# REPORT OF THE

# SOLID WASTE COMMISSION

# TO

# THE GOVERNOR

# AND

# THE GENERAL ASSEMBLY OF VIRGINIA


**HOUSE DOCUMENT NO. 28**

**COMMONWEALTH OF VIRGINIA**
**Richmond, Virginia**
**1981**

## MEMBERS OF THE COMMISSION

Dr. Robert F. Testin, Chairman, Richmond

Callis H. Atkins, Ruckersville

William M. Beck, Jr., Norfolk

Edward T. DiBerto, Virginia Beach

R. E. Dorer, Virginia Beach

Ernest C. Edwards, Jr., Chase City

Senator Joseph V. Gartlan, Jr., Fairfax

Delegate George W. Grayson, Williamsburg

Joseph M. Guiffre, Alexandria

Delegate R. Beasley Jones, Dinwiddie

Delegate Joan S. Jones, Lynchburg

Jonathan Murdoch-Kitt, Richmond

William T. Reed, Manakin-Sabot

Delegate John H. Rust, Jr., Oakton

Senator Stanley C. Walker, Norfolk

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Susan G. Dull, Executive Director

Nancy Arnett, Secretary

Mailing address: P.O. Box 3-AG
Richmond, VA 23208

Location: General Assembly Bldg.
910 Capitol Street, Room 824
Richmond, VA

Telephone: (804) 786-4169

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SOLID WASTE COMMISSION
TO
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RICHMOND, VIRGINIA

JANUARY, 1981

TO: Honorable John N. Dalton, Governor of Virginia
and
The General Assembly of Virginia

## I. INTRODUCTION

### A. Legislation Creating and Pertaining to the Solid Waste Commission

The Virginia Solid Waste Commission was created by the 1973 General Assembly through the passage of Senate Bill No. 856. This legislation, introduced by Senator Stanley C. Walker, created the Commission to study and advise upon the Disposal of Solid Wastes. During the 1976 Session of the General Assembly, the name of the Commission was changed to the Solid Waste Commission in Senate Bill No. 383. During the 1980 Session of the General Assembly, House Joint Resolution No. 44, introduced by Delegate George W. Grayson, was passed. This resolution directed the Virginia State Board of Health with the assistance of the Solid Waste Commission to plan for and establish a site for the disposal of low level nuclear waste.

### B. Membership of the Commission and Its Staff

The members of the Commission as of July 1, 1980, are: Dr. Robert F. Testin, Richmond; William M. Beck, Jr., Norfolk; Callis H. Atkins, Ruckersville; R. E. Dorer, Virginia Beach; Ernest C. Edwards, Jr., Chase City; Senator Joseph V. Gartlan, Jr., Fairfax; Delegate George

W. Grayson, Williamsburg; Joseph M. Guiffre, Alexandria; Delegate Joan S. Jones, Lynchburg; Delegate Beasley Jones, Dinwiddie; Jonathan Murdoch-Kitt, Richmond; William T. Reed, Manakin-Sabot; Delegate John H. Rust, Jr., Oakton; Senator Stanley C. Walker, Norfolk. Mrs. Susan G. Dull is Executive Director of the Solid Waste Commission and Mrs. Nancy J. Arnett serves as Secretary.

C. Meetings and Public Hearings

The full Commission met a total of seven times during 1980 and held nine public workshops in conjunction with low-level nuclear waste disposal.

D. Working Committees; Membership and Subject Areas

In September, 1979, the Commission formed a number of standing committees, the reports of which constitute the main body of this report. These committees include the Program Committee, chaired by Commission member DiBerto; the Hazardous Waste Committee, chaired by Commission member Dorer; the Radioactive Waste Committee, chaired by Commission member Grayson; and the Resource Recovery Committee, chaired by Commission member Edwards.

E. General Summary of Activities During the Past Year

As a result of the passage of House Joint Resolution No. 44, the bulk of the Commission activities during 1980 were directed toward planning for the management of low level nuclear wastes in Virginia.

During the summer of 1980 a series of public workshops were held jointly with the State Health Department. The purpose of which was to explain the issue of low level nuclear waste disposal to the general public and to solicit public comments concerning State efforts in this area. A report on these hearings was complied and submitted to the Governor and General Assembly in October. A special report on the Commonwealth's current efforts toward the management of LLRW is contained in Section V of this report.

In addition, the Commission continued work on its other primary areas of activity which included resource recovery, the development of a waste exchange for solid waste, and questions relating to the disposal of hazardous wastes. These topics also are covered in the body of the report.

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# II. RESOURCE RECOVERY

## A. Introduction

In recent years the American people as well as citizens of Virginia have become aware of two facts: one, that valuable natural resources are being rapidly depleted and two, that our environment is being degraded by an ever increasing volume of waste materials. These two facts generated the concept of converting waste into useful products. In 1976 the Federal Government enacted the Resource Conservation and Recovery Act. This act encourages resource recovery as a means of waste disposal.

The Virginia Solid Waste Commission determined that it should investigate and analyze selected existing and proposed resource recovery projects in the eastern part of the United States. Some of the data obtained has been included in previous annual reports.

In 1980 the Resource Recovery Committee of the Solid Waste Commission confined its activities to a study of progress of existing and proposed projects in Virginia. These projects are listed below and discussed in detail later in this report.

Resource Recovery projects in Virginia:

1. Southeastern Public Service Authority of Virginia, Portsmouth, Va.

2. City of Hampton-Langley Research Center, Hampton, Va.

3. Salem Resource Recovery Plant, Salem, Va.

B. Conclusions

1. Within today's economic framework, the recovery of energy in the form of steam appears to be an economically viable method of waste disposal. This method will substantially reduce the need for landfills.

2. The generation of steam is feasible only if a steam customer is within close proximity to the plant site (3 - 5 miles) and the energy requirement can be fit into the cycle of waste collection.

3. Small installations that would suit the needs of small cities or counties are economically feasible. (Salem-100 tons per day; Hampton-200 tons per day).

4. Savings in terms of gallons of oil per year are essential.

5. Steam generating plants, in small sizes, can be built to meet all environmental standards.

6. Burning of solid waste eliminates both known and possibly unknown problems with landfills. (i.e., methane gas, ground water contamination.)

7. The recovery of fractions, such as ferrous metals, aluminum, paper, etc., from the waste stream is desirable; however, the economics of these processes, with present technology, is questionable in medium size or small plants.

8. A survey of the political subdivisions of the State indicates that very few have the necessary operating and cost data to make accurate feasibility studies of a resource recovery system.

9. It is in the national interest to use all domestic energy sources that are available.

C. Recommendations

1. Each solid waste disposal system accumulate data on its operation including at least:

a. Tons per day
b. Ton miles of pick up service
c. Cost per ton of transportation
d. Cost per ton of landfill or other method of disposal
e. Cost should be on an accrual type of bookkeeping
f. Cost per ton of administration

2. Each politicial subdivision make a survey of public and private facilities to see what energy requirements may be in their area.

3. Where an existing or potential customer for steam or hot water is present, make the necessary studies to determine feasibility giving adequate emphasis to existing and potential fuel cost, environmental and political considerations.

4. The State of Virginia should adopt a policy to encourage the use of waste to generate energy at existing and proposed State, federal and locally owned facilities.

5. A limited system of planning grants for local governments should be considered by the State.

D. Resource Recovery Projects In Virginia

1. Southeastern Public Service Authority of Virginia

SUMMARY

a. Location - Portsmouth, Virginia

b. Size - 1500 tons/day

c. Product - Steam and electricity to Norfolk Navy Yard
Metals to scrap market

d. Status - Plant design is progressing but not to the final stages as of this time

## BACKGROUND

This project is planned to process all domestic and commercial waste from the cities of Norfolk, Portsmouth, Virginia Beach, Suffolk, and Franklin, and from the counties of Southampton and Isle of Wight. The facility will be located adjacent to the Norfolk Navy Yard in Portsmouth. This is a good example of a regional concept requiring long-term commitments and cooperation between political jurisdictions.

## PLANNING

A planning grant of $150,000 from the Environmental Protection Agency has helped defray planning expenses. The planning process started about five years ago and is not complete to date; however, it is very likely that the facility will include features as indicated below. Plant design is not in the final "go ahead" stage as yet.

## FACILITIES AND OPERATION

A Board of Commissioners selected from city and county officials will administer the project. The Norfolk Navy Yard will purchase all steam and electricity. Surplus steam will be used to generate electricity. Ferrous metal and perhaps other noncombustibles will be recovered for sale to the scrap market. The facility will process 10,500 tons/week from a population of about 800,000 persons. It is planned that the disposal plant will operate five days per week and the power plant will operate seven days per week. Residue will go to a landfill.

ECONOMICS

It is estimated that the facility will cost $140,000,000. The funds are to be obtained by the sale of revenue bonds. Revenue will be obtained from tipping fees, sale of energy, sale of metal, and interest earnings.

PERSONNEL

It is estimated that approximately two hundred employees will be needed.

2. City of Hampton-Langley Research Center

SUMMARY

a. Location - Hampton, Virginia
b. Size - 275 tons/day
c. Product - Steam to N.A.S.A.
d. Status - In operation

BACKGROUND

Landfill space is needed by the federal installations in the Hampton area and by the City of Hampton. NASA Langley Research Center needs steam. Land in the area has a high water table and it is extremely difficult to locate suitable land for a landfill in this congested area. A study made prior to the 1973 oil embargo indicated

that a resource recovery plant was economically undesirable. A new study published in 1974, based on the higher cost of energy, indicated that it was economically desirable.

## PLANNING

Planning was a joint effort of the Federal Government and the City of Hampton.

## FACILITIES AND OPERATION

Facilities were completed in mid-1980. The installation consists of two 100 T/D boilers installed in a concrete and steel building situated on a five acre tract of Langley Research Center property. Refuse is unloaded into a pit and an overhead crane is used to feed the boilers. The residue is deposited in the City of Hampton landfill. Stack gases are cleaned by electrostatic precipitators. The installation is in compliance with all environmental regulations. The facility will dispose of 70% of the City's refuse and 100% of the Federal Government's refuse. It will supply about 80% of Langley Research Center's steam demand. It is estimated that this heat recovery system will save about 2.4 million gallons of oil per year.

## ECONOMICS

Cost of the facility was 10.42 million dollars. The City of Hampton furnished 7.0 million dollars and the Federal Government, 3.42 million dollars. The City obtained funds through the sale of municipal

bonds. The initial tipping fee was estimated to be $4.22/ton and the steam revenue is $5.15 per 1,000 lbs. A review board will adjust fees quarterly in order to insure that the operation will pay its way.

PERSONNEL

The operation of the facility requires twenty-seven employees. Most of the employees were hired and trained on the job.

PLANT INSPECTION - November 14, 1980

This facility was put in operation in the fall of 1980. Members of the Solid Waste Commission visited the project on November 14, 1980. The actual operation meets or exceeds all design requirements. The start up and testing was accomplished without major problems. To date there has been no shut-down because of equipment failure. The City and the Air Force and NASA are well pleased with the operation to date.

3. City of Salem, Virginia

SUMMARY

a. Location - Salem, Virginia
b. Size - 100 tons/day
c. Product - Steam to Mohawk Rubber Company
d. Status - In operation

## BACKGROUND

The City of Salem, with a population of 24,000, is one of four governmental units in the Roanoke Valley. This Valley has a large population per square mile as compared to the surrounding area. In 1976, the Salem landfill was reaching its capacity. No new site could be found within the city limits. Efforts to obtain a new site in adjacent political jurisdictions were not pursued in view of the State law. A method of disposal within the city limits had to be found.

## PLANNING

The city personnel, consultants and Mohawk Rubber Company put together the existing system. Construction was financed by general obligation bonds. Bids were let and Branch and Associates of Richmond, Virginia was selected as general contractor, with Consumat Systems, Inc. as the supplier of the special equipment. The city council included two (2) million dollars in a 3.3 million dollars bond issue for public improvements for the plant. A problem was encountered with the bond attorney over the steam contract, but an Economic Development Authority grant for $302,000 was obtained. This grant raised the final cost of the steam generation equipment by $20,000, but did alleviate the bonding difficulties.

## FACILITIES AND OPERATION

The site is located adjacent to and was donated by Mohawk Rubber Company. A steel building with concrete floor was erected to house

four units with a burning capacity of 25 tons each per day. Haulers dump the waste in piles on the concrete floor. Small front end loaders are used to feed each furnace. The unit employs rams which drop the ash and noncombustibles into a quenching trough from which drag chains load this material into trucks. Combustion is started and maintained with either natural gas or oil. The primary furnace operates in an oxygen deficient atmosphere. The resulting combustible gases pass into a second furnace where they are burned. This process produces environmentally acceptable stack emissions. The waste is reduced on an average in volume by 90% and in weight by 60%. The residue is being used by the city as fill dirt.

ECONOMICS

The city invested 1.9 million dollars in the facility. Commercial haulers are charged a $4.75/ton tipping fee. The revenue from the sale of steam varies depending upon the cost of fuel being used by Mohawk Rubber Company which is natural gas when available, and oil at other times. The average combined revenue per ton of waste seems to be about $7.50. The total average cost of the operation is about $10.98 per ton including amortization over a ten year period. Actual operating cost is approximately $4.52 per ton. The cost of the operation is equivalent to a landfill cost of $6.00 per ton. Deductions should be made from this cost for items both tangible and intangible such as reduced truck maintenance, value of fill dirt and improvements in the environment.

PERSONNEL

All personnel are city employees that must have specialized training on the complex equipment in the plant. This training was obtained on the job with the assistance of Consumat Systems' employees. It was found, from experience, that a full time plant supervisor was necessary. A total of 12 employees are required for each 24-hour day, Monday through Friday.

PLANT INSPECTION - November 25, 1980

Front-end separation for aluminum and steel has been installed. On the day of the inspection the separation of the metals was still in the experimental stage. When fully operational it will reduce the quantity of ash and will increase the BTU/lbs of the waste that is burned. The city manager estimates that the increase will be about 23%.

Reynolds Metals Company which has installed the equipment free of charge to the city will receive all aluminum products for an initial period of 5 years.

## III. WASTE EXCHANGE

A visit was made to the Midwest Industrial Waste Exchange (formerly St. Louis Waste Exchange) in St. Louis, Missouri. This is the oldest, not-for-profit, waste exchange in the United States. It is a passive exchange (i.e., it exchanges information only and does not assume responsibilities for the resource being offered or accuracy of the information being listed.)

The exchange is becoming regional, if not national in scope. It has listings and subscribers in more than thirty states.

The exchange is successful. The extent of that success is difficult to measure due to the confidentiality afforded to the buyer and seller of the waste resources.

The Midwest Industrial Waste Exchange is eager to see more local, state, and regional waste Exchanges come into being in order to expand the number of available listings. They are eager to cooperate with Virginia in any effort to create an exchange.

The basic advice offered at this point by the Midwest Industrial Waste Exchange is that any Exchange created be a creation of the private sector and that confidentiality of information is assured. The Commonwealth best functions as a catalyst in encouraging the creation of the Waste Exchange.

It was felt that ultimately a truly national Waste Exchange would develop out of many state or regional exchanges.

Contact was made with a Waste Exchange in Mecklenburg County, North Carolina. This organization is in a transitional stage and much of the work of the exchange has been turned over to the University of North Carolina in Charlotte. The Institute for Urban Studies UNCC is working on a computer program to simplify its tasks of "manipulating" the listings.

Conclusion: Waste exchange is a concept which could assist in the reduction of wastes which would otherwise have to be buried or incinerated.

References: Midwest Industrial Waste Exchange
10 Broadway
St. Louis, Missouri 63102
(314) 231-5555
Arthur G. Baebler, Acting Director

University of North Carolina, Charlotte
Institute for Urban Studies
UNCC Station
Charlotte, North Carolina 28223
Mary Dawn Liston

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# IV. HAZARDOUS WASTES

## A. Definition

On 1980 November 19 the Virginia State Board of Health formally adopted Hazardous Waste Management Regulations for Virginia promulgated pursuant to the Federal Resource Conservation and Recovery Act of 1978. In these regulations a solid waste is to be considered hazardous if it exhibits any of certain characteristics defined within the regulations. The four characteristics used to define hazardous wastes are: toxicity, reactivity, corrosivity, and ignitability. A solid waste may be deemed hazardous if it may "cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating illness; or pose a substantial present or potential hazard to human health or environment when it is improperly treated, stored, transported, disposed of or otherwise managed." (3.05.01(a)(1)(2). The characteristic may be "measured by an available standardized test method which is reasonably within the capability of generators of solid waste or laboratories that are available to serve generators of solid waste; or reasonably detected by generators of solid waste through their knowledge of their waste" (3.05.01(b)(1)(2).

It is estimated that a significantly large proportion of wastes now generated in Virginia as well as in the nation will be classified as hazardous pursuant to the provisions of these regulations. These

wastes can present a significant and long-lasting threat to the public health and the environment.

B. Past Disposal Problems

The past disposal of hazardous wastes has been an unregulated activity until the advent of the recent federal regulations. For several decades industries generating wastes which were not acceptable in conventional sanitary landfills disposed of them in a number of different ways. These wastes which are now defined as hazardous or toxic were frequently stored or buried on site, released through the sanitary sewerage system or stored on sites which were later abandoned. Some of the chemical wastes stored in 55 gallon drums are highly toxic and have long since corroded through their containers and pose a substantial threat to the pollution of surface and ground water. Often no records were kept or records have since been lost or destroyed which would indicate where these wastes were disposed of. When such procedures are practiced damage to the environment or the damage to the public health often remains unknown until it is of such significance that it can be detected. The nature of these hazardous wastes is so varied that they are often present for long periods of time before anyone becomes aware of them. Unlike LLRW which even in small amounts can be measured via radiation, hazardous wastes have no easily-established methods for discovery and testing due to the enormous variety of chemicals in these wastes.

There have been numerous occasions, for instance, where one company has disposed of hazardous wastes on its property, retained no records and sold the company and associated properties or gone bankrupt. The new owner unknowingly inherits a "time bomb" problem which at some point in the future will become evident as a health hazard. In this case the responsibility for the clean-up is difficult to define. The costs of clean-up of these old hazardous waste sites is formidable and sometimes more than a company can absorb. Many companies are asking for financial assistance from state and federal government agencies to help lessen the blow of clean-up costs. Many States at this time do not have licensed hazardous waste disposal sites so companies must often travel long distances out-of-state to a licensed facility at very inflated prices. Transportation costs have skyrocketed due to the increased cost of diesel fuel, thus making it more financially difficult for companies to dispose of their hazardous wastes in a safe manner. Virginia is one of those States with no licensed hazardous waste disposal facility. At this time hazardous wastes generated in Virginia are disposed of in Maryland, South Carolina, Alabama, New York, and Ohio.

C. Present and Future Disposal Problems

The hazardous waste disposal problem is increasing in alarming proportions. It is estimated by the Federal Food and Drug Administration that 1,000 new chemical compounds come on the market each year and that close to 50,000 chemicals are in circulation in this country

as of 1980, with 35,000 currently classified as hazardous by the Federal Environmental Protection Agency. The greatest threat posed by the unsafe burial of these wastes is related to contamination of surface and groundwater supplies which provide water for household use to 80% of the citizens in the Commonwealth. According to the Environmental Protection Agency, just prior to World War II the American chemical industries were manufacturing 1 billion pounds of synthetic chemicals. As of 1977, the amount had increased to 350 billion pounds. The sheer volume of wastes resulting from the manufacture of these chemicals that has been disposed of in an unsafe manner, posing a threat to the public health and to the environment, is staggering.

D. Federal/State Regulations

The Resource Conservation and Recovery Act of 1976 (RCRA) was an attempt made at the federal level to address the area of solid waste management, including hazardous wastes. Regulations were promulgated by the Federal Environmental Protection Agency in 1980 November and the State equivalent regulations were adopted at the same time. These regulations on hazardous waste management are promulgated to regulate generators, transporters, and disposers of hazardous wastes. Hazardous waste management facility interim status standards will be in use as of 1980 November 19. These standards apply to facilities which treat, store or dispose of hazardous wastes until final administrative disposition of their permit application is made. The

management approach to these regulations is to provide a control system "from cradle to grave," from the moment of generation through each step of management until ultimate destruction or disposal. The State hazardous waste management program meets the requirements and is compatible with regulations issued pursuant to the Federal Resource Conservation and Recovery Act, Public Law 94-580, 42 USC 6901.

E. Conclusions

1. A facility for the disposal of hazardous wastes is needed in the Commonwealth.
2. Those industries which generate hazardous wastes and must dispose of them pursuant to the newly-established regulations must bear the cost for the disposal, not the taxpayer.
3. Disposal facilities should be located in an area of the State where the geology is suitable to ensure minimum risk to the public health or in environmental aspects particularly relative to groundwater pollution.
4. A hazardous waste management facility should include:

    a) Secure storage
    b) Incinerator
    c) Burial facilities designed to preclude contamination of groundwater and surface water and with suitable soil for compaction

5. The management of hazardous wastes must be considered on a case-by-case basis.

6. Regulations should be easy to read, understand, interpret, and enforce with accompanying literature in booklet form to serve as a guide to the regulations.

7. Technically speaking, hazardous wastes and LLRW could be disposed of on the same property as is done in Hanford, Washington.

8. The public needs to be educated as to what wastes are hazardous because small quantities often fall into the hands of the general public and small quantities under 1,000 kg/month are exempt from regulation. The State needs to provide for the disposal of these small quantities of hazardous wastes as a service to citizens.

9. The problem of disposal of hazardous wastes generated in Virginia needs to be addressed immediately.

## V. LOW-LEVEL RADIOACTIVE WASTES

The 1980 Session of the General Assembly passed House Joint Resolution 44 expressing the support of the General Assembly for the efforts of the State Board of Health and the Solid Waste Commission to determine the feasibility of establishing in Virginia a disposal facility for low-level radioactive wastes. The test of the resolution is as follows:

### HOUSE JOINT RESOLUTION NO. 44

Expressing the support of the General Assembly for the efforts of the State Board of Health and the Solid Waste Commission to plan for and establish in Virginia a disposal facility for low-level radioactive wastes.

WHEREAS, Virginia has numerous hospitals, colleges, universities and industries which are licensed to use radioactive materials which in turn generate low-level radioactive wastes; and

WHEREAS, there are only three privately-owned commercial low-level radioactive waste disposal facilities in the United States in which such wastes may be disposed; and

WHEREAS, during nineteen hundred seventy-nine these three facilities were intermittently closed or restricted; and

WHEREAS, the governors of the states in which these facilities are loacted have informed the governors of the several states that they will not continue to permit the disposal of low-level radioactive wastes generated throughout the United States; and

WHEREAS, the governors of the several states have therefore generally agreed that each state must accept responsibility for planning the disposal of its own wastes within its borders; and

WHEREAS, the Governor has designated the State Department of Health as the lead agency to conduct site evaluation, selection and planning for possible development of a low-level radioactive waste disposal facility within the Commonwealth; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the General Assembly supports the efforts of the Governor and the State Department of Health to determine the feasibility of planning the establishment in Virginia of a disposal facility for low-level radioactive wastes.

The Solid Waste Commission is authorized and directed to assist the Department in exploring all phases of site evaluation, selection and plan development. All other agencies of the Commonwealth are authorized and directed to assist and advise the Department and the Commission upon request in carrying out these responsibilities.

The State Department of Health and the Solid Waste Commission shall report their progress together with any legislative recommendations to the Govornor and General Assembly during the nineteen hundred eighty-one Session of the General Assembly.

During mid-1980 the Solid Waste Commission and the State Department of Health held nine public workshops to acquaint the general public with the nature of the low-level radioactive waste management problem and to discuss possible solutions, as well as receive information and answer questions from the interested citizens attending these workshops. The workshops were held in Fredericksburg, Charlottesville, Alexandria, Lynchburg, Danville, Norfolk, Richmond, Abingdon, and Blacksburg. The Solid Waste Commission compiled a summary of the material presented at these workshops as well as issues and questions raised by the public. In October, this report was submitted to the Governor, General Assembly, citizen groups, and those persons who participated in the workshops.

During the course of its deliberations in 1980, the Commission perceived that the issue involved was much broader than disposal of low-level radioactive wastes. The management of these wastes from "cradle to grave" involves generation and transportation as well as disposal by means of incineration and/or shallow land burial.

While transportation costs have skyrocketed during the last few years resulting in increased costs for the shipment of Virginia's wastes to out-of-State facilities, the construction, management,

perpetual care and maintenance of low-level radioactive waste facility for the use of generators of wastes in Virginia only is anticipated to place an undue burden upon the generators such as utilities, industries, hospitals, and research institutes due to the relatively small volume generated. A site operated for Virginia-only generators of these wastes would probably necessitate State subsidy. An economic analysis of the advantages of a State-only site versus a regional site will be done early in 1981.

It is necessary for the Commonwealth to make decisions as to the disposal of its low-level radioactive wastes in the immediate future because the three States with operational low-level radioactive waste sites at this time have expressed their unwillingness to continue to accept low-level radioactive wastes from outside their jurisdictions. Virginia is not the only State faced with an immediate problem; it is a national problem for small as well as large generators of low-level radioactive wastes.

According to the Federal Department of Energy estimates for 1980, Virginia generated 70,800 cubic feet of low-level radioactive wastes and ranked number 15 out of the 49 States listed. At this time Virginia's low-level radioactive wastes generated by utilities and industries go primarily to Barnwell, South Carolina; the hospital wastes are shipped to Hanford, Washington. The facility at Barnwell is currently instigating a plan for volume reduction which will reduce the amount of disposable material it receives from 240,000 cubic feet per month to 100,000 cubic feet per month. An initiative was passed

during the fall of 1980 by the citizens of Washington to prohibit unrestricted disposal of low-level radioactive wastes at the Hanford facility. The uncertainties associated with these two disposal facilities also suggests that Virginia should make plans to ensure that Virginia's generators of low-level radioactive wastes have facilities available to them at reasonable cost for future disposal. Employing techniques to reduce volumes through incineration and compaction would serve to reduce the amount of disposable materials generated.

The national trend in low-level radioactive waste management is moving toward regionalization as more and more States are coming to realize that "State-only" disposal sites will be prohibitively expensive. Regionalization involves more than locating a disposal facility for industry/utility-generated low-level radioactive wastes. Incineration, compaction, back-up disposal facilities and disposal of medical wastes are other elements which would have to be addressed in interstate compact to create a management plan for low-level radioactive wastes.

Virginia's location enables it to consider regionalization from two different approaches. One approach is to join with States to the south such as North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, and Kentucky. This would mean continued use of the Barnwell facility for shallow land burial of utility/industry-generated wastes. A second option is to work with States to the north, possibly Maryland, the District of Columbia,

Delaware, West Virginia, and Pennsylvania. No licensed disposal facilities are available at this time in any of these States.

Regional meetings are now taking place throughout the country to explore possible grouping of States to form interstate compacts. Each State which is contemplating joining an interstate compact must be aware of the many different elements in a low-level radioactive waste management scheme and each State will have to accept a role of some sort in this process.

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## VI. RECOMMENDATIONS OF THE COMMISSION

A. Hazardous Wastes

1. Management of hazardous wastes generated within the Commonwealth from "cradle to grave" needs to be addressed by the Board of Health and the Solid Waste Commission.
2. Disposal facilities for hazardous wastes generated in Virginia must be made available to generators of these wastes. This should be the a first priority in the management plan.

B. Waste Exchange

1. The Solid Waste Commission should host a conference of likely users or Trade Association Executives of likely users of a Waste Exchange to expose them to the creation of such an operation in Virginia.

C. Low-Level Radioactive Wastes

1. The Solid Waste Commission recommends that the Department of Health contract for an (economic analysis) of a "State-only" low-level radioactive waste disposal facility for utility/industry-generated wastes and that the study include a comparison to an interstate compact for regional management of low-level radioactive wastes.

2. The Commission also recommends that negotiations with other Southern States interested in a regional approach to the management of low-level radioactive wastes based around the existing Barnwell low-level radioactive waste disposal facility be continued in 1981.

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## VII. PLANS FOR 1981

A. The Solid Waste Commission plans to sponsor a seminar geared toward educating as well as interesting trade groups throughout the Commonwealth in the area of waste exchange. Seed money is available via State Health Department grant for the start-up costs of such an exchange by a non-profit organization.

B. A regional conference on resource recovery designed as a follow-up to the Commission's 1976 conference will be scheduled to provide updated information on resource recovery projects, funding, technology, and improvements over the past five years. Technical persons from the National Center for Resource Recovery in Washington D.C. will be invited to provide a national perspective.

C. The Commission will continue intense efforts toward managing low-level radioactive wastes generated in Virginia in conjunction with the State Department of Health.

D. Increased efforts in the area of hazardous wastes management will occur during the next year with particular emphasis upon disposal of these wastes.

E. The Commission plans to issue a booklet explaining the new hazardous waste management regulations for the use of generators, transporters, disposers, and interested citizens.