell, S.C., which is the only commercial waste disposal site in the eastern United States.

According to Dayne Brown, chief of Radiation Protection for the Department of Human Resources, this type of traffic has increased in the past few years. "We know it has increased because the volume of facilities using radioactive materials has increased," said Brown.

"We don't have any exact figures because vehicles carrying such wastes are not required to be licensed or to give us any advance notification of their trip through the state. But with Barnwell being the only commercial disposal site in the eastern United States, it stands to reason that states north of North Carolina are going to have to pass through here to get to Barnwell. We're a corridor for this type of traffic," he continued.

Brown said that the manpower and funding required to carry out a licensing and inspection program for all radioactive waste traffic in the state would be prohibitive.

"We do try to maintain readiness for such an accident at all times, though 90 per cent of our calls are false alarms," he said. "Two people in our section are on call 24 hours per day. We also have a mobile lab which we put in operation in January that can be used for periodic checking of vehicles carrying waste."

To check vehicles, officials from Radiation Protection set up sophisticated instruments at weigh stations. All vehicles carrying certain levels of radioactive materials must bear an indicating placard or symbol. Officials check to see that unplacarded vehicles aren't carrying radioactive materials. They also see that waste materials carried on labeled vehicles are properly packaged and labeled according to federal regulations and don't leak.

"Another way we prepare for accidents is to train first responders like ambulance, rescue and law enforcement officers how to protect themselves and others until we can get to the scene," said Brown.

In the event of an accident involving radioactive materials, Brown's office is notified directly or through the N.C. Highway Patrol. Officials from Radiation Protection are transported to the scene by Highway Patrol helicopter or relayed by patrol car. An evaluation of the situation is made and necessary action is taken.

"Our new mobile lab allows us to set up for several days if necessary," stated Brown, "and we can do on-the-site testing rather than having to take samples back to Raleigh as we did before."

Brown said that one ironic accident he remembers involved an Atomic Energy Commission (now Nuclear Regulatory Commission) "Atoms for Peace" display which used some radioactive materials. "An axle sheared on the transporting vehicle and it overturned. We checked for leaking radiation, found some and arranged for reloading of the materials."

In another incident, the driver of a vehicle carrying scrap material from a nuclear plant in the New England area noticed that a container had broken open. The Highway Patrol isolated the vehicle in a remote area until Brown arrived in the middle of the night.

"In this instance, the material

could have been dangerous if exposed for a long period of time or if contaminated articles had fallen off along the roadside. This was not the case. We saw to the off-loading and repair and sent the vehicle on its way," stated Brown.

Since 1961 when Radiation Protection began keeping records, there have been 80 radiation incidents in North Carolina. These incidents may involve contamination, exposure to radiation, fire, illegal possession of a radioactive source, theft or a number of others.

None of the accidents have constituted a serious threat to public health or safety. The most significant one occurred more than 10 years ago. It involved a leaking source in a licensed facility in Mecklenburg County. The facility was shut down for a while for decontamination.

From 1961 through 1970, there was no more than one

transportation related incident per year and for two of these years there were no incidents. In 1971, there were three incidents; from 1972-74, there was only one per year. However, in 1975 there was a notable increase of six incidents. This dropped to three in 1976 and rose to five in 1977. There was only one incident in 1978 and none thus far for 1979.

"We try to critique each incident we respond to," said Brown. "We look for any mistakes or loss of time which we might have made to make sure they don't happen twice," he concluded.

APPENDIX D: List of Counties in the State Economic Areas of North Carolina

LIST OF COUNTIES IN EACH STATE ECONOMIC AREA OF THE STATE OF NORTH CAROLINA

SEA 1

Alleghany
Ashe
Avery
Cherokee
Clay
Graham
Haywood
Henderson
Jackson
Macon
Madison
Mitchell
Swain
Transylvania
Watauga
Yancey

SEA 2

Alexander
Burke
Caldwell
McDowell
Wilkes

SEA 3

Alamance
Caswell
Granville
Orange
Person
Rockingham
Stokes
Surry
Vance
Yadkin

Sea 4

Cabarrus
Catawba
Chatham
Davidson
Davie
Iredell
Montgomery
Randolph
Rowan
Stanly

SEA 5

Anson
Cleveland
Caston
Lincoln
Polk
Rutherford
Union

SEA 6

Franklin
Harnett
Johnston
Lee
Sampson
Warren

SEA 7

Bertle
Chowan
Gates
Halifax
Hertford
Martin
Northampton
Perquimans
Washington

SEA 8

Edgecombe
Greene
Lenoir
Nash
Pitt
Wayne
Wilson

SEA 9

Cumberland
Hoke
Moore
Richmond
Robeson
Scotland

SEA 10

Beaufort
Camden
Currituck
Dare
Hyde
Pasquotank
Tyrrell

SEA 11

Bladen
Brunswick
Carteret
Columbus
Craven
Duplin
Jones
New Hanover
Onslow
Pamlico
Pender

SEA A

Buncombe

SEA B

Forsyth

SEA C

Guilford

SEA D

Macklenburg

SEA E

Wake

SEA F

Durham

APPENDIX E: Report of the Governor's Task Force on Waste Management

State of North Carolina

**Report of the
Governor's Task Force
on Waste Management**

February, 1981

March 9, 1981

Governor James B. Hunt, Jr.
State of North Carolina
State Capitol Building
Raleigh, North Carolina, 27611

Dear Governor Hunt:

In behalf of the Task Force on Waste Management which you appointed during July 1980, I am pleased to transmit herewith our report on the problem of waste management in North Carolina and suggested solutions for handling these problems.

The members of the Task Force were honored to have been selected for this vitally important assignment. They labored diligently by reading many reports, attending meetings throughout the entire period, listening to and questioning national experts on various aspects concerning the technology of waste management, conducting public hearings throughout the state in seven sites, and by contributing their wisdom and experience to this report. The report delineates as clearly as possible the issues, alternative options for handling these issues, and recommends strategies and legislative proposals for your consideration.

Owing to the constraint of time imposed by the convening of the General Assembly, it was not possible to resolve all of the issues confronting the state with regard to waste management. The Task Force was fortunate in being able to study the waste management strategy of other states and to adopt those ideas and techniques applicable to North Carolina.

It is hoped that you will agree to appoint the recommended Governor's Waste Management Board as soon as possible so that the work of the Task Force may be continued to resolve those issues being referred to it in this report.

The members wish to express their willingness to help you and any state agency involved in waste management as well as the newly proposed Board to implement and carry forward any of the recommendations.

Sincerely,

A handwritten signature in cursive script, reading "Bernard G. Greenberg". The ink is dark and the signature is fluid, with a large initial 'B'.

Bernard G. Greenberg

Chairman, Governor's Task Force
on Waste Management

TABLE OF CONTENTS

	<u>Page</u>
Membership of the Task Force	
Executive Summary	
Chapter I	Introduction 1
Chapter II	Statement of Goals of The Task Force 5
Chapter III	The Management Problem 7
Chapter IV	Technology and Strategies 15
Chapter V	Recommended Management Approach
	A. Elements of a Comprehensive Waste Management System 23
	B. Existing Management Framework 24
	C. Organizational Arrangements--The Governor's Waste Management Board 28
	D. Regulation and Enforcement 35
	E. Development and Utilization of Waste Management Technology 38
	F. Facility Development and Operation 47
	G. Emergency Response and Cleanup 56
	H. Citizen Involvement 57
Chapter VI	Strict Liability - General Considerations . 62
Chapter VII	Public Hearings 65
Appendix	
Acknowledgments	

MEMBERSHIP OF THE
GOVERNOR'S TASK FORCE ON
WASTE MANAGEMENT

Two Legislators

Representative Charles Holt
Co-Chairman, Legislative Study Commission
on the Management of Hazardous Waste
Box 53157
Fayetteville, North Carolina 28305

Senator Russell Walker
Co-Chairman, Legislative Study Commission
on the Management of Hazardous Waste
P. O. Box 1831
Asheboro, North Carolina 27203

Three Representatives of Industries Which Generate Waste

Textiles

Mr. Jack Elam
Vice President and General Counsel
Cone Mills Corporation
1201 Maple Street
Greensboro, North Carolina 27405

Utilities

Mr. William Graham, Jr.
Senior Vice-President and General Counsel
Carolina Power and Light
P. O. Box 1551
Raleigh, North Carolina 27602

Mr. Carl Horn, Jr.
Chairman of the Board
and Chief Executive Officer
Duke Power, P. O. Box 33189
Charlotte, North Carolina 28233

One Representative from the Higher University System

UNC - School of Public Health

Dr. Bernard G. Greenberg, Dean (Chairman of Task Force)
School of Public Health
University of North Carolina
Rosenau Hall 201H
Chapel Hill, North Carolina 27514

Two Representatives of Local Governments

Ms. Betty Ann Knudsen
Wake County Board of County Commissioners
617 Macon Place
Raleigh, North Carolina 27609

Mr. Forrest Campbell
Guilford County Board of County Commissioners
201 S. Eugene Street
Box 3427
Greensboro, North Carolina 27402

Three Citizens At-Large

Ms. Marion Nichol
President of the North Carolina League
of Women Voters
2637 McDowell Street
Durham, North Carolina 27705

Mr. Denny Shaffer
2910 Skye Drive
Fayetteville, NC 28303
Active Member of Sierra Club in NC
National Treasurer of Sierra Club

Mr. John Curry
P. O. Box 130
Carrboro, North Carolina 27510
Former President Conservation Council of N. C.

Secretaries from the following Departments within State Government

Department of Administration

Ms. Jane Patterson, Acting Secretary
116 W. Jones Street
Raleigh, North Carolina 27611

Department of Crime Control and Public Safety

Mr. Burley Mitchell
512 N. Salisbury Street
Raleigh, North Carolina 27611

Department of Natural Resources and Community Development

Mr. Howard Lee
512 N. Salisbury Street
Raleigh, North Carolina 27611

Department of Transportation

Mr. Tom Bradshaw
1 South Wilmington Street
Raleigh, North Carolina 27611

Department of Human Resources

Sarah T. Morrow, M.D., M.P.H.
325 N. Salisbury Street
Raleigh, North Carolina 27611

Department of Commerce

Mr. Lauch Faircloth
430 N. Salisbury Street
Raleigh, North Carolina 27611

Department of Agriculture

Commissioner James A. Graham
1 West Edenton Street
Raleigh, North Carolina 27611

Ex-Officio

Dr. Quentin W. Lindsey
Governor's Science and Public Policy Advisor
Office of the Governor, Administration Building
116 W. Jones Street
Raleigh, North Carolina 27611

EXECUTIVE SUMMARY

The proper and safe management of hazardous and low-level radioactive waste has become one of the most crucial health, environmental, and economic issues facing our state and nation today. Each year approximately 120 million gallons of hazardous waste and 200,000 cubic feet of low-level radioactive waste are generated in North Carolina in the process of meeting its citizens' demands for modern day goods and services. North Carolina ranks as the eleventh largest generator of hazardous waste and the fourth largest generator of low-level radioactive waste in the nation.

In the past, North Carolina generators have depended upon facilities in other states to treat and dispose of their waste materials. However, these states are reducing by indirect means the amount of out-of-state waste they will accept and North Carolina must now take responsibility for managing its own waste. The State's future depends on its ability and commitment to seek an acceptable solution for this problem. A well-conceived and strictly enforced waste management system that provides for waste prevention and in-state treatment and disposal of the non-preventable wastes will enable North Carolina to prevent Love Canals and future dumpings of PCB along its highways.

The thrust of this report is that the state must develop a system of waste management which is flexible enough to adjust to emergencies and changing technology, but is firm in its determination to prevent the generation of waste that cannot be disposed of safely. Protection of the health and environment of our citizens now and in the indeterminate future must be the overriding concern of this waste management system. Generators, transporters, and operators of waste management facilities must bear full responsibility for the consequences of damage as well as the operating expenses of the system.

The following recommendations are made by the Task Force as ways the state can take immediate steps to improve its ability to manage hazardous and low-level radioactive wastes and better protect the health of its citizens and the environment.

The Governor's Task Force on Waste Management recommends that:

1. A comprehensive waste management system be developed which emphasizes prevention and resource conservation and recovery, and minimizes the volume of waste to be disposed of.
2. The state adopt a basic policy to create economic incentives to encourage industry to minimize generation of wastes for which there is no other alternative than permanent disposal and to develop means of treatment or reuse of all wastes. To advance this policy, the state should enact legislation to create new tax incentives for industry to reduce generation and to treat and recycle waste.
3. A Governor's Waste Management Board be created to advise the Governor on organizational and policy issues related to the development and operation of an effective waste management program for North Carolina. The Board should be representative of a broad range of interests and should include members from all geographical areas of the state.
4. The state promote research and development which is directed to solve waste management problems unique to North Carolina. The Board also shall recommend annually to the Governor a recipient for a "Governor's Award of Excellence" for outstanding achievement by an industry or company that makes technological advancements in this field.
5. Funding be made available to the Waste Management Board to work in conjunction with the Piedmont Waste Exchange or any other existing organizations for the development of a successful Waste Information

Exchange. The Board shall also develop a plan for providing technical assistance and information to industries and, at the earliest feasible times, request the necessary funding from the General Assembly to implement the proposed plan.

6. The private sector be given the lead responsibility for selecting appropriate sites and for developing and operating waste management facilities. The state should be given the authority to acquire land, and own, operate or enter into lease agreements for the development and operation of these facilities if the private sector does not meet the demand.
7. The private sector be required to give title to the state for land which is to be used as a landfill containment facility for hazardous or low-level radioactive waste.
8. The necessary steps be taken to make revenue bonds available for hazardous and low-level radioactive waste treatment and recycling facilities but not for storage and burial facilities, and to require that a facility must obtain a certification of eligibility from the Department of Human Resources before it can qualify for such bonds. The Task Force believes that the total cost of storage and burial of wastes should be borne by generators.
9. A comprehensive plan for public participation be included as an integral part of the State's waste management program. It is particularly important that local citizens be given ample opportunity to be involved in siting waste management facilities in their community. The State should strongly encourage local governments to form local facility siting committees to guarantee local citizen input into the decision-making process and to provide for open exchange of information concerning a proposed facility. The Waste Management Board should create a subcommittee to work with each locality from the outset of the siting process. The Department of Human Resources should give notice to a locality when an application is made for a permit to locate a facility in the locality.

10. The Council of State be authorized to condemn land for the acquisition of suitable waste facility sites, after receiving a request from the Secretary of the Department of Human Resources, who has consulted with the Governor's Waste Management Board.

11. A waste management facility developer be authorized to petition the Governor's Waste Management Board in the event that the facility is prevented by local ordinance(s) or that the local governing body has formally adopted a position of opposing the proposed facility. After reviewing the petition and pertinent information, the Board shall make a recommendation to the Governor after determining whether:

(1) the proposed facility is necessary to establish adequate capability for the management of hazardous and low-level radioactive waste generated in North Carolina, and therefore serves the interest of the citizens of the state as a whole;

(2) all legally required state and federal permits or approvals have been issued by the appropriate state and federal agencies;

(3) the local citizens and elected officials have been given adequate opportunity to participate in the siting process.

(4) the existence of the facility would pose an unreasonable health risk or other adverse effect to the community and adequate steps have been taken to anticipate, manage and avoid all foreseeable risks.

After receiving a recommendation from the Board, the Governor should be authorized to reject the recommendation or to approve it and thereby make a final siting decision. This decision by the Governor shall have control over any applicable local ordinances, acts or rules.

12. Local governments be given the authority to establish a privilege license tax based on actual costs and lost revenues associated with a waste management facility, subject to review and approval by the Governor's Waste Management Board.
13. The state be authorized by statute to charge a tax or fee on the waste handled by burial facilities in order to establish a central fund sufficient to pay the cost of post-closure monitoring and care and to pay for any damages that might occur after the operators' 30-year period of post-closure liability has ended.
14. The Governor's Waste Management Board study and make a recommendation concerning whether the state should be compensated for actual costs of monitoring a waste management facility and, if so, what method should be used.
15. The Departments of Human Resources and Natural Resources and Community Development develop additional siting criteria for the development and operation of low-level radioactive waste management facilities.
16. The state of North Carolina pursue the regional compact approach with its neighboring states for the safe management of low-level radioactive waste. Federal legislation which legalizes these compacts has been enacted.
17. A study and evaluation be conducted of the waste management activities within state government related to hazardous waste and low-level radioactive waste. This evaluation should focus particularly on the effectiveness of the involved state agencies and of the Board itself in coordinating and improving performance of waste management functions. In order to ensure objectivity, legislative staff and outside consultants should be involved in this evaluation. High priority should be given to evaluating and reporting on the possible need to reorganize State agencies to

improve further the overall performance of waste management programs.

18. The Governor's Waste Management Board conduct an on-going evaluation of current and proposed rules and regulations and recommend to the appropriate body any changes, additions, or deletions considered necessary to ensure that the public's health and the environment are protected to the maximum extent possible. The Task Force currently recommends that several amendments be introduced during the 1981 General Assembly to strengthen current laws. Those recommendations are discussed in Chapter V, Subchapter D.
19. The state adopt a policy that financial responsibility for damages resulting from hazardous and low-level radioactive wastes be allocated to the greatest extent possible to generators, transporters, and operators of treatment, storage, and disposal facilities. The Task Force recommends that the Governor's Waste Management Board study and make recommendations to the Governor concerning the possibility of furthering this policy by: applying a standard of strict liability to generators, transporters, and facility operators; establishing a fund paid for by waste generators to compensate for personal, property, and environmental damages caused by waste; and increasing liability insurance for facility operators above the amount presently required under RCRA regulations.

CHAPTER I

INTRODUCTION

The history of human life on this planet may be viewed as a struggle between man and his environment in an effort to produce food, provide shelter, and to be protected from infectious diseases. After learning how to provide shelter against the elements of nature, man had to create a surrounding region that was sanitary and safe. For example, the Greeks, Romans and their contemporaries developed intricate systems for fresh water supplies and for disposing of human and animal wastes.

Problems of communicable disease, however, continued to constitute a threat to every generation until the present century. The spread of communicable disease and the resultant increase in mortality rates reached a peak when the industrial revolution brought masses of people to the city at the same time that sanitation of the environment was ignored both in the workplace and at home. In 1832, Edwin Chadwick conducted a survey of the laboring poor in England and concluded that an unsanitary environment was related to disease and high mortality. A few years later it was shown that a cholera epidemic in London could be traced to contaminated water. In the United States around the same time, viz. 1850, a sanitary survey was conducted by Lemuel Shattuck which confirmed the theory that poor sanitation was indeed a contributing factor in the spread of infectious disease. He recommended a plan of corrective action to which he anticipated objection because "We are businesslike, money-making, and money-loving people."

This brief sketch of the early public health movement is cited here to point out that good sanitation has always been synonymous with prevention of disease. These developments happened even before the germ theory was put forward in the latter half of the nineteenth century as the underlying cause of infectious disease. This history

demonstrates that not only can prevention of an unsanitary environment lower the incidence of disease before the causes are known, but also that the effort to maintain a safe environment must take precedence over all other concerns.

Although the underlying causes of infectious diseases were later traced to microorganisms and parasites, it is important to recognize that prevention was eventually the means of reducing these diseases to the point of elimination. Effective means of treatment, such as the antibiotics, were developed later to fill the gap when prevention failed or was not applied.

Prevention also must be brought to bear to solve the brunt of the problem of toxic substances and hazardous wastes. Where prevention is not applied, we must develop methods of treatment that are safe, effective, and economically feasible.

Hazardous wastes probably started to accumulate with the onset of the industrial revolution. Most of these waste products were relatively small and were almost always biodegradable. That is, with time, the waste product was attacked by elements of nature and lower forms of life such that the result was a harmless end product. In fact, the soil in which it was buried was sometimes enhanced.

Starting with World War II, industrial waste became more common as manufacturing and chemical by-products grew in volume and complexity. When non-biodegradable detergents, pesticides, heavy metals, trihalomethanes and other toxic substances first appeared in some of the nation's water supplies and food chain, concern was expressed as to the future of society and what kind of environmental nightmare would be the legacy to our children.

North Carolina was fortunate, in one sense, in lagging behind the northeast and midwest in industrial development. Large chemical dumps, such as those characterized by Love Canal, did not accumulate here twenty and thirty years ago. Hazardous waste products were slower in reaching this state.

Today, however, North Carolina has more than caught up with the nation in the generation of industrial by-products and chemicals that are dangerous to handle and which must be properly disposed. The textile, furniture, printing, paper, chemical, and agricultural industries are all contributing to this accumulation of waste. The Environmental Protection Agency (EPA) ranks North Carolina as eleventh in the nation in generating these hazardous waste products. Time is fast running out for the state to manage this problem.

Recognition of the dangers inherent in radioactivity is yet another problem. The hazards of cancer, birth defects, eye cataracts and other health impairments as a result of relatively high radiation doses were more clearly specified starting in the 1950s. As nuclear plants for generating electricity started to be developed, it was apparent that small amounts of radioactivity were present in disposable gloves, workclothes, and materials and tools used in the generating process. This low level radioactive waste was also present in equipment and animal carcasses used in scientific and medical research as well as in some of the disposable materials used in medical diagnosis and treatment.

North Carolina is now ranked as the fourth largest in the nation in the volume of low level radioactive waste generated. Moreover, some of the waste remains radioactive for a long period of time.

Until recently, there has been practically no coordinated effort among the states to solve these waste problems. A few took the initiative by implementing special legislative restrictions for the handling of certain waste materials and even fewer provided adequate sites for disposal by burial. The federal Resource Conservation and Recovery Act (RCRA) of 1976 recognized that the problem was growing out of control and that positive action was required both at the state and federal levels. As of November 19, 1980, RCRA requires a "manifest," or tracking system, which records the amount and kind of waste generated and traces the material to be certain that it is properly disposed. EPA is charged with adopting rules and

regulations for waste management, and enforcing them where any state is not certified as having the proper system to do so itself. North Carolina is one of the first states to receive interim authority from EPA to implement its own regulatory program under the RCRA.

This report is intended to recommend a waste management system which will supplement North Carolina's ability to protect the environment and comply not only with the rules and regulations but also with the spirit of the federal and state laws. The system is intended to manage the waste problem but it should be borne in mind that the long-range solution must be prevention. For that reason, the members of the Task Force wish to stress that the chapters on research and technical assistance are not luxuries but vital to the state's economic survival in the future.

Moreover, an adequate method for monitoring the effectiveness of this State's efforts to manage waste must be established to be doubly certain that harmful substances are not entering the food chain through water, land, or animals and that the ambient air is free of contaminants from the handling, treatment, and disposal of waste. All of these efforts should be part of an on-going evaluation of the waste management system in order to improve upon it as we learn from experience and research.

CHAPTER II

STATEMENT OF GOALS OF THE GOVERNOR'S TASK FORCE ON WASTE MANAGEMENT

The planning effort of the Task Force was scheduled to culminate in this final report and recommended legislation for consideration during the 1981 session of the General Assembly. The goals of this report are as follows:

- (1) Examine and document the need for North Carolina to develop the capacity to manage hazardous and low-level radioactive waste.
- (2) Examine alternative comprehensive waste management strategies and recommend a strategy that, (a) emphasizes resource conservation and recovery, (b) minimizes the volume which must be buried and (c) ensures the availability of cost-effective waste treatment sites and facilities in North Carolina based upon criteria that provide maximum protection of the public health and safety, and the environment.
- (3) Evaluate the relative capabilities of the public and private sectors to respond to the needs of the comprehensive waste management system, and recommend the appropriate roles for each.
- (4) Review current laws and regulations governing hazardous and low-level radioactive wastes and recommend any changes in these laws and regulations that are necessary to ensure that the health and safety of the public and the workers in the industry are protected, and that the environment is adequately safeguarded.
- (5) Make management recommendations for the ongoing planning, implementation and monitoring of the State's comprehensive waste management system.

- (6) Propose to the 1981 General Assembly legislation necessary to enable North Carolina to begin implementing a comprehensive waste management system.

CHAPTER III

THE MANAGEMENT PROBLEM

The United States government has been generating high-level and low-level radioactive wastes in defense and research programs since World War II. Since the 1950s, low-level radioactive wastes also have been produced by nuclear power plants, medical and research facilities and industrial activities. During the same period, hazardous wastes have increased at an accelerated rate with the development of thousands of new chemicals and the high technology industries that now characterize American society. Before discussing the management problem that these wastes have created, it is necessary to have an understanding of what these wastes are and where they originate.

A. Definition of Wastes

Low-Level Radioactive Wastes - The Nuclear Regulatory Commission, the federal government agency which regulates the use of commercial radioactive material, defines low-level radioactive wastes as any commercial radioactive waste other than the products from reprocessing used nuclear power plant fuel rods, the by-products of the mining and milling of uranium ore, or certain long-lived radioactive materials which require extremely long periods of isolation from the environment.

As their name indicates, low-level radioactive wastes generally contain very low levels of radioactivity. They usually consist of everyday items which have become slightly radioactive through exposure to a radioactive element. They may be paper, plastic, glassware, disposable syringes, clothing or gloves from medical or research laboratories, or filters, filter sludges, mechanical equipment, piping and liquid wastes from nuclear power plants or industrial operations. Though they present a very small hazard when compared with high-level wastes, low-level radioactive wastes must

still be handled carefully and disposed according to strict regulations.

Hazardous Waste - The Resource Conservation and Recovery Act of 1976, the federal law under which hazardous substances are regulated, defines a hazardous waste as "a solid waste, or combination of solid wastes, which because of its quantity, concentration or physical, chemical or infectious characteristics may:

--cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness.

--pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed."

Although the legal definition refers to solid wastes, hazardous wastes also include liquids, sludges and contained gases. Hazardous wastes possess at least one of four characteristics: ignitability, corrosivity, reactivity, or toxicity.

- a. Ignitable wastes catch fire easily and as a result normally are segregated from other waste materials. Examples include discarded organic solvents such as toluene and benzene, oils, plasticizers, some pesticides, and paint and varnish removers.
- b. Corrosive wastes are substances that eat away materials and living tissue by chemical action. Examples include alkaline cleaners, acid liquids used in etching, and wastes from battery production.
- c. Reactive wastes may react spontaneously and vigorously with air or water, be unstable to shock or heat, generate toxic gases, or explode. Examples include obsolete munitions and manufacturing wastes from the explosives and chemical industries.

- d. Toxic wastes are any substances (solid, liquid, or gas) that are poisonous to living beings. Examples include some pesticides, arsenic, cadmium, and their salts, and other heavy metals.

B. Current and Projected Waste Generation In North Carolina

Low-Level Radioactive Wastes - About 202,000 cubic feet of low-level wastes was generated in North Carolina in 1979. Projections indicate that this level will increase by a rate of 10 to 15 percent a year.

An estimated 55 percent of this waste was generated by nuclear power plants. Another 33 percent was generated as a by-product of nuclear fuel fabrication. Institutions, including hospitals, research centers, and universities, accounted for about 12 percent of the volume. (see Appendix I for statewide distribution)

Nuclear power, while generating 55 percent of the volume of low-level radioactive waste in the state, was responsible for more than 95 percent of the total level of radioactivity. These waste materials consist of filters used for removing radioactivity from contaminated liquids, solidified radioactive sludge from evaporation of liquids, compacted wastes such as paper and rags, and bulk waste from plant maintenance and repairs on radioactive equipment and systems.

Nuclear fuel fabrication represented 33 percent of the volume of low-level radioactive wastes generated in 1979. This was less than one percent of the total level of radioactivity. These wastes consist of combustible materials such as paper, towels, gloves, protective clothing and oil; and non-combustible wastes such as containers, machine tools, piping, laboratory glassware and calcium fluoride.

Medical, institutional and research facilities in North Carolina generated about 12 percent of the volume of the low-level radioactive wastes. This was about 4.5 percent of the total level of radioactivity. These wastes include laboratory animal carcasses,

slightly contaminated glassware, residues from the preparation of radioactive compounds, radiopharmaceuticals (radioactive drugs used in nuclear medicine departments for diagnostic and therapeutic programs) and the materials used in their preparation and administration to patients.

Hazardous wastes - Based on a 1976 survey of hazardous and difficult-to-handle wastes, the Solid and Hazardous Waste Branch of the North Carolina Department of Human Resources calculated that approximately 120 million gallons of hazardous substances are produced every 12 months in North Carolina. (see Appendix II for statewide distribution)

Seven major types of industries were included in the survey, and statistical projections were made after on-site visits to 825 manufacturing facilities across the state. These facilities include textile mills, printing and publishing companies, chemical and allied products manufacturers, primary metal industries, fabricated metal producers, electrical and machinery industries, and industries using other types of machinery.

The survey results show the top ten counties in the generation of hazardous waste are: Mecklenburg County (10 million gallons), Guilford County (7.5 million gallons), Gaston (4.4 million gallons), Wake (2.4 million gallons), Rowan (2.2 million gallons), Brunswick (2.1 million gallons), Cumberland (2 million gallons), Forsyth (1.6 million gallons), Wilson (1.5 million gallons), and Columbus (1.3 million gallons).

Under RCRA, industries and businesses that produce more than 1,000 kilograms (about 2,200 pounds) of hazardous waste material each month, or that haul or store hazardous wastes, were required to register with the EPA on or before August, 1980. The 10 counties with the greatest number of industries which registered with EPA as a large generator of hazardous substances are as follows: Mecklenburg, 159 generators; Guilford, 125; Wake, 58; Forsyth, 54;

Cumberland, 51; Catawba, 51; Davidson, 44; Durham, 42; New Hanover, 41; and Robeson, 38. Eight counties had no firms listed as major generators, transporters, or storers of hazardous wastes. (See Appendix III for number of generators per county).

More than 6,000 other industries and businesses in North Carolina also generate hazardous wastes, but in amounts that are under the 2,200 pound limit. They are not required at this time to participate in the manifest system, but legally are required to manage their wastes according to RCRA regulations.

More accurate data on waste generation in North Carolina will be available in the spring of 1981 after the manifest system set up under RCRA becomes fully operational. This cradle to the grave tracking system, which took effect on November 19, 1980, requires annual reports from industries on types and volumes of hazardous waste they generate.

C. The Economic Impact

The jobs and wages associated with generators of hazardous and low-level radioactive waste have a tremendous impact on the North Carolina economy. Even a partial disruption of the operation of waste generating industries owing to the lack of waste management facilities would have a serious effect on the state's employment picture.

A total of 1,442 companies in North Carolina registered with EPA in August, 1980, as generators of more than over 2,200 pounds of hazardous waste each month. Of these, 872 were registered with the North Carolina Employment Security Commission. The Commission's records show that these firms employ 361,926 people and pay more than five billion dollars in annual wages. These data do not represent the total employment and wages associated with companies which generate waste. (See appendix IV, V and VI for accompanying charts)

The nuclear industry in North Carolina employs more than 5,500 people and pays wage benefits annually of more than \$120 million. Figures for medical, research and institutional facilities are not available at this time, but the contributions of these activities to North Carolina's economy are considerable.

D. Current Waste Management Options for North Carolina Generators

Traditionally, North Carolina has depended on facilities in other states to treat and dispose of its hazardous and low-level radioactive wastes. The majority of North Carolina's hazardous wastes are transported to Pinewood, South Carolina, and to Alabama for treatment and disposal. Most of the low-level radioactive waste generated by North Carolina's nuclear power plant and other commercial activities are sent to Barnwell, South Carolina, where one of only three low-level disposal sites in the country is located. Medical and institutional low-level wastes are shipped to the two remaining disposal sites in Nevada and Washington state.

States that have handled wastes for other states in the past have indicated that they are no longer willing to shoulder the waste disposal burden for the entire country. If North Carolina is to continue to grow and prosper, the hazardous and low-level radioactive wastes generated within its own borders must be reduced by prevention, recycling, and recovery or destroyed by methods known to be safe. Land burial should be avoided if at all possible and the state system of management that is developed should be based on this principle.

In North Carolina at this time, small amounts of hazardous wastes are being treated at the plant sites where they are generated, and at several commercial incinerators that burn certain types of these wastes. None of these facilities have received final permit authorization under federal regulations which are expected to go into effect later this year.

An interim permit was granted to SCA Services of Boston, Mass., in September, 1980 for construction of the state's first large commercial treatment and recycling facility for hazardous wastes. The development of this facility has been held up pending the outcome of an administrative hearing, and possible court action.

E. What is Needed?

There is a need for additional treatment and volume reduction facilities within North Carolina to reduce the volume of hazardous and low-level radioactive waste which requires landfilling and reclaim those substances which can be reused. The Task Force is unable to determine at this time exactly how many of these facilities are needed in order to reduce to an absolute minimum the volume of waste that must be disposed of permanently. Once the manifest system is in full operation, information will be available to enable the state to determine more accurately the type and number of facilities needed to achieve this goal.

At least one hazardous waste landfill is probably needed now in North Carolina for ultimate disposal of wastes that cannot be treated or further reduced in volume. Presently, it is not determined if a landfill is needed for low-level radioactive waste. A regional compact appears to be more feasible economically, and North Carolina is discussing this possibility with its neighboring states. Under this approach, each state would determine what role it would play in developing the necessary facilities for a comprehensive waste management system. The Barnwell facility in South Carolina could serve as a regional burial facility. Other facilities which are needed for the creation of a comprehensive regional system include an additional back-up burial facility, an incinerator for liquid waste from medical and research facilities, and volume reduction and storage facilities. North Carolina must determine which type of facility it is willing to develop if it wants to be a member of this compact system. The state should also continue to lay the necessary foundation to develop an in-state capability to manage properly its

low-level radioactive waste in case the regional approach is not successful.

CHAPTER IV

TECHNOLOGY AND STRATEGIES FOR MANAGING WASTES

A variety of technologies and strategies exist today for the handling, treatment and disposal of hazardous and low-level radioactive wastes. While recognizing that these technologies will improve with continued research and increased knowledge, they offer a far better solution to the existing waste management problem than no management at all.

The recommended approach to solving North Carolina's waste problem is to develop a variety of safe and economical alternatives. This comprehensive waste management system must be designed to facilitate prevention, resource conservation and recovery and minimize the volume to be buried. The following is a general discussion of technologies available today. More detailed information is available in two recently published reports - The Technical Advisory Committee Report on Hazardous Waste in North Carolina and the Technical Advisory Committee Report on Low-Level Radioactive Waste in North Carolina. They are available upon request from the Department of Human Resources.

A. Resource Conservation and Recovery

The most desirable and economical way to manage and control hazardous wastes is in the plant where they are generated. It is possible to reduce wastes without slowing progress, or losing good jobs and economic security. This is being proved by industry itself. In an article entitled, "Thinking Ahead: Making Pollution Prevention Pay," in the November-December 1980 issue of the Harvard Business Review, (pp. 2-22), Michael Royston presents very convincing evidence that "new no-waste technologies in use around the world can help companies meet their goals of profit, growth, and survival." The article describes how many firms see the production of hazardous, or any other waste, as uneconomical and eliminate or reduce them by redesigning their manufacturing process.

Conservation and recovery methods employed at plant sites are referred to in the Technical Advisory Committee Report on Hazardous Wastes as the "in-plant option," and utilize two general areas of technology:

1. Process modifications that eliminate or greatly reduce specific toxic substances in the waste stream by making them non-hazardous. This usually involves changing the chemistry or the engineering techniques used in the production processes.
2. Processes that either recycle wastes to be used again, or that reduce the volume of hazardous waste (for example, incineration) leaving the plant.

These processes do not always offer a total solution to the problem either because the technology doesn't exist or because current methods are not economical.

B. Recycling, Treatment, and Volume Reduction

Because many companies cannot afford to develop the in-plant capabilities to recycle, treat and reduce their waste volume, the development of off-site facilities to provide these services is needed in North Carolina.

One example of a recycling facility for hazardous waste already in operation in North Carolina is the Oil Recycling Demonstration Plant. This facility converts waste motor oil, a hazardous waste, into a completely reclaimed, high quality lubricating oil. The impurities removed from the oil are concentrated into a very small volume for further disposal. The cost of the facility is approximately \$2 million, and an economic analysis shows a good return on the investment.

Recycling or recovering radioactive elements from low-level radioactive wastes, on the other hand, is normally not economically

feasible. There is one exception to this general rule in North Carolina. Since fuel fabrication wastes contain low enriched uranium, the General Electric Fuel Fabrication plant in Wilmington recovers uranium and useful by-products from incinerated low-level radioactive wastes.

The plant is also storing about one million cubic feet of calcium fluoride sludge (which results from the processing of fuel rods) because the company believes that a process for recovering uranium from these materials will be found in the not too distant future.

Types of processes used to treat and reduce hazardous waste materials include thermal, chemical, biochemical and physical.

1. Thermal Treatment - The most common types of thermal treatment are pyrolysis and incineration. Pyrolysis uses high temperatures (thousands of degrees) to convert hazardous waste compounds into non-hazardous compounds and ash.

Incineration uses high or low temperatures to burn hazardous wastes, converting them into water, carbon dioxide and ash. In either case, the resulting ash may be hazardous or non-hazardous. If it is hazardous, it must be disposed of in an approved landfill.

2. Chemical Treatment - Some hazardous wastes may be made less dangerous by chemical reactions that transform them into a less hazardous form. This can be achieved through fixation, which joins the hazardous compound with a less hazardous material; and precipitation, which separates the liquid and solid constituents of a hazardous material.
3. Physical Treatment - Physical treatment separates hazardous constituents from the non-hazardous ones which reduces the volume to be treated or disposed.

4. Biological Treatment - In biological treatment, certain microorganisms attack the molecular structure of hazardous substances breaking down these substances into less hazardous compounds. Recent innovations in biological engineering provide methods of disposing of even the most toxic of wastes.

Much of the volume of low-level radioactive wastes generated in North Carolina can be reduced by compaction or incineration. Compaction is probably the simplest method available for volume reduction. In the compaction process, trash is hydraulically rammed into a shipping drum under pressure. A vacuum removes air expelled from the drum to a ventilation system where it is filtered to remove radioactivity. The process is repeated until the drum is filled. It reduces volume by a factor of three.

The incineration process reduces low-level radioactive waste volume by 50 to 90 percent and converts the waste into ash which is chemically inert, sterile, nonflammable and has low water solubility. This works well for dry trash and combustible liquids. It is especially suited to institutional low-level radioactive waste.

C. Waste Information Exchange

Waste exchange is another approach to hazardous waste management that is designed to promote recycling and reuse of industrial wastes. The exchange concept has been successful in Europe and is being tried in at least twelve locations in the United States. The Piedmont Waste Exchange in Charlotte is operated by the University of North Carolina at Charlotte through the Institute for Urban Studies. It publishes a periodical called the Waste Watcher on a quarterly basis.

A waste exchange organization either can acquire and resell waste materials, or it can simply serve as a clearinghouse to exchange information that will help industries locate waste materials which they can use in their industrial processes.

An exchange organization that actually handles wastes must make a substantial investment in land and equipment, as well as employ highly trained personnel. These types of organizations have been only moderately successful and it will be important to study the impact of the Piedmont Waste Exchange, started in 1978, to learn its value as a waste management tool for North Carolina. If the initial phase is a clearinghouse which transfers information only, operating costs are minimal.

The clearinghouse also can become an effective source of technical information on recycling, process modification, and changes in regulations, particularly useful to medium-sized and small companies.

The waste exchange clearinghouse approach is not very useful when dealing with low-level radioactive wastes because it is normally not feasible to recycle or recover the radioactive constituents from materials.

D. Land Treatment

In land treatment, selected types of hazardous wastes can be applied to the plant-soil system (a land area covered by vegetation) at specific rates and times. Chemical and biological reactions break down a portion of the waste, absorption and fixation affect other portions, and controlled migration is allowed for certain inorganic fractions. Application rates are kept low enough so that the land remains agriculturally usable.

The technology for land treatment is still being developed. It is not clear what part it will play in the overall hazardous waste management plan for the state of North Carolina.

The concept of land treatment is not applicable to the management of low-level radioactive wastes.

E. Above Ground Storage

Above ground storage is neither a permanent solution nor one which is applicable to all classes of waste products. As the word storage implies, the method might be useful for the temporary placement of certain substances above ground for which there is a reasonable prospect that research will develop new technology to recover or recycle the useful substances (e.g. heavy metals), or new procedures to detoxify or neutralize the waste completely. Above ground storage at off-site facilities would be inappropriate for low-level radioactive wastes with a half-life of approximately one year or longer and for corrosive and ignitable products. Storage should never be considered for materials that can be safely treated as mentioned in Section B.

Storage must carry enormous security requirements against fire, lightning or other unusual weather conditions, accidents, leakage, and extremes of temperature which may increase the reactivity of the waste. The primary advantage of temporary storage is to avoid the use of landfills for materials that might be detoxified or recycled within a few years as technology improves. It will also promote the need for the state and nation to embark upon research that will lead to methods of recovery and detoxification.

The Task Force recommends that the proposed Governor's Waste Management Board study this method and attempt to classify those waste products which are amenable to such storage. It should also consider taking steps to assure that this type of facility is available in North Carolina if it proves to be a better management option for certain types of waste.

F. Land Disposal

A final, but currently necessary component of a comprehensive waste management system is approved landfills for ultimate disposal of wastes that cannot be treated or further reduced in volume.

Every effort should be made to recycle or reduce the volume of all wastes so that the use of landfills will be minimized. The disposal of wastes in a properly engineered, well monitored and secure landfill can be handled without immediately endangering the environment or health of the citizens. However, present knowledge is inadequate to determine how long a landfill facility will remain secure. Therefore, any waste disposed of in a burial facility should be clearly identified and labelled, and its location marked to facilitate retrieval in case detoxification becomes feasible or leakage is discovered.

Landfill containment of hazardous wastes is primarily intended for waste solids, which are normally delivered to the landfill in containers (drums, barrels) and placed in compartmentalized subsections of the landfill. Absorbent is placed around, above and below each container, and the landfill is lined with clay or artificial liners to prevent waste material from moving through the soil to the groundwater.

Closure of the individual compartments, or cells, in a landfill requires the application of impermeable liners and vegetative cover. After closure of all cells, the site is perpetually monitored for environmental impact.

The standards imposed by the Resource Conservation and Recovery Act for the design, construction, and operation of a permitted landfill, and the costs of locating, designing, permitting and operating an approved facility obviously are very high. It is not economically feasible to operate more than a few in North Carolina.

Historically, low-level radioactive wastes in the United States have been disposed of in shallow burial landfills. This disposal method involves excavating the earth to form trenches, partially filling the trenches with pretreated, packaged wastes, and back filling the trenches with earth. In effect, the soil is the package for the waste, and when properly engineered, provides highly effective

containment. Whether this containment will still be effective many years later is unanswerable at this time; however, ongoing monitoring of the site will help ensure that the public's health and environment are protected.

CHAPTER V

RECOMMENDED MANAGEMENT APPROACH

A. Elements of a Comprehensive Waste Management System

As Chapter IV of this report indicates, there are many approaches that can be taken to alleviate the waste problem, ranging from reducing the amount of waste that is generated to ensuring that there are adequate facilities available for final treatment and disposal. All of these approaches are essential to a comprehensive management system and their implementation will require a cooperative effort among the private and public sectors of the state.

Before discussing the recommended strategies for North Carolina to improve its waste management capability, it is important to understand the functions that any successful waste management system must include. The first goal of a waste management system is to identify the wastes to be managed. The second is to assure they are transported, treated and disposed in a safe and proper manner.

The Task Force has found it helpful to organize these essential functions into six broad categories to be discussed briefly here and expanded on later in the report. They are:

1. REGULATION AND ENFORCEMENT - Establishing rules defining wastes that are subject to regulations; setting standards for their safe handling, transport, treatment and disposal; policing the regulations and imposing legal remedies for violations.
2. FACILITATING TECHNOLOGICAL SOLUTIONS - Encouraging research and development of technology, providing an information waste exchange, promoting recovery and recycling of wastes and providing tax incentives and other inducement to utilize new technology.

3. FACILITY DEVELOPMENT AND OPERATION - Selecting and acquiring sites for waste facilities, building and operating the facilities, monitoring the surrounding area and, in the case of burial sites, closing the sites and monitoring after closure.
4. EMERGENCY RESPONSE AND CLEANUP - Providing immediate responses to emergency spills and accidents, and cleaning up any discharges of waste and abandoned storage sites.
5. PUBLIC INVOLVEMENT - Encouraging public involvement in the development of a waste management system for the state, particularly in the decisions concerning the siting of new facilities.
6. ORGANIZATION - Creating an organizational arrangement to provide evaluation, coordination and consistent policy direction among governmental agencies which play a role in carrying out waste management functions.

B. Existing Management Framework

North Carolina's current management framework for hazardous and low-level radioactive waste consists primarily of extensive regulatory programs for both types of waste. There is also an established procedure for responding to emergencies related to waste spills or accidents, and for cleaning up discharges into the environment.

The existing legal framework for regulating hazardous waste is the RCRA implemented in North Carolina under the Solid Waste Management Act. The existing regulatory framework for low-level radioactive waste is established by the regulations of the federal Nuclear Regulatory Commission (NRC) and implemented in North Carolina under the North Carolina Radiation Protection Act. Both federal programs set minimum standards which the states must meet in order to assume primary authority for their implementation. North Carolina meets the standards for both programs and has the primary responsibility for regulating these wastes.

The Department of Human Resources (DHR) has the primary statutory authority for regulating hazardous and low-level radioactive waste. The Solid and Hazardous Waste Branch in the Division of Health Services administers the hazardous waste program. The Radiation Protection Section in the Division of Facility Services administers the low-level radioactive waste program. The Health Services Commission and the Radiation Protection Commission are the rulemaking bodies for development of program standards.

The hazardous waste and low-level radioactive waste regulatory programs use a very similar approach. Standards for handling these wastes are established for generators, transporters and facility operators. Generators must keep records of quantities and types of waste and the disposition of those wastes. Transporters must keep records of all waste transported and deliver those wastes only to approved facilities. Facility operators must meet strict environmental, health and safety standards. They must go through a strict permitting process which includes a showing of complete financial responsibility. The hazardous waste law provides for administrative penalties for violations of its provisions or regulations, while the Radiation Protection Act provides for criminal penalties. The following is a more detailed description of these regulatory programs.

Hazardous Waste - Under North Carolina's hazardous waste regulatory program, regulations have been established identifying and listing hazardous wastes. Also, standards have been established applicable to generators of hazardous waste that require:

- (1) recordkeeping practices that accurately identify the composition and quantities of hazardous wastes generated and the disposition of such wastes;
- (2) labeling practices to identify the waste in appropriate containers used for the storage, transport, or disposal of hazardous waste;

- (3) use of a manifest system to assure that all hazardous waste generated is disposed at permitted facilities;

In addition, regulations have been established that require transporters of hazardous wastes to:

- (1) keep records of manifests concerning types and amounts of hazardous waste transported;
- (2) transport only hazardous waste that is properly containerized and labeled;
- (3) clean up waste if spilled during transportation;
- (4) transport hazardous wastes only to approved treatment, storage, or disposal facilities designated by the shipper on the manifest form.

Regulations establishing performance standards applicable to owners and operators of facilities for the treatment, storage and disposal of hazardous wastes are being finalized. Such standards include requirements concerning recordkeeping, monitoring, training of personnel, and financial responsibility. Therefore the construction of new facilities will not be permitted until the proposed EPA standards are finalized. Existing facilities that meet interim standards have been allowed to continue until finalization of the standards, at which time they will be required to comply or discontinue operation.

Low-level radioactive waste - In 1964, North Carolina was designated as an "Agreement State" by the Atomic Energy Commission (now the Nuclear Regulatory Commission) with specific regulatory authority to control and regulate low-level radioactive materials. Under this agreement, North Carolina must have a program compatible with NRC regulations designed to protect the public health and safety. The regulatory program is very detailed and stringent; radioactive

materials are closely controlled at all stages of use and disposal. The state is not responsible for regulating high level radioactive waste. That is the responsibility of the federal government.

Before a license authorizing the operation of a low-level radioactive waste disposal or treatment facility can be issued, DHR must be satisfied that the applicant complies with all regulatory standards related to siting and facility performance, personnel, training, procedures, equipment and a safety program. There is need for additional criteria for siting burial facilities. The EPA and the NRC are currently working on the development of such criteria.

After receiving a radioactive material license from DHR and an air emission permit from NRCD, the facility operator is then responsible for the safe and efficient construction and operation of the facility. The DHR is responsible for conducting periodic operating inspections to assure compliance with all requirements. The operator must promptly correct any violations when detected by the regulatory agencies. If the licensee fails to meet all regulatory requirements, DHR may modify, suspend, or revoke the license. The Task Force recommends that present laws be amended to provide also civil penalties for violators.

Facility operators are required to make payments to an extended care fund, and acquire and maintain any bonding or insurance required by state regulations.

Transporters and generators of low-level radioactive waste are required to comply strictly with all packaging, labeling, monitoring, and recordkeeping requirements of the U.S. Department of Transportation and the standards established by the North Carolina Radiation Protection Commission. This is important to ensure minimal risks when low-level radioactive wastes are transported to and handled at treatment and disposal facilities.

Other agencies with existing regulatory responsibility - The Transportation Division of the Utilities Commission in the Department of Commerce, enforces transportation regulations in regard to for-hire carriers of both types of waste. Regulatory authority over pesticides, many of which are hazardous substances, lies with the Department of Agriculture. The Department of Natural Resources and Community Development administers the Oil Pollution and Hazardous Substances Control Act of 1978 which prohibits discharges of oil and other hazardous substances. Natural Resources and Community Development is also the permitting authority for several pollution control permits that may be necessary for building and operating a hazardous waste facility.

Lead responsibility for responding to hazardous and radioactive waste emergencies rests with the Department of Crime Control and Public Safety, which has the responsibility for planning, organizing and directing the initial response to hazardous and low-level radioactive wastes emergencies. The Secretary of Crime Control and Public Safety is given the statutory authority to utilize and allocate all available State resources to cope with such emergencies. The Department of Natural Resources and Community Development is authorized by statute to clean up hazardous waste discharges which are considered emergencies.

C. Organizational Arrangements--The Governor's Waste Management Board

In order to have an effective waste management system, it is necessary to establish an organizational structure that will ensure that all of the functions of the system are being performed satisfactorily. Inasmuch as many of the important management functions are located in various state departments, this is an especially important issue for North Carolina.

The Task Force considered two general approaches to establishing a new organizational structure. One is to place all waste management functions in a single agency, either newly formed for this purpose or

consolidated under an existing agency. The advantage of this approach is that all functions would be unified under a single administrative arrangement, thereby facilitating coordination and consistency in all aspects of waste management. The disadvantage is that it would require a major reorganization within State government, and also create a new agency that would duplicate some of the expertise and capabilities existing in others.

The second approach is to create a Board to oversee the management activities of the agencies involved in waste management. The Board would promote interagency coordination, monitor the effectiveness of the combined efforts of the various agencies, and make recommendations for improving the overall management effort. This approach provides a mechanism for comprehensive coordination and evaluation while leaving the management functions in the various agencies that presently have the personnel and expertise to handle them.

The Task Force recommends that a Governor's Waste Management Board be created. It should be emphasized that in recommending this approach, the Task Force does not reject the possible need for later reorganization to consolidate waste management functions. Indeed, the Task Force recommends that the Board be directed to study the necessity for such reorganization and to report its findings to the Governor and General Assembly at an appropriate time in the future.

The following is a more detailed description of the recommended purpose, organization, operating procedures and functions of the Governor's Waste Management Board. (Also explained in Appendix VII)

1. THE PURPOSE OF THE BOARD

The purpose of the Governor's Waste Management Board is to ensure the development and implementation of an effective, unified program of waste management in North Carolina by building upon the recommendations of this report.

2. The Organization of the Board

- a. Membership. Total membership of the Waste Management Board should be 20 individuals. The Secretary or Commissioner of the following departments (or his or her designee) should be appointed.

Department of Human Resources

Department of Natural Resources and Community
Development

Department of Commerce

Department of Administration

Department of Agriculture

Department of Crime Control and Public Safety

Department of Labor

Department of Transportation

In addition to the above members, the Executive Director of the North Carolina Board of Science and Technology should be appointed, plus eleven representatives from the legislature, counties, municipalities, private industry, higher education and public interest groups. No more than two representatives should be appointed from industries that generate hazardous or low-level radioactive waste. Members from outside state government should be appointed by the Governor and should be chosen to ensure that all geographical areas of the state are represented. Nominations for these positions may be made by individuals, associations, and other groups.*

*In making appointments to the Waste Management Board, consideration should be given to the fact that members of the Task Force have devoted six months to learning about the technology of Waste Management as well as the complex issues of siting, legal considerations, and other matters that will continue to need attention. For this reason, as well as to provide continuity, of the Membership of this new Board might have a running start by using some of the members of the Task Force.

Because of the potentially controversial nature of the Board's activities serious consideration should be given to having the members bonded against personal liability, at the expense of the state.

- b. Staff. The staff should consist of an Executive Director, a Secretary to the Executive Director, a public participation specialist, and such additional people as may be essential to ensure efficient and effective organization and operation of the Board. The staff should be located in the Department of Human Resources.
- c. Chairperson. The Chairperson of the Board should be appointed by the Governor. The Chairperson should not be from industry or the Secretary or Commissioner of a State agency or his or her designee. The Task Force believes that the Board will require a chairperson who can devote a major part of his or her time to the work of the Board. This need for a "working" chairperson should be kept in mind in making the appointment, and an office should be provided in the Department of Human Resources.
- d. Reporting Procedure. The Board will report directly to the Governor.

3. The Operating Procedures of the Board

The Board is not designed to supersede or duplicate the functions of any department or agency. It should work to achieve unity among state departments, local governments, the general public and private sector in seeking the best solutions to the state's waste management problem. It may recommend changes in procedures and responsibilities, subject to final approval by the Governor or, where required, by the General Assembly.

The Task Force recommends that a subcommittee of the Board be created to work with local officials and citizens when a permit application has been filed to develop a waste management facility in the area. This will help to ensure strong communication and involvement between the state and locality in the permitting process.

4. The Functions of the Board

The Board's role would include the following functions:

- a. Assess the volume, distribution, and characteristics of low-level radioactive and hazardous waste generated in North Carolina and promote and facilitate the development of necessary facilities to manage safely these wastes.
- b. Promote and advise on the development of a comprehensive waste management system which maximizes prevention and resource recovery and conservation, and minimizes the amount of waste that must be buried. As an essential part of this function, the Board would have the primary responsibility for promoting the establishment of a waste information exchange.
- c. Promote process modification and encourage research and development to aid in the prevention of waste generation.
- d. Ensure that the necessary technical assistance and continuing education are made available to generators to help them reduce waste volume and make necessary arrangements to manage their waste safely.
- e. Study and evaluate activities within State government related to hazardous waste and low-level radioactive waste management. This should be done annually until January, 1986 and every two years thereafter. The evaluation

should focus particularly on the effectiveness of the involved state agencies and of the Board itself in coordinating and improving performance of waste management functions. In order to ensure objectivity, the appropriate staff in the legislative branch and non-governmental consultants should be involved in this evaluation. As a part of the initial evaluation, a report should be prepared on the possible need to reorganize state agencies to improve overall performance of waste management programs. The report should give consideration to the advantages and disadvantages of consolidating or centralizing administration of programs that are now in separate agencies.

- f. Study and make recommendations concerning how to allocate to generators, transporters and facility operators financial responsibility for damages caused by waste. Matters to be studied are the possibility of applying a standard of strict liability to generators, transporters and facility operators, establishing a fund paid for by waste generators to compensate for personal property and environmental damages caused by waste, and increasing liability insurance requirements for facility operators.
- g. Advise on the state's role in facility development if the private sector fails to respond to this need.
- h. Initiate preemption procedures as a last resort in cases where it appears that a proposed treatment, storage or disposal facility has been prevented by a locality, and make recommendations to the Governor concerning the following findings which are necessary to deciding whether or not to exercise the preemption authority: (1) whether the proposed facility is necessary to establish adequate capability for the management of hazardous and low-level radioactive waste generated in North Carolina, and

therefore serves the interest of the citizens of the state as a whole, (2) whether all legally required state and federal permits or approvals have been issued by the appropriate state and federal agencies, (3) whether local citizens and elected officials have had adequate opportunity to participate in the process, and (4) whether the existence of the facility poses an unreasonable health risk or other adverse effect to the community and adequate steps have been taken to anticipate, manage, and avoid all foreseeable risks.

- i. Advise and assist in discussions with other states concerning regional (interstate) waste management agreements.
- j. Promote public information and education activities concerning waste management.
- k. Review and approve privilege license taxes which localities propose to apply to off-site waste management facilities in their jurisdiction.
- l. Develop means for promoting and implementing any policies and recommendations in this report.
- m. Advise the Secretary of Human Resources on whether it is necessary to request that the Council of State condemn land for the development of a waste management facility.
- n. Review the adequacy of waste management regulations to protect the health and safety of state citizens and recommend to the appropriate body what changes, additions, or deletions should be made.

D. Regulation and Enforcement

North Carolina's regulatory and enforcement programs should ensure that all aspects of handling hazardous and low-level radioactive wastes are carried out in a manner that provides maximum protection of the environment and the public's health and safety. North Carolina is fortunate to have comprehensive laws and established regulatory programs for both hazardous and low-level radioactive wastes. The agencies responsible for administering these regulatory programs worked in cooperation with the Task Force to identify deficiencies in these laws. As a result of this joint effort, the Task Force recommends the following statutory amendments:

1. Hazardous Waste

The following is a summary of proposed amendments to the N.C. Solid Waste Management Act, the statute which establishes the state's hazardous waste regulatory program. These amendments are needed to place North Carolina in a position to receive final EPA approval to implement the RCRA.

- a. The definition of "solid waste" in the Solid Waste Management Act should be changed so that it will include, rather than exclude, the following classes of substances: sludges incidental to and generated by waste water discharges that are point sources subject to permits under the Federal Water Pollution Control Act; oils and other liquid hydrocarbons controlled under Article 21A of Chapter 143 of the North Carolina General Statutes; and mining refuse covered by and regulated under the North Carolina Mining Act.

The change in these exclusions is considered desirable to ensure that the coverage of the North Carolina regulatory program is as broad as the coverage of the RCRA. Although each of these classes of substances is to some extent

regulated by another agency, in all cases the other agency does not have adequate statutory authority to deal with the disposal of any hazardous wastes associated with such substances. Therefore, the present practice is to rely on the Solid and Hazardous Waste Branch to regulate disposal of such wastes, even though the wastes are not actually subject to the hazardous waste regulatory program. The amendments would require by law the procedures that are presently in practice.

- b. The definition of "person" in the Solid Waste Management Act should be amended to include state and federal agencies. The effect of this amendment would be to subject these government agencies to the provisions of the law and the regulations promulgated pursuant to it.
- c. The Health Services Commission should be authorized to establish a list of wastes that are hazardous and subject to regulation under the provisions of the State Solid Waste Disposal Act.
- d. The Health Services Commission should be given clearer authority to promulgate and enforce rules requiring operators of hazardous waste facilities to carry sufficient insurance and to provide funds to cover the costs of facility closure, post-closure monitoring, and any corrective measures that may become necessary.
- e. The Secretary of the Department of Human Resources should be authorized to consider risks to the environment as well as to public health in determining whether an imminent hazard exists concerning solid and/or hazardous waste. Consequently, the Secretary would have authority to order a generator or transporter of a solid or hazardous waste, or the operator of a solid or hazardous waste management facility, to eliminate any conditions that create an imminent hazard to the environment.

- f. The remedies for violations of solid and hazardous waste laws and regulations should be strengthened by (a) increasing from \$5,000 to \$10,000 per day the maximum amount for administrative penalties imposed by the Department of Human Resources, and (b) making violations of the law or regulations a misdemeanor, i.e. a minor criminal offense. (Amendment (b) would have the effect of extending enforcement authority to general law enforcement officers throughout the state, thereby greatly increasing enforcement capability.)

2. Low-Level Radioactive Waste

The following is a summary of proposed amendments to the Radiation Protection Act, the statute which establishes North Carolina's low-level radioactive waste regulatory program.

- a. The Radiation Protection Commission should be given clear authority to establish fees or charges for radioactive waste disposal, long term or perpetual care costs and associated training, inspection, and enforcement costs.
- b. The Radiation Protection Commission should be authorized to impose civil penalties for violations of the Radiation Protection Act and regulations pursuant to it. The procedures and dollar amounts should be the same as those for hazardous wastes.

3. Transportation of Hazardous and Low-Level Radioactive Waste

The appropriate statutory amendments should be made to extend the authority of the Transportation Division of the North Carolina Utilities Commission to cover not-for-hire (private) carriers for purposes of enforcing hazardous and low-level radioactive waste transportation regulations. The Enforcement Section of the Transportation Division plays a major role in

inspecting trucks that transport hazardous and low-level wastes. It is estimated that over 50% of such wastes are transported in North Carolina by private carriers, and that this percentage will likely increase. The State's ability to enforce waste transportation regulations would remain greatly impaired unless the authority of the Transportation Division's inspectors is extended to private carriers.

E. Development and Utilization of Waste Management Technology

1. Research and Development

Statement of need

The Technical Advisory Committee on Hazardous Waste Management estimated that there may be as many as 50,000 chemicals in use today. Not all of them may be hazardous or toxic in nature but the sheer volume of known hazardous wastes generated in North Carolina in 1980, estimated at somewhere between 600,000 and 1,800,000 tons per year, means that the state can not afford to continue to rely upon the technologies of the 1960s and 1970s to handle this growing problem.

Whether the new chemicals introduced each year during the manufacture of goods is 2000 or 5000, it is clear that the drive for more and better technology in our life style is creating a potential for the hazardous waste problem to grow quickly out of control. Economic development and technological progress can not and should not be halted to stop the accumulation of waste, but neither should their growth be incompatible with the protection of the environment. The potential harmful effects to the state's water, air, and food associated with the manufacture, use, transportation, and disposal of wastes must be controlled, first of all, by better methods during the manufacturing process. If prevention is not possible, then those methods for recycling, recovery, incineration, temporary

storage and burial of these wastes should continue to be improved.

In summary, the present volume of hazardous wastes is large and destined to grow even more rapidly in the future unless the preventive efforts discussed in Chapter IV A. are successful. Furthermore, new, complex chemicals will be introduced into this stream of waste, the effects of which scientists do not yet understand. It is imperative, therefore, that waste prevention be stressed rather than waste management.

Research goals

The Technical Advisory Committee on Hazardous Waste Management recommended "That the state encourage continued research and development within this field of hazardous waste management." The Task Force members strongly support this advice and urge its adoption to accomplish the goals outlined below.

- a. It is generally recognized by large industries that it is inefficient to generate waste products during the manufacturing process which have no useful purpose. In fact, the lack of any useful function for these waste products might be viewed as doubly inefficient because they need to be transported and eventually disposed or treated. Therefore, the primary goal in research and development, to be performed mostly by industry, should be the avoidance of wastes by suitable changes in the manufacturing process. The incentive for such research is a reduction in the cost per unit of manufactured product. Additional incentives can be created by authorizing certain tax allowances for companies that eliminate waste generated by the manufacturing process.
- b. If it is not economically possible to avoid the production of these hazardous materials during the manufacturing

process, the next goal for research by industry should be efficient recycling and recovery of any useful products. The justification for industry to conduct such research is continued reduction of the operating costs per unit of good manufactured. An additional incentive can be created by extending tax allowances for those companies that reduce or recycle their wastes, especially those that do so on site.

The Technical Advisory Committee recognized the importance of this kind of research by industry and recommended the issuance of an annual "Governor's Award for Excellence" to a company in this state with outstanding achievement in this regard. The Task Force endorses this suggestion because it will help encourage and recognize this kind of research and development. The Task Force believes, however, that tax incentives are an even stronger inducement for industry to eliminate or reduce waste.

- c. The chemical complexity of most toxic substances and hazardous waste materials is growing faster than the technology to detoxify and/or neutralize them. No state should continue simply to bury these materials ad infinitum because of the loss of this land for raising food or for residential development. These burial sites if not properly designed and monitored could represent a perpetual threat to health.

Research should be encouraged among the state agencies, educational institutions, and research enterprises to study these hazardous materials in order to learn how to inactivate, degrade, or render innocuous as many as possible.

- d. Many toxic and hazardous substances can be burned safely on land-based incinerators or ocean-going ships equipped

with appropriate incineration systems. Research is needed, however, to study which materials can be treated by incineration and to ascertain the safety measures that need to be taken to assure that the release of pollutants from the incinerator stack is harmless to plant, animal, and human life. In fact, the first project might be to study which wastes can be incinerated safely on land and which ones need to be burned far out at sea. Current research by the Environmental Protection Agency has demonstrated the safety of incinerating organochlorine wastes in this manner.

- e. Many of the toxic substances and hazardous wastes may end up as an organic sludge that can be digested in special chambers to produce methane gas. Such efforts would not only reduce the volume of waste but they may actually be energy efficient.
- f. More research and development needs to be encouraged among engineering geologists and hydrologists to study and improve the criteria for siting of burial disposal facilities.
- g. More research and development needs to be promoted among agricultural experts, particularly those in soil science, on monitoring burial disposal sites as well as learning what kinds of crops can be grown safely on land treated with wastes and sludge. With the present state of knowledge, safety might require that the use of such land be limited to growing ornamental crops, or trees for lumber and paper.
- h. Additional research is needed in monitoring all kinds of waste treatment facilities to ascertain the healthfulness of persons working or living adjacent to them. A delay of twenty years in observing carcinogenic or mutagenic

effects is not unusual at the present time. This means that research in environmental epidemiology needs further support and encouragement to be able to detect potentially harmful effects as early as possible.

Promotion of research and development

As indicated in the previous section, goals a and b should be encouraged among the private sector by appropriate dissemination of information, tax incentives, and the issuance of a "Governor's Award for Excellence" for outstanding achievement.

Goals c through h might be encouraged in state agencies, or by grants and contracts to educational institutions and research organizations in the state. The Task Force considered various options for this purpose such as the appropriation of funds to the Governor's Waste Management Board, or to the Board of Science and Technology, or to specific components in state government concerned with the handling of wastes. Under the constraint of time, it was not feasible to reach consensus and the Task Force strongly advises the new Board and the General Assembly to study this problem in order to decide upon appropriate actions to promote such research in the years ahead.

2. Technical Assistance and Continuing Education

Statement of need

As indicated in the foregoing section on Research and Development, the current volume of toxic substances and hazardous materials requiring special handling is large, growing every day, and becoming still more complex in its chemical composition. The only solution to handling this problem is to reduce it in size and complexity by means of targeted research efforts.

This means that the current technology for the management of waste will become obsolete in a few years. The forecast of new knowledge in the future, plus the fact that many generators of waste are not familiar with even the current technology, points to the need for this state to promote continuing education courses and workshops to inform persons how to cope with the problem of hazardous wastes. Where the particular problem may be unique or special, the state should also establish and support a plan for providing technical assistance and consultation to waste generators, transporters, and operators of treatment facilities.

Goals

- a. To promote the development of a mechanism for conducting continuing education short courses, workshops, and demonstrations on the current technology to handle various classes of toxic substances and hazardous materials.
- b. To promote the development of an arrangement whereby the state can offer technical assistance and consultation to individuals and companies with special waste management problems.

Implementation of goals

Owing to the constraint of time, the Task Force was unable to reach agreement on how the technical assistance and continuing education should be conducted and financed. It is hoped that the Board will consider these issues and take appropriate actions to implement them in accord with current practices in the state.

In this connection, the Task Force wishes to point out that the educational institutions in the state are a valuable resource with experts in many disciplines who can be used to supplement

the personnel in state government. The first institution which comes to mind is the Industrial Extension Service at North Carolina State University. However, it would be short sighted to fail to take advantage of the scores of other university faculty and organizations that have special knowledge of one or more of the waste materials and are willing to respond to requests for assistance. A project sponsored by the Environmental Studies Council of the University of North Carolina resulted in a directory on May 1, 1980 of faculty in 38 North Carolina four - year colleges and universities who are available for this purpose. The listing of names is categorized by the nature of the waste product. A copy of the directory may be obtained by contacting Dr. David A. Adams, Division of University Studies, North Carolina State University, Raleigh [(919) 737-2815].

Another directory of experts, on an international basis, is available from the World Environment Center entitled "Contact: Toxics - Guide to Specialists on Toxic Substances" by Richard Penberthy, Editor. (World Environment Center, UNA-USA, 300 East 42 Street, New York, N. Y. 10017; \$49.50).

Finally, it would be a mistake to overlook the large number of specialists in this subject employed by non-profit research organizations such as the Research Triangle Institute and the Chemical Industry Institute of Toxicology in the Research Triangle Park. Also, the Environmental Protection Agency and the National Institute of Environmental Health Sciences in the Research Triangle Park have experts who are available on request for assistance to states.

3. Waste Information Exchange

The Task Force believes that it is very important that a Waste Information Exchange be established in North Carolina to facilitate the sharing of information on reusable waste

material and waste management technology. The advice of experts and experiences in other states and in Europe indicates that an exchange which actually acquires and resells wastes is not economically feasible in North Carolina at this time. The Task Force believes, however, that an "information" exchange would be most beneficial to the state and that every effort should be made to make it self-supporting.

The Technical Advisory Committee on Hazardous Waste has recommended that an exchange be operated by a non-governmental agency because of the possibility that waste generators would be hesitant to divulge trade information to a government agency for fear that the public would have access to such information as "public records". This concern can be resolved by adopting a state law which classifies this information as confidential. The Task Force is therefore of the opinion that the exchange can be operated by a public agency as well as a private organization.

One exchange, the Piedmont Waste Exchange, has already been established in Mecklenburg County by the University of North Carolina at Charlotte.

The Task Force recommends that the Governor's Waste Management Board study and decide upon a plan for working with the Piedmont Waste Exchange and any other existing organizations to establish a successful exchange. The Task Force also recommends that a request for appropriations adequate to plan and further develop the exchange be made to the 1981 General Assembly, either through further development of the Piedmont Exchange or development of an additional facility if needed.

4. Tax Incentives

Tax incentives can play an important role in encouraging generators to develop or expand their capability to reduce and

treat waste generated in the plant. A tax incentive already available for this purpose in North Carolina is accelerated depreciation. Accelerated depreciation is now authorized for air cleaning equipment, sewage and waste treatment plants, and pollution abatement equipment under G.S. 105-130.10 (Amortization over 60 months is authorized). Another available tax incentive is the exclusion from the property tax base for real estate and equipment used for air cleaning, waste disposal, air and water pollution treatment, and recycling and resource recovery [G.S. 105-275(8)].

There is precedent in North Carolina law for other forms of tax incentives. Credits against corporate income tax are authorized now for construction or installation of solar hot water heating and cooling equipment (G.S. 105-130.23), construction of cogenerating power plants (G.S. 105-130.24), and conversion of industrial boilers to wood fuel (G.S. 105-130.26). The law could be changed to provide explicitly that hazardous and low-level radioactive waste treatment and disposal equipment are also eligible for this type of credit.

There are other types of tax incentives that could promote the waste reduction, recycling, and treatment goals that the Task Force advocates. The Task Force recommends that legislation be enacted to create those tax incentives that would be most feasible and effective in North Carolina.

The Task Force has also considered the possibility of establishing disincentives to generating waste, such as direct tax on such waste. However, the Task Force believes that the cost to generators for transporting and disposing of waste according to current state and federal regulations will provide an effective disincentive for the generation of waste, thus performing the same function as a tax.

F. Facility Development and Operation

The Task Force concluded that the private sector is better prepared and capable of developing and operating waste treatment and disposal facilities than the state. It is, therefore, recommended that the state's role in facility development be initially limited to seeking qualified private firms that are interested in locating recycling, volume reduction and disposal facilities in North Carolina, and assisting such companies in contacting willing communities with suitable sites.

The Department of Commerce is the state agency with the existing capability and experience to lead efforts to identify and attract the most qualified waste management companies to North Carolina. This function must be carried out in close coordination with the Departments of Human Resources and Natural Resources and Community Development.

There is the possibility that private industry might not respond adequately or quickly enough to meet the pressing need for treatment and disposal facilities in the state. Consequently, it is necessary that state government be authorized and prepared to acquire approved sites, and to own and operate them or to enter into lease agreements to carry out these functions. The Task Force believes that the Secretary of DHR should have the authority to carry out these functions. In doing so, the Secretary should consult with the Governor's Waste Management Board, as the primary mechanism for gathering information and opinions from the various agencies and the public.

There are many stages involved in developing a waste facility. The Task Force has analyzed each of these stages to determine what the state's role should be to ensure that the functions are carried out according to the best interests of the public.

1. Developing Site Selection Criteria

The Task Force believes that site selection criteria should ensure maximum protection for the public's health and safety and the environment. Criteria for hazardous waste facilities are being finalized by EPA under the RCRA. The primary responsibility for implementing these criteria in North Carolina is now assigned to the Department of Human Resources. However, siting criteria for low-level radioactive waste facilities are not well developed. The Task Force recommends that the Governor's Waste Management Board work with the NRC and the EPA to expedite development of these criteria. The Board should also provide assistance when necessary to coordinate input from state agencies with expertise on criteria related to such matters as water quality, air quality, land quality, and balancing such factors as proximity to generators, transport distance and associated hazards, and distances from populated areas.

2. Screening and Monitoring Areas Generally Suitable for Sites

The Task Force believes it is necessary to move quickly to identify sites that meet the applicable geological and hydrological criteria and to initiate facility design, site monitoring and other preconstruction activities. It is also desirable that consideration be given to siting facilities as close as possible to the sources of wastes to minimize transportation risks.

3. Final Decisions Concerning Facility Sites

Recent experiences in North Carolina and other states document the very real possibility that resistance and exclusion by localities may be pervasive enough to prevent the needed waste management facilities from being developed. Many other states are convinced of the seriousness of this problem and have either

proposed or adopted laws which guarantee that the state has final siting authority for these types of facilities. This policy has been endorsed by the National Governor's Association.

The Task Force gave a great deal of consideration to this issue and recommends that every effort be made to find suitable sites in receptive communities. It is in the best interest of the citizens of the state to ensure that sites are available for these facilities. If this approach is not successful, however, the state must be in a position to make a final decision on a site location.

In the event that a facility siting is prevented by local ordinance(s) or that the local governing body has formally adopted a position of opposing a proposed facility, the Waste Management Board shall meet after being petitioned by the facility developer. After reviewing the petition and pertinent information, the Board shall make a recommendation to the Governor after determining whether: (1) the proposed facility is necessary to establish adequate capability for the management of hazardous and low-level radioactive waste generated in North Carolina, and therefore serves the interest of the citizens of the state as a whole; (2) all legally required state and federal permits or approvals have been issued by the appropriate state and federal agencies; (3) local citizens and elected officials have had adequate opportunity to participate in the process; and (4) the existence of the facility would pose an unreasonable health risk or other adverse effect to the community and steps have been taken to anticipate, manage, and avoid all foreseeable risks.

After receiving the recommendation from the Board, the Governor should be authorized to reject the recommendation or approve it, and thereby make a final siting decision. This decision shall have control over any applicable local ordinance, acts, or rules.

In order to facilitate a cooperative state/local approach to siting facilities, the Task Force recommends that localities in which waste storage, treatment, or disposal facilities are proposed should be encouraged to form local siting advisory committees. More specific recommendations concerning the purpose, organization and functions of such committees are set out in Subchapter H, Citizen Involvement.

4. Compensation to Localities in Which Facilities are Located

The Task Force strongly supports the principle that the generators of waste should pay all costs directly and indirectly associated with treatment and disposal of their waste. In keeping with this principle, the Task Force recommends that localities be given the statutory authority to establish a privilege license tax on waste handled by off-site treatment or disposal facilities located within their jurisdiction, subject to review and approval by the Governor's Waste Management Board. Such taxes should be compensatory in nature, and should therefore be limited by statute to an amount or rate that is reasonably related to the direct and indirect costs incurred by the locality as a result of the facility operation. Permissible costs should include expenses associated with fire and other emergency protection, measures to ensure safe traffic patterns and transportation, and any local health and environmental monitoring designed to supplement the state's monitoring programs. In addition, localities should be authorized to recoup any real property tax revenues that are permanently lost because of state ownership of land on which facilities are located or the lowering of property values on adjacent land. The former will be particularly applicable to burial facilities because of the recommendation that the State acquire title to any land on which hazardous or low-level radioactive wastes are buried.

5. Acquisition and Ownership of a Facility Site

The Task Force believes that private companies have the necessary capital and are best able to acquire sites. On the other hand, it is recommended that the Council of State, upon receiving a request from the Secretary of the Department of Human Resources, be authorized to condemn land for necessary facility sites where private acquisition fails or when the state decides to initiate site development. This authority should be used only as a last resort after the Secretary has consulted with the Governor's Waste Management Board and made a determination that a particular facility is necessary to the establishment of adequate waste treatment capability in North Carolina. In such cases, the state might later lease or sell the site to a private company that wants to build and operate a facility.

In the case of burial facilities, the Task Force believes it is necessary that the state have immediate and unlimited access for monitoring and inspection. The state should therefore be authorized to require private companies that purchase burial sites to give title to the land to the state in exchange for a lease-back or similar legal agreement. The agreement would guarantee that the company could use the site for as long as it desires and remains in compliance with all state and federal regulations. Such an arrangement is not necessary for treatment or storage facilities that do not entail burial.

6. Financing the Facility

The Task Force is of the opinion that the state should not provide any new subsidies for waste management facilities, with the possible exception of experimental facilities offering promising new technology. Private capital is ordinarily available for such facilities.

Industrial revenue bonds are presently available for pollution control facilities, and the Task Force recommends that any necessary steps be taken to make such bonds available to finance reduction, recovery and recycling facilities, but not storage or burial facilities.

Before a pollution control facility may be approved for such bonds by the Department of Commerce, the DNRCD must certify that the facility will have a materially favorable impact upon the environment, or will prevent or diminish materially the impact of pollution which might otherwise occur. The Task Force recommends that a similar requirement be established whereby prior to receiving approval for industrial revenue bonds, the Department of Human Resources must certify to the Department of Commerce that the facility will promote waste management goals in North Carolina and will not have an adverse effect upon public health or the environment.

7. Construction and Ownership of the Facility

The Task Force believes that the private sector is better suited for moving expeditiously to build waste facilities because they have access to major capital funds and have established technical expertise. The Task Force further believes that there are private companies with the necessary capital who are interested in locating facilities in North Carolina.

The state should be clearly authorized to build and own a facility if the private sector fails to respond within a reasonable time. The Secretary of the Department of Human Resources should be authorized to determine, after consulting with the Governor's Waste Management Board, when it is necessary to exercise this authority.

8. Operating and Monitoring the Facility

The Task Force believes that a facility should be operated in the safest possible manner. Private companies are better prepared to assume these management functions and a state regulatory agency is likely to regulate a private company better than it would regulate itself or another state agency.

The Task Force recommends the strictest, most thorough monitoring of facility operation, including the environment and the human, plant, and animal life in the area. Such monitoring is primarily a state responsibility. However, the Task Force recommends that localities use revenues from the privilege tax to establish under the supervision of the local health department or other appropriate group the capability to coordinate with and supplement the state's monitoring programs.

The Department of Human Resources has primary responsibility for monitoring health in the state whereas DNRCD has the expertise and responsibility for monitoring environmental effects. These two agencies should coordinate monitoring activities in consultation with the Governor's Waste Management Board.

The Task Force recommends that serious consideration be given to assigning state employees to work on site at facilities that are large enough to justify such an approach. This is especially important in the case of burial of low-level radioactive or hazardous waste in order to verify package labeling and inspect containers. The cost of such monitoring should be borne to whatever extent practicable by a fee or tax on the waste handled by the facility. The Task Force recommends that the Governor's Waste Management Board determine whether the Secretary of Human Resources presently has adequate authority to establish such a fee as a part of the facility permitting process.

The Task Force recommends that provisions be made to allow periodic public visitation and inspection of facilities by designated representatives. In addition, there should be a requirement that a periodic report be made to the public on the operation of the facility.

The Task Force recommends that adequate remedies, including criminal and administrative penalties and injunctive relief be statutorily authorized for any violations of regulations stemming from facility operation.

9. Closure and Post-Closure Care of Land Containment Facilities

Every precaution must be taken to ensure that closure and long-term care of land containment facilities are handled in the most thorough fashion possible by the operator under close supervision by the state. The cost should be covered to the greatest possible extent by the generators that use the facility. This policy is in keeping with the present requirements of North Carolina's hazardous waste management regulations. Under state and federal regulations, facility owners have the responsibility for proper closure of all facilities and, in addition, are responsible for post-closure monitoring of land containment facilities for a 20-year period. The facility owner is required to provide a bond, insurance, or other type of fund to cover post-closure monitoring and preventive maintenance as well as liability for damages for 30 years after closure. Also, the funds should cover tax loss revenues to the local community after closure.

The Task Force recommends that similar regulations should be established for low-level radioactive waste facilities. The statutory amendments necessary to authorize such regulations should be made. The Task Force further recommends that the Governor's Waste Management Board closely monitor and evaluate the adequacy of these closure and post-closure regulations for

both types of waste and to encourage the Division of Health Services to ascertain any possible health problems.

10. Additional Liability Considerations

It is necessary for the public to be assured that adequate liability coverage is carried for a hazardous or low-level radioactive facility during both the life of the site and after its closure.

Under Federal law, the facility operator must assume primary responsibility for liability during site life and for 30 years after closure. This is accomplished by the operator providing adequate liability insurance during this period. The Task Force feels that the issue of whether the state should provide back up liability insurance during this period also must be considered. One reason for this is the possibility that the insurance coverage is inadequate to cover damages.

The question of post-closure liability is even more critical. The operator's liability extends 30 years after closure. Injuries from these facilities may occur after the 30 year period has ended. Since the operator's responsibility has ended and the state has title to the land, the state must be in a position to assume responsibility for monitoring the site, remedying any problems that become apparent, and, if necessary, compensating for damages caused by the facility. The Task Force recommends that the state be authorized by statute to charge a tax or fee on the waste handled by burial facilities in order to establish a central fund sufficient to pay the cost of post-closure monitoring and care and to compensate for any damages that might occur after the operators' 30-year period of liability has ended. This approach is consistent with the general policy of passing all waste management costs to generators and is already being used by South Carolina.

The state assumption of liability is clouded by the doctrine of sovereign immunity, which makes the state immune from liability unless it has consented to be liable by statute. North Carolina has consented to limited liability by the North Carolina Tort Claims Act, which allows people injured by negligent acts by the state to recover up to \$100,000. This statute would probably apply here, but the amount of recovery is limited.

The Task Force recommends that the Waste Management Board study whether the state should waive sovereign immunity by statute during the post-closure period. This could be accomplished by a specific statutory waiver and the purchase of liability insurance out of the above-recommended fund. Such waiver is likely to promote acceptance and enhance credibility in the state's efforts to enforce the regulations as stringently as possible.

G. Emergency Response and Cleanup

The citizens of North Carolina must be provided protection from the immediate threat posed by hazardous waste related emergencies such as spills and accidents, and from environmental degradation associated with abandoned waste dumps or storage facilities. A federal "superfund" bill was passed recently by Congress. This law provides \$1.6 billion to be used to clean up abandoned waste dumps and spills or other discharges. This fund cannot be used to compensate for personal damages that might be caused by such spills or discharges.

There are certain limitations on the use of the federal "superfund" that make it inadequate to meet the emergency response needs of North Carolina. The main part of the fund will be used to clean up certain targeted existing hazardous sites which have been determined to be major problems. There will be a remaining contingency fund to which the states will have access for dealing with major emergencies that

arise or are discovered in the future. However, the funds will not be available for smaller emergencies which might pose a risk to North Carolina's citizens or environment.

North Carolina has an existing system for emergency response to deal with smaller emergencies. The Department of Crime Control and Public Safety is responsible for planning, organizing and directing initial response to hazardous waste emergencies. The Division of Environmental Management (DNRCD) is authorized by statute to clean up hazardous waste discharges, but funding for this has been inadequate. To give the state the capability to clean up hazardous waste problems that do not qualify for the federal "superfund", it is recommended that sufficient funds be appropriated by the Legislature to DNRCD to deal with abandoned waste dumps and the full range of hazardous waste related emergencies that are not covered by the "superfund." The Governor's Waste Management Board should continue to monitor the adequacy of emergency response and clean-up efforts in North Carolina as well as to see that the appropriate steps are taken to find and clean up the "orphan dump sites".

H. Citizen Involvement

Meaningful citizen involvement and participation are critical to developing an effective waste management system in North Carolina. Mechanisms should be developed to provide ample opportunity for citizen involvement in ongoing policy development and decisions concerning proposed facilities.

The Governor's Task Force was composed of representatives from state and local governments, higher education, environmental groups and industries associated with the generation of hazardous or low-level radioactive waste. The Task Force attempted in various ways to solicit, receive and give consideration to public opinion during its deliberations. Notices of meetings were distributed to the press, interested citizen groups and organizations as well as to individuals who indicated an interest in receiving them. Time was

made available at the end of each meeting for the public to make comments.

Members of the Task Force met with representatives of the major newspapers throughout the state to familiarize them with the state's waste management problem. Radio and television programs were also broadcasted to educate more fully the general public. The Department of Human Resources has made its toll-free telephone line (1-800-662-7030) available for citizens to call to express their opinions and concerns on this subject as well as to request information.

The Task Force held seven public meetings in late January, 1981 at seven locations across the state to receive public comments on its draft report and recommendations. The opinions and information received at these meetings were presented to the Task Force for its consideration before the report and recommendations were finalized and presented to the Governor. In view of the short time frame for public comment, the Board should continue to seek public reaction to the final report of the Task Force.

In order to ensure citizen input into ongoing policy development, monitoring and evaluation of the effectiveness of the state's waste management system, the Task Force recommends that the Governor's Waste Management Board be structured to represent a broad variety of citizen viewpoints. As recommended, the majority of the members of the Board would be from outside of state government in order to incorporate a wide variety of interests and viewpoints. The specifics of the recommended membership of the Board are discussed in more detail in Subchapter C, "Organizational Arrangements - The Governor's Waste Management Board".

The Task Force recognizes that waste management facilities have met with much suspicion and resistance from citizens in the locality of the proposed site. This reaction is due, at least in part, to poor communication between the facility developer, the state regulatory

agencies, and the local citizens. Past experience in other states indicates that early and thorough public participation and education must be encouraged in the facility siting process.

Local Facility Development Committees

To facilitate early involvement of local citizens, the Task Force has recommended that DHR notify the locality as soon as an application for a facility permit is received. In order to promote thorough local involvement throughout the siting process, the Task Force strongly recommends that local facility development committees be established in all localities in which a facility is proposed. These committees would serve as a forum for exchange of information and opinions between state regulatory agencies and the involved locality. This should provide state agencies with a means for understanding and addressing local concerns. This approach should help to avoid misinformation and distrust by subjecting the decision-making process to an open forum.

The formation of such advisory committees should not be made a legal requirement but should be optional according to the preference of the local governing body. Nevertheless, widely based local participation is vital and the Task Force strongly recommends that committees be formed, organized, and operated along the following lines.

1. Organization: Suggested representation on the Local Facility Development Committee consists of the following:
 - a. Citizens organizations
 - b. County government
 - c. Municipal government

- d. Local industry/commerce
 - e. Local health/environmental agencies or groups
 - f. Local educational/research institutions
 - g. Local transportation/shipping interests
 - h. Agricultural interests
2. Appointment of Members: Nominations may be made by anyone from the groups or agencies to be represented. Appointment of the Committee should be made by the county commissioners, with one commissioner representing county government.
3. Functions of the Committee
- a. To meet with state and private representatives to determine nature, scope and proposed location of facility under consideration.
 - b. To participate in planning public meetings, distribution of information and such other steps that should be taken fully to inform all people of the county, community or relevant area of what is being proposed, including the advantages and disadvantages.
 - c. To take steps, in conjunction with state government and private representatives, to ensure that response is made to questions and concerns of the citizens of the affected area insofar as available knowledge and understanding permit.
 - d. To recommend to state government and private industry those measures that should be taken to make the location of the facility acceptable to concerned citizens, should a

decision be made to locate the facility. Examples of such measures include the following:

- On-going monitoring of plants, wildlife and human health.
- Provisions for fire and other emergency protection.
- Changes in traffic patterns and other transportation measures to enhance safety.
- A "waste management fee or tax" to be used to offset the additional costs of the facility on the community.
- In the event that the local committee concludes that the facility should not be located where proposed, so state and give reasons.

The Governor's Waste Management Board may receive the recommendations of the local facility siting committee along with state agency recommendations regarding siting the proposed facility.

CHAPTER VI

STRICT LIABILITY CONSIDERATIONS

One of the most important considerations in public acceptance of a waste management system in North Carolina is the assurance that persons harmed by the generation, storage, transportation, treatment, and disposal of wastes will be adequately compensated.

The Task Force believes that both hazardous and low-level radioactive wastes have an inherent potential to harm property, business, and people. The risk of such harm may be very low if proper precautions are taken, but the amount and nature of the harm may be very great. The Task Force also believes that the primary liability for damages resulting from waste management activities should be borne by generators, transporters, storers, and facility operators. This basic premise must be balanced against the need for North Carolina to have waste facilities and the benefits that result from a well designed and operated waste management system. With these considerations in mind, the Task Force discussed at length the idea of providing strict liability by statute for activities associated with handling hazardous and low-level radioactive wastes. The Task Force favors in principle the adoption of this concept in North Carolina but is concerned about the possibility that the cost of liability insurance might have the effect of preventing facilities from locating in the state.

Strict liability is a legal doctrine which imposes liability without fault on a person or company whose activity has caused damage to another person. This is in contrast to most actions for damages in which it must be shown that the company or person(s) who caused the damage was at fault, i.e. negligent. If strict liability is applied in the waste management system, a damaged person will still have to prove that the damages were caused by wastes that were under the control of the party being sued. Such proof is difficult enough when dealing with waste substances which have many properties and effects that are still unknown. To require proof also that the party in control of the waste which caused the damage was negligent

has the effect of making recovery of damages more difficult and expensive to the point that it may become infeasible or discourage the suit from being instituted.

Strict liability has already been imposed by North Carolina courts on activities that are considered ultrahazardous or abnormally dangerous in character, such as blasting or keeping dangerous animals. There is the possibility that courts would find activities associated with hazardous or low-level radioactive waste to be ultrahazardous and thus judicially impose the doctrine. The Task Force feels, however, that imposing the doctrine by statute would enhance public acceptance of the waste management system and show that there is concern that people who have been harmed will have the greatest possible chance of recovering damages.

One state (viz. Pennsylvania) has already adopted a standard of strict liability for waste transporters and facility operators by statute adopted in July, 1980. The State of New Jersey is currently considering an act establishing a limited form of strict liability. The act was passed by the State Senate in January, 1981, and is now being considered by the House of Representatives. Although it is too early to be certain of the effects of such a law, waste generators, transporters, and facility operators in Pennsylvania have apparently accommodated strict liability without discontinuing operation. The Task Force believes that North Carolina should also attempt to do so.

There are several complex legal issues that must be studied and resolved before strict liability is adopted. Among these are the questions of statutes of limitation, and whether to apply comparative or contributory negligence theories. Also, there are other methods for allocating financial responsibility for damages to waste generators which might be considered forms of strict liability. One method entails establishing a fund to pay for personal, property and environmental damages caused by waste. Such a fund can be administered by the state and paid for by an excise tax or similar charge levied on generators. The Task Force recommends the Waste Management Board form a committee of experts in this area of law to study the various approaches to strict liability and the

legal issues involved and advise the Waste Management Board on this matter.

CHAPTER VII
PUBLIC HEARINGS

The Governor's Task Force on Waste Management held seven public hearings between January 19 and 22, 1981. The hearings were held in Wake, Guilford, Cumberland, Pitt, Mecklenburg, Onslow, and Buncombe Counties. Copies of the Task Force's Draft Report were made available and widely distributed on January 12. The purposes of the hearings were to discuss the report and the recommendations contained in it and to receive comments from the public on how they might be improved.

The Task Force was aware that its tight schedule had limited the public's opportunity to review thoroughly the Draft Report before the hearings. Consequently, the public was encouraged to continue to submit written comments after the public hearings were closed and many did so in the ensuing weeks. Citizen involvement at the meetings was very good and many oral comments were received. The registered attendance at the meetings was as follows (all those who attended did not register, and by rough estimate the actual attendance was as much as 50 percent higher than the registered attendance):

<u>DATE</u>	<u>LOCATION</u>	<u>REGISTERED ATTENDANCE</u>
January 19	Wake County	248
January 20	Guilford County	200
January 20	Cumberland County	100
January 21	Pitt County	106
January 21	Mecklenburg County	124
January 22	Buncombe County	120
January 22	Onslow County	33

Those in attendance were encouraged to submit written or oral comments expressing their opinions and recommendations. Those comments and any written comments received during the week following the hearings have been summarized. Every attempt has been made to include all the comments without being repetitive, and to state them as accurately as possible. An asterisk has been placed beside those comments that were made most frequently.

Citizen reaction sheets were also made available to those who attended. The purpose of the sheet was to allow the attendees to give an opinion as to the importance of each of the sixteen recommendations in the Draft Report, and to indicate whether they agreed, disagreed or had no opinion concerning each recommendation. The approximately 330 citizen reaction sheets that were completed at the meetings have been summarized by listing the citizen reactions under the corresponding recommendation. No citizen reaction sheets were distributed at the Mecklenburg County meeting, but they were mailed to those who registered and several were returned.

It should be noted that the results of the citizens reaction sheets are not necessarily consistent with the comments that were made most frequently, particularly concerning the more controversial recommendations. For example, commentators frequently and consistently objected to authorizing the state to preempt or override local ordinances and condemn land for waste facilities, while a slight majority of those who completed the citizen reaction sheets indicated that they agree that the state should have these two types of authority.

The Task Force reviewed and gave serious consideration to the citizen reaction sheets and summary of citizen comments before finalizing its report and recommendations. Several important changes were made as a result. The summary of citizens' comments and recommendations includes the Task Forces' response to the comments that were most frequently made, and indicates any changes in the recommendations that were made as a result of those comments.

A. Summary of Citizens Comments and Recommendations Concerning Waste Management Received at Public Hearings Held January 19-22, 1981

1. THE GOVERNOR'S WASTE MANAGEMENT BOARD

- Is there really a need for another Board such as the one proposed?
- Industries that generate waste should not be represented on the Governor's Waste Management Board.

- The proposed Board's name should be changed to The Toxic Waste Reduction Board.
- Any policy-making Board should have balanced representation from all geographical parts of North Carolina and not be dominated by the Piedmont.
- The responsibilities for all matters of management, i.e. regulation, emergency response, transportation controls, enforcement, etc., should be consolidated under one Board or Agency.
- The chairperson of the Board should be someone other than the head of the agency that administers the waste management regulatory system.

RESPONSE: The Task Force is recommending that the chairperson be selected by the Governor. The chairperson should not be the Secretary or Commissioner of a state agency or his or her designee, and should not be in the employ of a waste generating industry. No more than two members representing waste generating industries should be selected to serve on the Board.

2. REGULATION AND ENFORCEMENT

- * - Penalties for violations of laws and regulations should be very strict. Violations should be a felony rather than a misdemeanor.
- The state must have adequate personnel to investigate individual water contamination problems and to monitor generally compliance with regulations and standards.
- North Carolina should have the statutory authority to be stricter than EPA regulations concerning hazardous waste.
- Present EPA regulations are not adequate.
- Local law enforcement officials, rescue squads, fire departments, etc. should be trained to enforce waste laws and regulations and react to emergencies.

RESPONSE: The Task Force is recommending that penalties for violations for both the Solid (and Hazardous) Waste Law and Radiation Protection Act be strengthened. The Solid Waste Law presently authorizes a maximum civil penalty of \$5,000 per day for each violation, and does not provide for criminal penalties. The Task Force is recommending that it be amended to increase the maximum civil penalty to \$10,000 per day and to provide that violations be a criminal misdemeanor. The Radiation Protection Act presently provides that violations are a criminal misdemeanor but does not provide civil penalties. The Task Force is recommending that it be amended to provide for civil penalties, with a maximum of \$10,000 per day for each violation. The Task Force believes that the civil penalties of up to \$10,000 per day will be a severe and sufficient deterrent to violations. However, only employees of the Department of Human Resources are authorized to assess civil penalties. Making violations a criminal misdemeanor will give all general law enforcement officials jurisdiction to stop and investigate probable violations, and to hold the alleged violator while representatives of the Department of Human Resources can reach the scene and investigate the possibility of assessing a civil penalty. Making violations a felony would not enhance this function, and would probably make successful prosecution more difficult.

3. DEVELOPMENT AND UTILIZATION OF WASTE MANAGEMENT TECHNOLOGY

- More research on radioisotopes is needed to enhance the ability to predict their potential for migration after burial.
- If the state is going to support research facilities (such as the proposed micro-electronics research center) that help attract waste generating industries, then the state should also support research on the waste impacts of those same industries and on better ways to recycle, reduce and treat the wastes they generate.

- * - Tax incentives for developing and utilizing methods for reducing waste and/or disincentives for producing waste, should be recommended.

RESPONSE: The Task Force believes that the cost to generators for transporting and disposing of waste according to the requirements of RCRA is likely to provide an effective disincentive for the generation of waste, and will thus perform the same function as a tax on the waste. The Task Force agrees that there are forms of direct tax incentives that should help reduce the amount of waste generated. Two possible approaches are an income tax deduction for capital expenditures for equipment used to make process changes to reduce the amount of hazardous waste generated, and a property tax exclusion for such equipment. G.S. 105-130.10 presently allows an income tax deduction for "the amortization over a 60-month period of the cost of purchasing and installing equipment or constructing facilities for the purpose of recycling or resource recovering of or from solid (and hazardous) waste." G.S. 105.275 (8)(b) presently allows an exclusion from local property taxes for real and personal property used for the same purposes. Neither statute is applicable to equipment used to modify industrial processes to reduce hazardous or low-level radioactive waste generation. The Task Force believes that it should be a basic state policy to create economic incentives to encourage industry to minimize generation of those wastes for which there is no other current alternative than permanent disposal. The Task Force has therefore recommended that the Waste Management Board study the matter and make recommendations to the General Assembly as soon as possible concerning amending these statutes and any other legislative steps that will provide incentives to reduce waste generation.

4. FACILITY DEVELOPMENT AND OPERATION

- * - The state should not have authority to preempt or override local ordinances. Every other option should be tried before such action is taken. A local community board could make just as good a decision about this matter as anyone else. A siting committee to improve local input is a good idea. The Board, not the Secretary of Human Resources should have final authority to preempt. (The comments on condemnation were similar.)
- Sites should not be forced on rural, politically-weak counties where generators are not located.
- More thought should be given to defining the criteria that will be used to decide whether the state should actively develop a facility (i.e. that the private sector is not meeting the need).
- Treatment and disposal sites should be located on state-owned lands wherever possible.
- Stronger steps should be taken to encourage or require treatment and disposal of waste on the site where it is generated. There was one suggestion that all generators be required to treat and dispose on site.
- The state should develop an adequate data base concerning distribution of waste on a site-by-site basis, and then develop a specific statewide plan for all facilities and their approximate location.
- Treatment facilities should be limited to a size necessary to handle existing demand in sub-state areas and should not be large enough to attract new generators or accommodate waste from other states. (There was a suggestion that every county be responsible for its own waste). More study is needed on the distribution of waste generated in the areas of the state so that the number, types, capacity and location of treatment and disposal facilities can be matched to in-state needs.
- Low-level radioactive waste should be incinerated and disposed of on-site.
- Localities should be authorized to zone areas suitable for facilities, based on low population density - for example, an average density of 2 people per acre for a 5-mile radius.

- Private companies are primarily profit-motivated and cannot be trusted to operate facilities in the safest manner.
- * - Above ground storage of wastes needs to be seriously considered.
- Incineration at sea on ships is a potentially superior long-range technique. North Carolina should support or actually build an incinerator ship.
- Before licensing a facility, there should be more attention to adequacy of local emergency response capability concerning fire, health, spills, law enforcement and other emergency problems.
- The state should not provide tax free bonds for facilities. If bonds or other financial aids are considered, a referendum should be a prerequisite for approval.
- Localities should be able to charge a fee or tax, and/or require a bond adequate to cover lost property values in proximity to site as well as other costs.
- All residents within a certain radius (25 miles was suggested) should have a choice of moving after being adequately compensated by the state, or of remaining with free medical monitoring provided by the state.
- Monitoring of facilities should be a county responsibility, with support from the state and federal government.
- State laws should be changed, if necessary, so that the state does not have to take the lowest bid for facility operators if the state becomes involved in developing a facility.
- * - The period of liability for an operator after closure of a site is not long enough - it should be in perpetuity. Taxpayers should not be stuck with the bill.
- Facility owners should be required to monitor a closed site perpetually.
- Bonds posted by facility owners to cover closure and post-closure expenses should not be held by private parties.
- The waste exchange and/or other mechanisms for encouraging recycling should be implemented.

RESPONSES: * The Task Force agrees that every other option should be tried before preempting or overriding local ordinances. However, the Task Force believes that it is in the best interest of the citizens of the entire state to ensure that North Carolina can develop the facilities necessary to manage safely the waste generated in this state. This entails establishing a mechanism to prevent localities from arbitrarily prohibiting needed facilities that are proposed for safe, suitable sites. The combined effect of such prohibitions could ultimately mean that there would be no sites available in the entire state. In response to requests that the state should only use the authority as a last resort, the Task Force has modified its recommendations so that local ordinances would not be generally preempted, but rather that a waste management facility developer be authorized to petition the Governor's Waste Management Board in the event that the facility is prevented by local ordinance(s) or that the local governing body has adopted a position of opposing the proposed facility. After reviewing the petition and pertinent information, the Board shall make a recommendation to the Governor after determining whether:

1. the proposed facility is necessary to establish adequate capability for the management of hazardous and low-level radioactive waste generated in North Carolina, and therefore serves the interest of the citizens of the state as a whole.
2. all legally required state and federal permits or approvals have been issued by the appropriate state and federal agencies.
3. local citizens and elected officials have been given adequate opportunity to participate in the process.

4. the existence of the facility poses an unreasonable health risk or other adverse effect to the community, and adequate steps have been taken to anticipate, manage, and avoid all foreseeable risks.

After receiving a recommendation from the Board, the Governor should be authorized to reject the recommendation or approve it and thereby make a final siting decision. The decision by the Governor shall have control over any applicable local ordinances, acts, or rules.

- * Efforts were made to determine if the above-ground storage alternative is used as an effective means to manage safely hazardous and low-level radioactive waste in other states. Based upon the inquiries made by the staff and members of the Task Force, it appears that this approach has not been fully developed or used as a waste management option. Only one state (New Jersey) is currently attempting to pass legislation requiring above-ground storage. The Task Force has added a recommendation that the Board continue study and research to determine with certainty if above-ground storage is a safe and feasible alternative and, if so, to begin to develop the necessary standards to implement such an approach. In the meantime, the Task Force recommends the use of such facilities for temporary storage only of those materials likely to be capable of recovery or detoxification.
- * The final federal regulations governing the issue of perpetual care by the operators have not been issued. The state, in any event, will assume this responsibility after the operator's legal responsibility has terminated. The state will monitor the facility until it is proven that it no longer poses a threat to the health and well-being of the citizens within the community. When the state assumes this monitoring responsibility it should waive its right

to sovereign immunity and consider obtaining liability insurance. The Task Force is recommending that the State be authorized to establish a fee or tax on burial facilities in order to build a fund adequate to pay for post-closure monitoring and care and for any damages caused by the closed facility.

5. CITIZEN INVOLVEMENT

- Local facility siting committees should be required in every locality where a facility is proposed.
- * - Local involvement should be provided in siting, managing, monitoring and inspecting facilities.
- * - Public participation and education are vital to waste management planning. Funds should be provided and a serious effort made to educate the citizens about North Carolina's waste management problem.

RESPONSES: * The Task Force is recommending that the Department of Human Resources notify the locality when an application is made for a permit to locate a waste management facility in the locality, and that the Waste Management Board establish a siting subcommittee to work with the locality to promote open communications between the facility developer, the locality, and the state. To facilitate this process the Task Force is also recommending that local siting advisory committees be formed by localities in which facilities are proposed. Such committees could be used by the locality and state regulatory agencies as a forum for exchanging information and opinions concerning the proposed facility. Localities might establish conditions in local permits or request that conditions be added to state permits whereby the facility operator would agree to periodic public inspection. The results of state monitoring and inspections should be made more available to local citizens. In addition, the Task Force has recommended

that localities establish the capability to coordinate with and supplement the state's inspection and monitoring programs, and that they be authorized to establish a privilege license tax on the facility in order to pay the costs of establishing such a capability.

- * Funds will be requested from the state and federal government to continue efforts to inform and involve the general public. This is a very critical component of the program and additional funds will be requested to adequately support it. The Task Force is recommending that the staff to the Governor's Waste Management Board include a person to work on public participation and education activities such as developing informational materials and coordinating public hearings and meetings.

6. EMERGENCY RESPONSE AND CLEANUP

- * - The state should establish a fund for cleaning up abandoned sites, as well as spills and similar emergencies. This fund should be paid for by generators, perhaps by means of an excise tax.
- A single state agency should be responsible for all aspects of emergency response and cleanup.
- The state and local governments should share emergency responsibility.

RESPONSE: * The Task Force recommends that the Department of Natural Resources and Community Development be appropriated adequate funds to cleanup spills and respond to similar emergencies.

7. TRANSPORTATION

- Transportation is an important concern. Emergency response groups should be formed for local transportation mishaps.

Every effort should be made to ensure that a safe transportation system is established.

- Insurance on transporters should be high. Bonding of transporters was suggested.
- Transport routes should be carefully designated and marked.
- Waste should not be transported through residential areas.

8. OTHER COMMENTS

- * - A consumer education approach should be tried. Techniques suggested were (a) labelling products that generate hazardous waste in their production, (b) making the list of generators easily available to the general public.
- * - New industry coming into North Carolina should be screened based on waste generated and discouraged if the volume or type of waste exceeds the state's treatment and disposal capability.
- * - Generators should pay for all costs of handling and regulating waste so that these costs will become a production cost and will be reflected in the price of the product.
- * - Generators and handlers should be held strictly liable for any damages caused by waste.
- More attention should be given to defining the more radioactive types of waste so that they can be handled differently from the less radioactive types.
- The state should concentrate on encouraging alternative ways of generating energy, thereby decreasing reliance on nuclear power and reducing its waste by-products. Some suggested that nuclear power be banned.
- Any policy-making body should consider the costs associated with medical treatment, lost worktime, etc. as well as the benefits associated with salaries and economic stimulation when considering the economic value to the state of waste-producing industries.
- Pesticides containers should be collected and disposed of at some central locations.

RESPONSES: * The labelling of products would have to apply to a tremendous number of consumer products. Although the Task Force agrees that it might promote consumer awareness and reduce consumption of goods that cause hazardous waste in their production, this approach would be an awesome undertaking and its feasibility should be studied by the Waste Management Board. The list of generators is currently a matter of public record.

* The Task Force recommends that the Department of Commerce work with the Department of Natural Resources and Community Development and the Department of Human Resources in improving procedures for assessing the potential waste generation of new industries and ensuring that the state is in a position to control and safely manage these wastes.

* The Task Force agrees that waste generators should pay all costs of handling waste and believes that the new "cradle to grave" regulatory program will cause such internalization of costs. The Task Force also agrees in principle that the costs of government regulation should be borne by generators and has recommended that localities be authorized to effectuate such an approach by levying a privilege license tax on waste facilities.

The Task Force has also recommended that the state study the possibility of establishing a similar charge to pay for its regulatory programs. Also, in furtherance of this policy, the Task Force has modified its report to recommend that tax free industrial revenue bonds be made available only for recovery and recycling facilities, and not for storage and disposal facilities.

* The Task Force favors strict liability and has modified its recommendations to state that it should be a state

policy that financial responsibility resulting from hazardous and low-level radioactive wastes be allocated to the greatest extent possible to those who generate and transport waste or operate treatment, storage, and disposal facilities. The Task Force recommends that the Governor's Waste Management Board study the possibility of furthering this policy by applying a standard of strict liability to generators, transporters, and facility operators, establishing a fund paid for by waste generators to compensate for personal, property, and environmental damages, and increasing liability insurance for facility operators above the amount presently required under RCRA regulations.

B. Citizen's Reactions to the Draft Recommendations of the Governor's Task Force on Waste Management Report

At the seven public hearings held to review the draft report of the Task Force, attendees were asked to fill out citizen reaction sheets responding to the draft recommendations of the report. Approximately 330 sheets were filled out, giving those in attendance the opportunity to 1) express their opinion on the importance of each of the sixteen draft recommendations and 2) to indicate whether they agreed, disagreed, or had no opinion on each draft recommendation. The following are the results of the citizen reaction sheets to each of the sixteen draft recommendations.*

CODE

IMPORTANCE

High = H

Low = L

AGREEMENT

Agree = Ag

Disagree = Disag

No/Opinion= N/O

*It is important for the reader to remember that the recommendations are written here as they were before the public meetings and there have been many changes in the final recommendations.

The Governor's Task Force on Waste Management recommends:

1. A comprehensive waste management system be developed which emphasizes prevention, resource conservation and recovery and minimizes the volume of waste to be placed on or buried in the land.

H---349

Ag.-----337

L--- 5

Disag.-- 7

N/O----- 0

2. A Governor's Waste Management Board, composed of a representative group of people and chaired by the Secretary of the Department of Human Resources, be created to advise the Governor on organizational and policy issues related to the development and operation of an effective waste management program for North Carolina.

H---239

Ag.-----218

L--- 79

Disag.-- 75

N/O----- 12

3. The private sector be given the lead responsibility for selecting appropriate sites and for developing and operating waste management facilities. The state should be given the authority to acquire land, and own, operate or enter into lease agreements for the development and operation of these facilities if the private sector does not meet the demand.

H---276

Ag.-----207

L--- 45

Disag.--112

N/O----- 11

4. The private sector be required to give title to the state for land which is to be used as a landfill containment facility for hazardous or low-level radioactive waste.

H---246

Ag.-----202

L--- 82

Disag.-- 98

N/O----- 23

5. The Council of State be given the authority to condemn land for the acquisition of suitable sites upon the recommendation of the Secretary of Human Resources.

H---248

Ag.-----170

L--- 71

Disag.--156

N/O----- 23

6. State laws be amended to enable pre-emption of local zoning laws pertaining to siting of waste treatment, storage, and disposal facilities. The Secretary of the Department of Human Resources should be authorized to exercise this authority after the Governor's Waste Management Board has determined the facility is essential to the health, safety, and welfare of the citizens of North Carolina. Prior to making a final decision, the Secretary must also (1) determine that the proposed site and facility meet all federal and state environmental, health, and safety standards (2) give local citizens an adequate opportunity to express their viewpoint and concerns, and (3) document and set forth the justification for overriding local concerns.

H---284

Ag.-----159

L--- 50

Disag.--157

N/O----- 13

7. Local governments be given the authority to establish a fee, surcharge, or tax based on actual costs and lost revenues associated with a waste management facility.

H---214

Ag.-----237

L---120

Disag.-- 67

N/O----- 29

8. The Department of Human Resources and Natural Resources and Community Development develop additional siting criteria for the development and operation of low-level radioactive waste management facilities.

H---243

Ag.-----257

L--- 69

Disag.-- 25

N/O----- 30

9. The state of North Carolina pursue the regional compact approach with its neighboring states for the safe management of low-level radioactive waste. Federal legislation which legalizes these compacts has been enacted and will become effective in 1986.

H---239

Ag.-----250

L--- 94

Disag.-- 38

N/O----- 29

10. A comprehensive plan for participation be included as an integral part of the State's waste management program. State procedures should encourage county commissioners to form local facility siting committees to guarantee local citizens' input in the decision-making process and provide for an open exchange of information on the proposed waste management facility.

H---274

Ag.-----303

L--- 67

Disag.-- 15

N/O----- 9

11. The state should promote research and development which is directed to solve waste management problems unique to North Carolina. The Board also shall recommend annually to the Governor a recipient for a "Governor's Award of Excellence" for outstanding achievement by an industry or company that makes technological advancements in this field.

H---209

Ag.-----248

L---112

Disag.-- 48

N/O----- 27

12. Funding be made available to the Waste Management Board for the development of a Waste Information Exchange. The Board shall also develop a plan for providing technical assistance and information to industries and request the necessary funding from the 1982 General Assembly to implement the proposed plan.

H---196

Ag.-----253

L---125

Disag.-- 28

N/O----- 28

13. An evaluation be conducted of the waste management program in North Carolina to determine its effectiveness.

H---212

Ag.-----296

L--- 91

Disag.-- 13

N/O----- 16

14. The Industrial Revenue Bond Act be amended, and any other necessary steps be taken, to make revenue bonds available for hazardous and

low-level radioactive waste facilities and to require that a facility must obtain a certification of eligibility from the Department of Human Resources before it can qualify for such bonds.

H---231

Ag.-----221

L--- 87

Disag.-- 62

N/O----- 30

15. The Governor's Waste Management Board conduct an on-going evaluation of current and proposed rules and regulations to ensure that the public's health and the environment are protected to the maximum extent possible. The Task Force also recommends that several amendments be introduced during the 1981 General Assembly to strengthen current laws. Those recommendations are discussed in Chapter V, Subchapter D.

H---249

Ag.-----261

L--- 42

Disag.-- 25

N/O----- 29

16. The Governor's Waste Management Board study the following issues and make recommendations for appropriate action to the Governor after receiving input from the general public.

- Should the state be compensated for actual cost of monitoring a waste management facility, and if so, what method should be used?
- Should the state legally impose a standard of strict liability for damages caused by generators, transporters, and operators of hazardous and low-level radioactive waste facilities. The Task Force favors some form of strict liability unless it would cause insurance rates to be so high as to be prohibitive.
- Should the state provide back up liability insurance in addition to what it is currently required from operators for the operation of waste management facilities?

H---259

L--- 33

Ag.-----259

Disag.-- 27

N/O----- 25

NORTH CAROLINA

LOCATION AND CATEGORY OF LOW LEVEL RADIATION WASTE GENERATORS

- ▲ Operating Nuclear Plant
- Nuclear Fuel Manufacturer
- Medical, Research & Education

January 1981

PROJECTED CURRENT VOLUME OF HAZARDOUS WASTE GENERATED IN THE COUNTIES
OF NORTH CAROLINA*

* Gallons Per Year Based on a 1976 Survey
(in thousands)

No waste
Under 100
101 - 1,000
1,001 - 10,000

TABULATION BY COUNTY OF
HAZARDOUS WASTE GENERATORS *

Alamance	23	Cumberland	51	Johnston	21	Randolph	18
Alexander	3	Currituck	1	Jones	--	Richmond	9
Alleghany	2	Dare	2	Lee	15	Robeson	38
Anson	7	Davidson	44	Lenoir	14	Rockingham	12
Ashe	2	Davie	4	Lincoln	7	Rowan	30
Avery	1	Duplin	11	McDowell	7	Rutherford	16
Beaufort	10	Durham	42	Macon	1	Sampson	9
Bertie	4	Edgecombe	18	Madison	2	Scotland	14
Bladen	5	Forsyth	54	Martin	6	Stanly	10
Brunswick	8	Franklin	2	Mecklenburg	159	Stokes	1
Buncombe	36	Gaston	37	Mitchell	4	Surry	12
Burke	24	Gates	--	Montgomery	1	Swain	1
Cabarrus	11	Graham	2	Moore	8	Transylvania	5
Caldwell	35	Granville	6	Nash	3	Tyrrell	--
Camden	--	Greene	2	New Hanover	41	Union	14
Carteret	3	Guilford	125	Northampton	5	Vance	4
Caswell	--	Halifax	22	Onslow	7	Wake	58
Catawba	51	Harnett	4	Orange	9	Warren	2
Chatham	9	Haywood	5	Pamlico	--	Washington	7
Cherokee	4	Henderson	14	Pasquotank	4	Watauga	5
Chowan	--	Hertford	13	Pender	--	Wayne	36
Clay	1	Hoke	4	Perquimans	1	Wilkes	11
Cleveland	13	Hyde	2	Person	7	Wilson	10
Columbus	12	Iredell	25	Pitt	21	Yadkin	2
Craven	16	Jackson	2	Polk	2	Yancey	<u>1</u>
							1,442

*These North Carolina industries, businesses, and public agencies notified EPA by August 18, 1980 that they were generators of more than 2,200 pounds of hazardous waste each month.

Appendix V

HAZARDOUS WASTE STUDY

SUMMARY OF EMPLOYMENT AND WAGES OF IDENTIFIED FIRMS
(DATA FOR 1980)

STANDARD INDUSTRIAL CLASSIFICATION GROUP	NUMBER OF FIRMS	EMPLOYEES	ANNUAL WAGES (\$ MILLIONS)
AGRICULTURE PRODUCTS	4	43	.39
MINING	1	34	.29
CONSTRUCTION	4	24	.16
FOOD	11	3962	93.36
TOBACCO	8	17138	297.13
TEXTILES	95	65404	714.27
APPAREL	8	1906	16.22
LUMBER AND WOOD	45	6292	80.34
FURNITURE	103	48354	468.72
PAPER	26	10889	211.27
PRINTING	20	3463	44.62
CHEMICALS	104	34537	591.85
PETROLEUM	1	64	1.02
RUBBER	32	14740	203.01
LEATHER	9	2849	30.65
STONE, CLAY, GLASS	15	6142	92.09
PRIMARY METALS	9	2680	47.58
FABRICATED METALS	52	11754	175.28
NONELECTRIC MACHINERY	45	21304	355.60
ELECTRICAL MACHINERY	52	38618	592.40
TRANSPORTATION EQUIPMENT	32	10362	142.43
INSTRUMENTS	10	4648	64.17
MISCELLANEOUS MANUFACTURERS	7	1533	15.14
TRANSPORTATION, COMMUNICATION, PUBLIC UTILITIES	45	12664	238.13
WHOLESALE TRADE	78	3664	75.53
RETAIL TRADE	32	227	2.59
SERVICES	20	38397	529.97
GOVERNMENT	4	234	2.25
TOTAL	872	361,926	\$5,086,460

EMPLOYMENT IN INDUSTRIES GENERATING HAZARDOUS WASTE IN N.C., BY COUNTY, 1980

APPENDIX VII

WASTE MANAGEMENT FUNCTIONS FOR NORTH CAROLINA

Throughout the discussions of the Governor's Task Force on Waste Management, the Management Role Working Group and the Town Meetings there has been interest in and concern for the development of a North Carolina STRATEGY or STATE PLAN.

The initial task of the proposed Governor's Waste Management Board is to develop the details of that STRATEGY or STATE PLAN. This STRATEGY or STATE PLAN would "provide a framework upon which the diverse activities of participating agencies can be coordinated and focused upon specific areas of responsibility consistent with the expertise, resources and statutory authorities of such agencies.... it [would not be] intended to relieve any agency of its statutory responsibilities for protection of the public health, safety or welfare."

As the North Carolina STRATEGY is developed certain waste management functions must be defined and implemented. The accompanying functions are ones that have been identified as of importance in North Carolina.

The attached charts are an initial attempt to define the general categories of waste management function and to identify the agencies and other groups that should be involved in developing and implementing these functions. These charts are not presented and should not be accepted as definitive. An attempt has been made to include the agencies and groups that have been discussed in the various meetings of the Task Force as well as those functions and agencies that have been identified specifically in responses to a questionnaire on this subject. These charts are meant to pass on to the Governor's Waste Management Board a general idea as to how it might organize itself to deal with the necessary functions of a comprehensive waste management system.

NAME OF FUNCTION	DESCRIPTION OF FUNCTION
Intergovernmental Cooperation and Coordination	Development, modification, if necessary, and supervision of a North Carolina Waste Management Strategy or Plan; intergovernmental (federal, state, local) coordination of activities; coordination of public and non-governmental involvement.
Information Management	Coordination, when necessary, of the several departmental information office responses; creation of a central point from which information can be made available -- for the public, for media, for policy and decision makers.
Citizen/Local General Purpose Government Participation	Designing a system of appropriate and targeted participation and comment; coordination of system with existing citizen councils, boards and commissions.
Technical Assistance (traditional state agency role)	Coordination of traditional state advisory programs and those offered in University system (e.g. Industrial Extension, NCSU) and developing programs as needed in Community College system.
Research and Development (Higher Education/Industry)	Encourage development of alternatives to production of toxic and hazardous waste materials stressing safe resource recovery and reduction, substitution of non-toxic materials for toxic, encouraging epidemiological research.
Regulatory Assessment	Assessment and recommendations for improving state and federal regulations and regulatory programs.
Rule-Making	Establishing and implementing rule-making procedures according to administrative procedures act.
Monitoring and Evaluation	Implementation of a continuing program that monitors closely and evaluates impact of toxic substances on the environment and the relation of that impact to public health.
Enforcement	Understanding, supporting and assessing the capability for surveillance, enforcement, and prosecuting and remedying violations.
Crisis Response	Understanding, supporting and assessing the North Carolina EMERGENCY RESPONSE PLAN; development of contingency plans, specialized training of emergency personnel, mitigation of environmental damages. Support the purchase and maintenance of response equipment.
Transportation	Delineating the transportation element of waste management from general functions; development of a specialized program that addresses transportation concerns of local government jurisdictions and public concern for health, safety and welfare.
Interstate Compacts	Development of regional compacts with neighboring states that leads to the establishment of a minimal number of facilities and provides maximal protection to health and the environment.

CHART I

INTERGOVERNMENTAL COOPERATION AND COORDINATION

(Report: GOVERNOR'S TASK FORCE ON WASTE MANAGEMENT)

Governor's Waste Management Board:

Department of Human Resources (DHR)
Department of Natural Resources and Community Development (NRCD)
Department of Commerce (DoC)
Department of Administration (DoA)
Department of Crime Control and Public Safety (CCPS)
Department of Transportation (DoT)
Department of Agriculture (DoAG)
Department of Labor (DoL)

Executive Director: Board of Science and Technology

11 representatives from Legislature, counties, municipalities,
higher education and public interest groups

(Chairman to be selected by Governor: non-member of regulatory state agency or waste-generating industry:
housed in Department of Human Resources)

CHART II

INFORMATION MANAGEMENT	CITIZEN/LOCAL GENERAL PURPOSE GOVT PARTICIPATION	TECHNICAL ASSISTANCE (Traditional State Agency)	RESEARCH AND DEVELOP (Higher Education/In
Public Affairs or Public Information Offices of:	Existing Elements: DoA: State Goals and Policies Board	EPA DHR: Division of Health Services (DHS)	Lead Agency: DoC: N Board of Science and Technology
Governor	Local Government Advocacy Council	Environmental Health Section	N. C. University Sys
DoA			
DHR			
NRCD			
DoC	DHR: Commission for Health Services	Radiation Protection Section	Private Universities
DoT			
DoAG			EPA
DoL	Radiation Protection Commission	NRCD: Division of Environmental Management (DEM)	Appropriate Industry or Associations
CCPS		DCA	
NRCD: Division of Community Assistance (DCA)	NRCD: Environmental Management Commission		Appropriate Professi Organizations
North Carolina Association of County Commissioners (NCACC)	DoAg: Pesticides Board	Division of Soil and Water Conservation	
North Carolina League of Municipalities (NCLM)			
North Carolina City and County Managers Assoc. (NCCCM)	NCACC NCLM	DoC: Economic Development Divisions	
Institute of Government (IoG)		DoAg: Office of Agri-business Office of Consumer Services	
U.S. Environmental Protection Agency (EPA)		N. C. University System Community Colleges IoG	

CHART III

REGULATORY ASSESSMENT	RULE MAKING	MONITORING AND EVALUATION	ENFORCEMENT
DHR: Solid & Hazardous Waste Radiation Protection	By State Agency as appropriate	DHR: DHS Solid and Hazardous Waste Radiation Protection Epidemiology	DHR: DHS Solid & Hazardous Wa: Radiation Protection
NRCD: DEM Office of Regulatory Relations	DHR: Commission for Health Services Radiation Protection Commission	NRCD: DEM Air Quality Water Quality Groundwater	NRCD: DEM Office of Legal Affairs Office of Administrative Hearings
CCPS	NRCD: Environmental Management Commission	Office of Water Resources: Hydrology Section	
Commerce: Utilities Commission Transportation Division	DoAg: Pesticides Board	Office of Regulatory Relations	CCPS
DoAg: Pesticide & Plan Protection Division		Office of Legal Affairs	DoC: Utilities Commis Transportation Division
Field Representation from state agencies		DoC: Utilities Commission, Transportation Division	DoAG: Pesticide & Plan Protection Divis
Appropriate citizen representation particularly environmental and industry groups		DoL: OSHA	DoL: OSHA
NCACC		DoAg: Pesticide & Plant Protection Division	----- Commission of Health Services Radiation Protection Commission Environmental Manageme Commission Pesticides Board ----- Department of Public Instruction (safe use toxics in schools) ----- emergency medical, pub safety
NCLM			
NCCCM			

CHART IV

CRISIS RESPONSE	TRANSPORTATION	INTERSTATE COMPACTS
-----------------	----------------	---------------------

Lead agency: CCPS

TO BE DEVELOPED

Office of Governor

Lead Agency: DoT

DHR

See "North Carolina Hazardous Materials: Emergency Response Plan" CCPS: Division of Emergency Management, January 1981. Particularly, Annex C, p. C-1; Annex H, pp. H-1&2 (Organization Chart and Communications)

NRCD

CCPS

Should there be an assessment and/or planning committee set up under the Waste Management Board, it might not include only the many federal and state agencies coordinated by CCPS but field representation from state agencies, and appropriate public representation -- Civilian Defense Red Cross, United Way, Emergency Medical Personnel, Sheriffs, Police, Fire and Public Safety officers

ABBREVIATIONS

CCPS: DEPARTMENT OF CRIME CONTROL AND PUBLIC SAFETY
DoA : DEPARTMENT OF ADMINISTRATION
DoAG: DEPARTMENT OF AGRICULTURE
DoC : DEPARTMENT OF COMMERCE
DCA : DIVISION OF COMMUNITY ASSISTANCE (NRCD)
DEM : DIVISION OF ENVIRONMENTAL MANAGEMENT (NRCD)
DHR : DEPARTMENT OF HUMAN RESOURCES
DHS : DIVISION OF HEALTH SERVICES (DHR)
DoL : DEPARTMENT OF LABOR
DoT : DEPARTMENT OF TRANSPORTATION
EPA : ENVIRONMENTAL PROTECTION AGENCY
IoG : INSTITUTE OF GOVERNMENT
NCACC: NORTH CAROLINA ASSOCIATION OF COUNTY COMMISSIONERS
NCCCM: NORTH CAROLINA CITY COUNTY MANAGERS ASSOCIATION
NCLM: NORTH CAROLINA LEAGUE OF MUNICIPALITIES
NRCD: DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

ACKNOWLEDGMENTS

- A. The Task Force wishes to acknowledge and express its appreciation to the members of the two Technical Advisory Committees who contributed their time and expertise in preparing the reports which served as background materials and provided valuable sources of information.

Technical Advisory Committee on Hazardous Waste Management

Dr. J. K. Ferrell, Chairman
Chemical Engineering Department - N. C. State University

Mr. Evander H. Rowell
North Carolina Textile Manufacturing Association

Dr. Donald Hart
Chemical Industry Institute of Toxicology

Mr. Billy Buffaloe
North Carolina Department of Agriculture

Dr. Alvis Turner
School of Public Health - UNC - Chapel Hill

Mr. Hood L. Richardson
North Carolina Society of Professional Engineers

Mr. Steve Conrad
Natural Resources and Community Development

Mr. William "Buck" Deal
Southern Furniture Manufacturing Association

Mr. O. W. Strickland

Department of Human Resources - Division of Health Services

Dr. Quentin Lindsey - Ex-Officio Member

Governor's Science and Policy Advisor

Technical Advisory Committee on Low-Level Radioactive Waste Management

Captain William H. Briner, Chairman

Duke University Medical Center

Mr. Dayne H. Brown

North Carolina Department of Human Resources - Division of Facility Services

Mr. James M. Davis, Jr.

Carolina Power & Light Company

Dr. Ralph L. Ely

Research Triangle Institute

Mr. Lionel Lewis

Duke Power Company

Dr. Raymond L. Murray

North Carolina State University

Mr. William B. Smalley

General Electric Company

Dr. James E. Watson

School of Public Health - UNC - Chapel Hill

Dr. Richard Witcofski

Bowman-Gray School of Medicine

Ms. Patricia J. Serie
Consultant
EG&G Idaho, Incorporated
(Contractor to United States
Department of Energy)

Dr. Quentin Lindsey - Ex-Officio Member
Governor's Science and Policy Advisor

B. The Task Force wishes to acknowledge with gratitude the highly valuable information provided by the following guest speakers who presented different perspectives on the waste management problem. They all volunteered their time in preparing and delivering their presentations to the Task Force.

Dr. John Nemeth
Consultant and Chief Ecologist
Law Engineering, Inc.

Dr. John Hart
Assistant Dean of Engineering for Extension Services
North Carolina State University

Dr. Franklin Hart
Associate Dean, Research Programs
North Carolina State University

Dr. Michael Overcash
Associate Professor of Biological and Agriculture Engineering
North Carolina State University

Mr. Alan Borner
Associate Coordinator
U & H Environmental Research
University of New Hampshire

Mr. Robert Fox, Vice-President of Operations
I & T. Enviroscience, Inc.

Mr. David Reid
Special Assistant to the Governor of South Carolina

Mr. Herb Oakley
Vice President
Chem-Nuclear Systems, Inc.

Mr. Patrick Wicks, President
Chem-Security Systems, Inc.

Dr. Robert Goyer
Deputy Director of the National Institute of Environmental Health Services

Dr. Don Huisinigh
Toxic Substance Project Leader
Governor's Office

Mr. James Henry (and the Students)
Head of Media Services
North Carolina School of Science and Mathematics

Ms. Mary Kelly
First Vice-President, League of Women Voters of South Carolina

- C. The Task Force wishes to express its special thanks to individuals who were not members of the Task Force but who volunteered their time to serve as a member of the Work Group on Public Participation. Their efforts were extremely valuable in developing ways to educate and involve citizens in this overall effort to seek an acceptable solution for North Carolina.

Mr. Jim McGough

Mr. Lee A. Krohn

Ms. Heidi G. Chapman

Ms. June Milby

Ms. Melinda J. Holland

Ms. Shirley Marshall

Ms. Jane Sharp

Mr. Terry Pierson

Mr. Rick Estes

Ms. Joyce Moore

Mr. David Long

Mr. Martie Groome

Mr. R. W. Reaves

Mr. Tommy Thompson

Mr. Barney Kane

D. The Task Force wishes to express their appreciation for the staff support provided by the Department of Human Resources. The Task Force acknowledges with gratitude the unceasing efforts of Lucy Bode in providing the administrative and logistical support necessary to complete its work on time. Special commendation is hereby accorded to Glenn Dunn who served as staff coordinator of the Task Force and whose legal knowledge was essential in highlighting many of the complex issues faced by the committee. The Task Force also wishes to thank David Swanson for assisting in the research of various management approaches being pursued by other states. Special thanks

is given to Russ Edmonston and Bryant Haskins for their assistance in writing and editing the report and for carrying out the necessary public information activities which included the development and distribution of a questionnaire. Special tribute is given by the Task Force to Vahnis O'Neal for making all the meeting arrangements and for preparing and disseminating the agendas and minutes of each meeting. They all worked many long hours and holidays to keep the Task Force's activities on schedule.

The Task Force would also like to express their appreciation to Alice Garland of the Department of Transportation and Shirley Marshall of the Department of Natural Resources and Community Development for the invaluable staff assistance they provided especially during its deliberations concerning the various management options.

The Task Force would also like to thank the following people for their advice and consultation on various issues under consideration by the group.

Professor Robert Byrd - UNC Law School

Professor Milton Heath - Institute of Government

Associate Professor Charles D. Liner - Institute of Government

Professor William A. Campbell - Institute of Government

Members of the Task Force wish to express their appreciation to the many members of the public and news media who attended meetings and volunteered their opinions regarding matters facing the Task Force. These expressions of opinion continue to reinforce in the minds of the Task Force members their responsibility to serve the interest of the general public.

APPENDIX F: Regulations for Protection Against Radiation

per hour, the licensee or registrant shall immediately notify, by telephone and telegraph, the final delivering carrier and the agency.

(g) Each licensee or registrant shall establish and maintain procedures for safely opening packages in which radioactive material is received, and shall assure that these procedures are followed and that due consideration is given to special instructions for the type of package being opened.

History Note: Statutory Authority G.S. 104E-7;
Eff. February 1, 1980.

.2516 WASTE DISPOSAL

(a) No licensee shall dispose of any radioactive material except:

- (1) by transfer to an authorized recipient as provided in Section .2400 of this Subchapter, or
- (2) as authorized pursuant to the provisions of this Rule.

(b) Any person may apply to the agency for approval of proposed procedures to dispose of radioactive material in a manner not otherwise authorized in this Section. Each application shall include:

- (1) a description of the radioactive material, including the quantities and kinds of radioactive material and levels of radioactivity involved, and the proposed manner and conditions of disposal;
- (2) where appropriate, an analysis and evaluation of pertinent information as to
 - (A) the nature of the environment, including topographical, geological, meteorological, and hydrological characteristics;
 - (B) usage of ground and surface waters in the general area;
 - (C) the nature and location of other potentially affected facilities; and
 - (D) procedures to be observed to minimize the risk of unexpected or hazardous exposures.

(c) The agency will not approve any application for a license to receive radioactive material from other persons for disposal on land not owned by a state or the federal government.

(d) No licensee shall discharge radioactive material into a sanitary sewerage system unless:

- (1) It is readily soluble or dispersible in water;
- (2) The quantity of any radioactive material released into the system by the licensee in any one day does not exceed the larger of (d)(2)(A) and (B) of this Rule:
 - (A) the quantity which, if diluted by the average daily quantity of sewage released into the sewer by the licensee, will result in an average concentration not greater than the limits specified in Table 1, Column 2 of Rule .2523(a) of this Section; or
 - (B) ten times the quantity of the radioactive material specified in the table in Rule .2524(a) of this Section.

- (3) The quantity of any radioactive material released in any one month, if diluted by the average monthly quantity of water released by the licensee, will not result in an average concentration exceeding the limits specified in Table I, Column 2 of Rule .2523(a) of this Section.
- (4) The gross quantity of radioactive material released into the sewerage system by the licensee does not exceed one Curie per year.
- (5) Excreta from individuals undergoing medical diagnosis or therapy with radioactive materials are exempt from any limitations contained in this Rule.
- (e) No licensee shall dispose of radioactive material by burial in soil except as specifically approved by the agency pursuant to (b) of this Rule.
- (f) No licensee shall incinerate radioactive material for the purpose of disposal or preparation for disposal except as specifically approved by the agency pursuant to Rule .2507 and (b) of this Rule.
- (g) The Commission or its designee shall conduct a public hearing in any county in which a person proposes to operate a radioactive waste processing facility or a radioactive waste disposal facility, as defined in Rule .2204 of this Subchapter, or to enlarge an existing facility for such processing or disposal. Rules governing this hearing shall be those found in 10 NCAC 3B .0400.

History Note: Statutory Authority G.S. 104E-7; 104E-10(d);
Eff. February 1, 1980.

.2517 RECORDS

- (a) Each licensee or registrant shall maintain records showing the radiation exposures of all individuals for whom personnel monitoring is required under Rule .2510 of this Section. Such records shall be kept on agency form DFS-5251 in accordance with the instructions contained in that form, or on clear and legible records containing all the information required by agency form DFS-5251. The doses entered on the forms or records shall be for periods of time not exceeding one calendar quarter.
- (b) Each licensee or registrant shall maintain records in the same units used in this Section, showing the results of surveys required by Rule .2509 of this Section, monitoring required by Rules .2515(c) and (e) of this Section, and disposals made under Rule .2516(b) and (d) of this Section.
- (c) Records of individual exposure to radiation and to radioactive material which must be maintained pursuant to the provisions of (a) of this Rule and records of bioassays, including results of whole body counting examinations, made pursuant to Rule .2508 of this Section shall be preserved until the agency authorizes disposition.
- (d) Records of the results of surveys and monitoring which must be maintained pursuant to (b) of this Rule shall be preserved for two years after completion of the survey except that the following records shall be maintained until the agency authorizes their disposition: