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REPORT BY THE U.S.

General Accounting Office

Regional Low-Level Radioactive Waste Disposal Sites--Progress Being Made But New Sites Will Probably Not Be Ready By 1986

Currently, three sites in Nevada, South Carolina, and Washington are used to dispose of all this country's commercial low-level nuclear wastes--materials contaminated with relatively low levels of radioactivity. The Low-Level Radioactive Waste Policy Act of 1980 encouraged the States to form interstate compacts and establish new, regional, low-level waste disposal sites by January 1, 1986. GAO found, however, that new disposal sites will probably not be ready to operate in most regions until sometime between 1988-90.

To resolve this time difference, the Federal Government could either extend the 1986 date or open existing Department of Energy disposal sites for commercial waste disposal. Currently, Department of Energy sites receive low-level wastes generated only by nuclear defense activities. On the other hand, States could temporarily keep the three existing commercial disposal sites open to all States or store low-level wastes in centrally located, warehouse-type facilities until new disposal sites are opened. These last two options maintain the States' responsibility in the area and, GAO believes, are more in line with the intent of the Low-Level Radioactive Waste Policy Act.



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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-194786

The Honorable Richard L. Ottinger
Chairman, Subcommittee on Energy
Conservation and Power
Committee on Energy and Commerce
House of Representatives

The Honorable Barney Frank
House of Representatives

You requested that we review certain aspects of the Low-Level Radioactive Waste Policy Act of 1980 (P.L. 96-573). Specifically, you requested that we (1) evaluate the problems States face in forming interstate or regional compacts, (2) assess the ability of individual States or regional compacts to establish low-level waste disposal sites by 1986, and (3) recommend alternative contingency plans for those States unable to meet the time frame. This report addresses each of the specific areas and contains conclusions based on our review.

We obtained comments on a draft of this report from the Department of Energy, the Nuclear Regulatory Commission, the Environmental Protection Agency, and the States of South Carolina and Washington. These comments are included in appendices II through VI of this report. We also obtained comments from the National Governors' Association, which are incorporated in the body of the report as appropriate.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 3 days from the date of issuance. At that time, we will send the report to other interested parties.


J. Dexter Peach
Director



D I G E S T

In December 1981 the Congress passed the Low-Level Radioactive Waste Policy Act (P.L. 96-573) which (1) gave the States the responsibility for disposing of low-level nuclear wastes and (2) encouraged them to form interstate compacts and construct regional disposal facilities. It also established January 1, 1986, as the date when a congressionally approved interstate compact could exclude outside (non-member) States from using its disposal facilities.

In November 1981 and February 1982, respectively, Representatives Barney Frank and Richard L. Ottinger, Chairman, Subcommittee on Energy Conservation and Power, House Committee on Energy and Commerce, asked GAO to

- evaluate the problems facing States in forming interstate compacts and disposing of low-level wastes;
- assess the ability of States to establish new low-level waste disposal facilities by January 1, 1986; and
- recommend alternative contingency plans if any State will not have access to a low-level waste disposal site by 1986.

Low-level nuclear wastes, as the name implies, are generally materials contaminated with relatively low levels of radioactivity. They include such things as paper trash, used protective clothing, and other items used in the operation of nuclear powerplants, hospitals, research institutions, and various industrial facilities. Low-level wastes must be controlled or isolated for relatively short periods of time--about one hundred years--as compared to thousands of years for other types of radioactive waste. (See pp. 1 to 4.)

Several Federal departments and agencies are responsible for various aspects of commercial low-level waste disposal. The Department of Energy (DOE), for instance, is helping the States form regional compacts and deal with the technical aspects of the disposal problem. The Environmental Protection Agency (EPA) is responsible for setting generally applicable radiological standards for protecting the environment around low-level waste disposal sites, while the Nuclear Regulatory Commission (NRC), and in some cases the States, regulate the disposal sites and their operators. (See p. 11.)

Today, all the Nation's commercial low-level wastes are disposed of in three shallow land burial sites in the States of Nevada, South Carolina, and Washington. These sites will not be adequate to handle the expanding volumes of low-level waste. More importantly, the Governors of the three States have made it clear that they will no longer bear the entire burden of low-level waste disposal--their States will not become the Nation's nuclear dumping grounds. (See pp. 4 to 7.)

To help resolve the low-level waste disposal dilemma, the States (in accordance with the Low-Level Radioactive Waste Policy Act) are actively forming regional interstate compacts and attempting to create new disposal sites. Once the compacts are formed, at least two of the member States must ratify the compact. The ratified compact is then submitted to the U.S. Congress for its approval. As of January 1983, the States had tentatively formed seven regional groupings and drafted six compact agreements; the remaining agreement is nearing completion. In addition, two States (California and Texas) are independently developing their own disposal sites. None of the compacts has received congressional approval.

While progress is being made, it is likely that only two regions (the Northwest and Southeast) will have operating disposal sites by the January 1, 1986, target date established in the act. These regions already have large commercial low-level waste disposal facilities (in the States of Washington and

South Carolina) and do not have to go through the time-consuming site selection, licensing, and construction process. The proposed Rocky Mountain region also has an operating disposal site at Beatty, Nevada, but under the compact agreement terms, this site will be closed. (See pp. 15 to 21.)

Consequently, as of January 1, 1986, those States outside of the Northwest and Southeast regions could be excluded from using the two remaining commercial disposal sites and might have to look for other alternatives for temporarily managing commercial low-level wastes.

One alternative would be for the Congress to extend the January 1, 1986, exclusion date in the Act--possibly to 1988 or 1990. This would give the States additional time to develop regional disposal facilities before the existing sites are closed to out-of-region waste. Most of the State and Federal officials GAO spoke with, however, felt that some States would interpret this action as a signal that the Federal Government would continue to resolve the Nation's low-level waste problems--a message that could discourage the States from quickly seeking their own solutions to the low-level waste problem. (See pp. 23 and 24.)

Another alternative would be to temporarily dispose of commercial low-level wastes at one or more of DOE's 13 low-level waste burial sites. These sites are currently being used to dispose of low-level wastes generated by DOE's defense programs. DOE opposes this action, however, because it believes that (1) special statutory authority would be needed for DOE to accept large volumes of commercial waste for extended periods, (2) disposing of commercial waste in DOE facilities could disrupt national defense activities and may require an environmental impact statement under the provisions of the National Environmental Policy Act, and (3) other short-term options are available to the States that do not involve Federal intervention. Nevertheless, DOE believes that its sites could be used to dispose of commercial wastes in emergency-type situations. (See pp. 24 to 27.)

There are two alternatives available to the States that do not require Federal action.

Perhaps the least disruptive alternative is for the States to convince the Northwest and Southeast compact regions to temporarily accept out-of-region waste after January 1, 1986. In fact, the compact agreements for these two regions allow this to happen, contingent upon a favorable vote of member States and approval of the State where the site is located. In addition, officials from these regions said that, although there is no incentive to do so, they might continue to accept out-of-region waste from those States or regions that were making adequate progress in establishing new sites. (See pp. 27 and 28.)

A second alternative available to States is the temporary storage of low-level wastes (in warehouse-type facilities centrally located or at the generation sites) until the new disposal sites are available. This alternative is more costly than one-time disposal and results in a small increase in the risk of exposure to workers and the general population. Nonetheless, NRC and DOE officials told GAO that this was a technically safe option which is already being considered by several States. (See pp. 28 and 29.)

In GAO's view, the best alternatives are those which do not require Federal action. While changing the 1986 date or opening DOE disposal sites to commercial wastes could resolve short-term problems, they would not be consistent with the Low-Level Radioactive Waste Policy Act. This Act gave the States the responsibility for low-level waste disposal--a responsibility that they have generally accepted. Federal actions, at this time, could reduce the momentum that the States have already established. (See pp. 31 and 32.)

To facilitate the progress being made by the States, however, some Federal actions should be taken or continued. DOE, NRC, and EPA, should continue to assist the States in forming regional groupings and help resolve technical problems associated with locating, designing, licensing, constructing, and operating disposal facilities. DOE, for instance, is already providing funding support to help States form interstate compacts and

standards for low-level waste disposal facilities and (2) act quickly to ratify regional compact agreements. With regard to this last point, the regions can begin to establish new sites without congressional ratification of their compacts. However, State officials doubted that progress would be made until this step is completed. To date, one compact agreement (Northwest) had been sent to the Congress but no action has yet been taken. (See pp. 19 to 20.)

AGENCY COMMENTS

GAO obtained comments on a draft of this report from DOE, NRC, EPA, the States of South Carolina and Washington, and the National Governors' Association. These groups expressed no significant disagreement with the issues discussed in the report but suggested some specific changes which GAO incorporated in the report as appropriate. In addition, DOE, NRC, EPA, and the States of South Carolina and Washington provided general comments which are summarized beginning on page 33 and included as appendices to this report.

locate new disposal sites; it should continue to do so. NRC has issued final Federal regulations governing disposal site selection, licensing, design, operation, and final closure and will be responsible for licensing some of the new sites.

It is important, however, that EPA assign a higher priority to and complete general applicable radiological standards for low-level waste disposal facilities. The States believe that these standards are necessary before they can make firm decisions on the selection of disposal sites. In this context, GAO reported in May 1982¹ that EPA has consistently given the development of radiological standards a low priority and was consequently causing delays or uncertainties in several Federal programs dealing with the disposal of nuclear wastes. GAO recommended that EPA reevaluate its priorities and keep the Congress informed of the progress and schedule for developing radiological standards. Also, GAO suggested that the Congress--if it was dissatisfied with the information provided by EPA--consider transferring the responsibility for establishing radiological standards to another agency or group. (See pp. 32 and 33.)

Since the issuance of that report, EPA says that it has placed a higher priority on the development of radiological standards but does not plan to have low-level waste disposal standards completed until late 1984 or early 1985. If it holds to this schedule, EPA does not believe that the initial siting selections of the States or regional compacts would be adversely affected. This is particularly true, EPA said, because NRC already has siting criteria which "should be compatible with an EPA standard in that range." (See EPA's comments on this report in app. IV.)

From the standpoint of congressional oversight on low-level waste matters, the States believe that it is important that the Congress (1) ensure the early completion of environmental

¹"Cleaning Up Nuclear Facilities--An Aggressive And Unified Federal Program Is Needed," EMD-82-40, May 25, 1982.

C o n t e n t s

		<u>Page</u>
DIGEST		i
CHAPTER		
1	INTRODUCTION	1
	Low-level radioactive waste--what is it, where does it come from, and how is it disposed of?	1
	Commercial low-level waste disposal--how did we get in such a critical position?	4
	The consequences of running out of disposal capacity could be staggering	8
	The act gives the States responsibility for disposing of commercial low-level waste	9
	Federal agencies still have responsibilities for low-level waste management	11
	Objectives, scope, and methodology	12
2	STATES ARE MAKING PROGRESS BUT FACE A NUMBER OF PROBLEMS IN ESTABLISHING NEW LOW-LEVEL WASTE DISPOSAL SITES	15
	The time needed to form regional compacts leaves little time to locate and license new disposal sites	15
	Even after compacts are formed, locating and licensing new disposal sites will require considerable time	20
3	THE STATES NEED TO PLAN FOR THE PROBABILITY THAT NEW DISPOSAL SITES WILL NOT BE OPERATING BY 1986	23
	The 1986 target date is important for maintaining the States' momentum	23
	The States should, and can, plan for the contingency of new disposal sites not being ready by 1986	24
	What options do the States have if new disposal sites are not ready by 1986?	24
4	OBSERVATIONS AND CONCLUSIONS	30
	Agency comments and our evaluation	33

APPENDIX

Page

I	Progress being made by the States in forming regional compacts and establishing new commercial disposal sites	37
II	The Department of Energy's February 7, 1983, comments on a draft of this report	43
III	The Nuclear Regulatory Commission's January 31, 1983, comments on a draft of this report	45
IV	The Environmental Protection Agency's February 23, 1983, comments on a draft of this report	49
V	The State of South Carolina's February 16, 1983, comments on a draft of this report	52
VI	The State of Washington's February 22, 1983, comments on a draft of this report	54

ABBREVIATIONS

AEC	Atomic Energy Commission
CONEG	Coalition of Northeastern Governors
DOE	Department of Energy
EPA	Environmental Protection Agency
GAO	General Accounting Office
NRC	Nuclear Regulatory Commission

CHAPTER 1

INTRODUCTION

At present, commercial low-level radioactive wastes generated in the United States are disposed of primarily by shallow land burial. Unfortunately, while the number of sites available for disposing of this waste has decreased from six to three, the volume of low-level waste generated annually is steadily increasing. The Department of Energy (DOE) projects that by 1990, a total of five to seven disposal sites will be needed for commercial wastes. Further, the States where the existing three disposal sites are located are no longer willing to shoulder the burden of disposing of low-level wastes for the entire country. Therefore, it is imperative that the United States develop a viable low-level waste disposal program to ensure that all parts of the country have access to regional burial sites. Without a place to dispose of this waste, nuclear powerplants, hospitals, research institutions, and industry will eventually have to curtail or cease activities using radioactive materials. To meet this need, the States, with the assistance of DOE, are now in the midst of forming regional interstate compacts to develop new commercial disposal sites.

LOW-LEVEL RADIOACTIVE WASTE-- WHAT IS IT, WHERE DOES IT COME FROM, AND HOW IS IT DISPOSED OF?

Low-level radioactive waste can best be defined by what it is not. It is not spent reactor fuel,¹ the high-level waste byproducts from reprocessed spent fuel,² transuranic wastes,³

¹Spent fuel is the used uranium fuel that has been removed from a nuclear reactor. If not reprocessed to recover unused uranium and plutonium, spent fuel must be isolated from the environment for many thousands of years to allow the radioactivity to decay.

²High-level wastes are the byproducts of a spent fuel reprocessing plant. They include most of the highly toxic and radioactive fission products contained in spent fuel and must be carefully managed and disposed of for thousands of years to prevent releases to the environment.

³Transuranic wastes are 11 manmade radioactive elements with an atomic number higher than that of uranium and which remain hazardous for thousands of years.

or uranium mine and mill tailings.⁴ These types of radioactive waste contain much higher levels of radioactive elements or long-lived radionuclides. Spent fuel and reprocessing wastes require both shielding and cooling because of their intense radioactivity. In addition, because of the long-lived radionuclides which they contain, high-level wastes, spent fuel, transuranic wastes, and mill tailings must be isolated or managed for very long periods of time. In contrast, low-level waste, as indicated by its name, is contaminated by relatively low levels of radioactivity, generally requires little shielding and no cooling, and represents a potential hazard for a relatively short time--measured in hundreds of years at the most as contrasted to thousands of years for transuranic and high-level wastes.

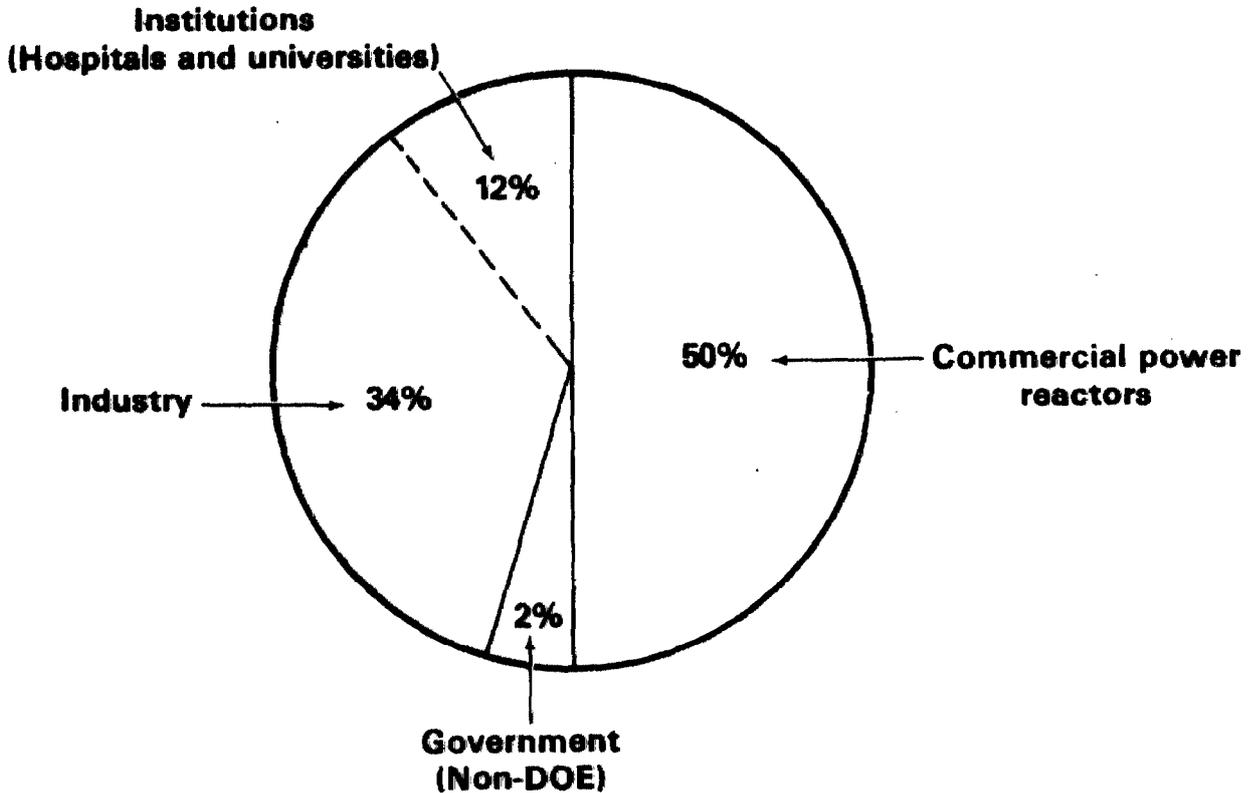
Commercial activities--mainly those at commercial nuclear power reactors, industry, medical facilities, and research institutions--produce radioactive low-level waste. The chart on the next page shows the sources and relative volumes of low-level waste disposed of at commercial disposal sites during 1981.

Nuclear powerplants generate low-level waste through their normal power generating operations. A nuclear powerplant with a capacity of 1,000 megawatts (generally the size of plant being built today) produces about 15 semi-trailer loads of low-level waste annually. Nuclear powerplant fuel fabricators, enrichment plants, and uranium mines and mills also produce low-level waste.

Hospitals generate low-level wastes by using radioactive materials in diagnostic procedures and therapeutic treatment. An estimated 80 to 100 million nuclear medical procedures, including diagnosis and therapy, are performed annually in the United States. An average size hospital produces roughly one semi-trailer load of low-level waste a year.

Research institutions produce low-level waste through biochemical, biological, and physiological experimentation, as well as through research in physics, inorganic chemistry, and geology. Industry generates low-level radioactive waste through the production of radiopharmaceuticals and the manufacture of watch dials and radiography instrumentation. Industrial waste also includes discarded radiation sources used for inspecting welds in piping and determining the soil and rock layers that oil and gas wells pass through. Government wastes include materials

⁴Uranium mill tailings are wastes resulting from refining uranium ore. They emit low levels of radiation but, because of their volume and long half-life, they are not classified as low-level waste.



Note: Based on best estimates

Figure 1: Typical distribution of low-level waste generated in the United States and buried in commercial disposal sites in 1981.

SOURCE: U.S. Department of Energy

from Veterans hospitals and government-operated research clinics and are similar to the other types of institutional wastes. Generally all non-DOE low-level wastes are disposed of in commercial sites.

Forms of low-level waste common to all the generators include paper trash, used protective clothing, discarded glassware, tools, and equipment. In addition, each type of generator produces wastes characteristic of its particular activity. Power reactors produce used chemical ion exchange resins, filters, and filter sludges, as well as lubricating oil and greases. Industrial users produce waste machinery parts, plastics, and organic solvents. Hospitals and research institutions produce liquids and glass waste from diagnostic

testing, animal carcasses from experiments, and various organic liquid wastes.

How is low-level waste disposed of?

Keeping potential radiation exposures below safe limits and preventing radionuclides from entering the human environment requires low-level waste disposal sites to be kept under State or Federal institutional control up to 100 years after the site is closed. In the United States, low-level waste is now disposed of in three commercial shallow land burial sites in the States of Nevada, South Carolina, and Washington. (See picture of a disposal site on following page.) Private companies operate these low-level waste disposal sites on land leased from the States or the Federal Government. The operation of the sites is regulated by the Nuclear Regulatory Commission (NRC) or the States themselves.

The wastes, packaged in steel drums or wood boxes, are placed in trenches up to 50 feet deep and several hundred feet long. As the trenches are filled, the waste is covered with several feet of earth. If required to prevent radionuclides from leaching into the soil and groundwater or leaking from the top of filled trenches, drain field trench liners or other engineered features may be incorporated.

Site operators and State or Federal regulatory agencies regularly monitor the site, both open and closed trenches, and its surroundings to determine radiation levels. Inspectors periodically collect and analyze soil, vegetation, air, surface water, and groundwater samples. After they arrive at a disposal site, transport vehicles are also surveyed for external radioactive contamination. After a site is filled to capacity, the operator will cap the trenches to shed water and prevent wind and water erosion. Permanent markers are then placed at the site to show the location, volume, and radioactivity content of the buried waste. At that point, the site is turned over to the State, which must care for, monitor, and control access to the site for up to 100 years while the radionuclides decay. However, under the Nuclear Waste Policy Act (P.L. 97-425) which became effective on January 7, 1983, States now have the option of transferring title and custody of a closed and properly decommissioned low-level waste site to the Federal Government.

COMMERCIAL LOW-LEVEL WASTE DISPOSAL--HOW DID WE GET IN SUCH A CRITICAL POSITION?

Commercial activities have been producing low-level radioactive wastes since the 1950s. During the 1950s, much of the small volume of commercial wastes was discharged into the

Figure 2



Source: U.S. Department of Energy
Workers stacking containers of low-level radioactive waste at the Hanford, Washington, commercial disposal site.

ocean.⁵ Ocean dumping was expensive and was stopped when the Atomic Energy Commission (AEC)--DOE's predecessor--allowed these wastes to be buried at government-owned sites in Tennessee and Idaho, pending the establishment of commercial sites. The first commercial burial site was established at Beatty, Nevada, in 1962. In 1963, after a second commercial site was opened at Maxey Flats, Kentucky, AEC stopped accepting commercial wastes. Four more commercial disposal sites were established over the next 8 years--at West Valley, New York, in 1963; Hanford, Washington, in 1965; Sheffield, Illinois, in 1967; and Barnwell, South Carolina, in 1971.

When all these sites were operating, the Nation was close to having a regional low-level waste disposal system as shown in the following map.

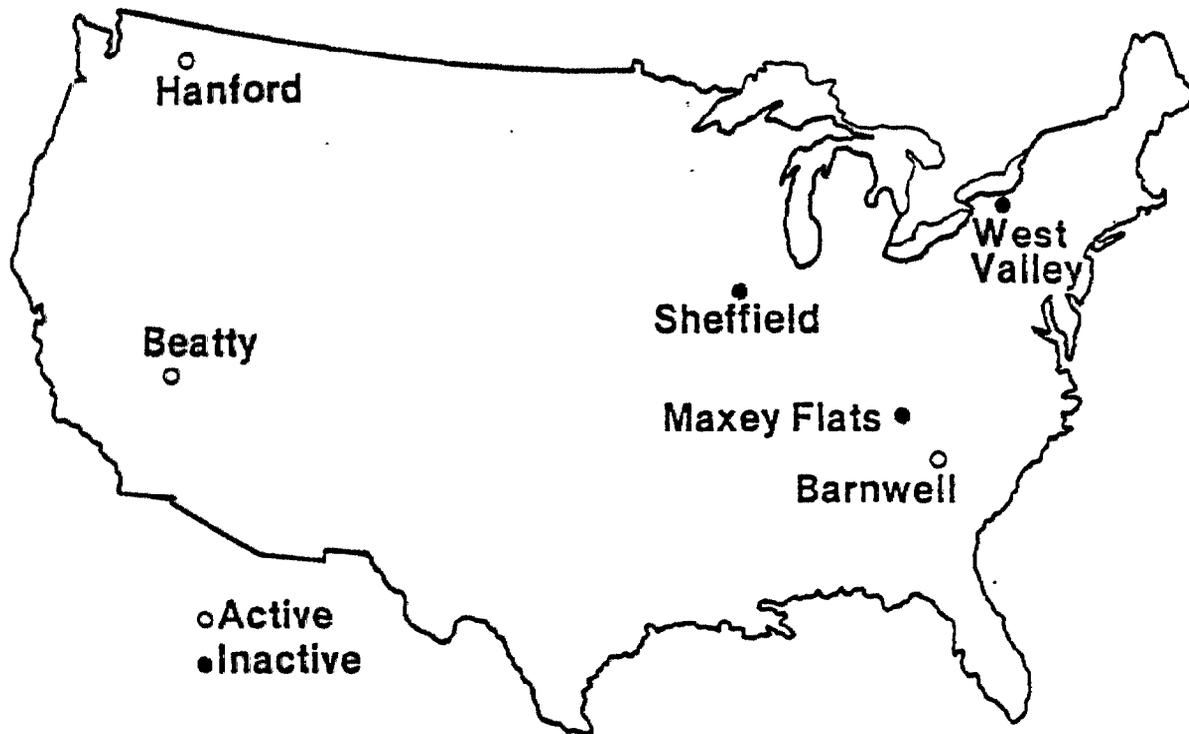


Figure 3: Active and inactive commercial low-level waste disposal sites in the United States

SOURCE: U.S. Department of Energy

⁵For a further discussion of ocean disposal, see the GAO report entitled "Hazards Of Past Low-Level Radioactive Waste Ocean Dumping Have Been Overemphasized," EMD-82-9, Oct. 21, 1981.

However, between 1975 and 1979, three of these sites were closed. The West Valley site was closed in March 1975, when the caps of burial trenches began leaking radioactive contaminated water. The Maxey Flats site was closed in December 1977, after radionuclides began leaching from burial trenches. At both sites, the problem was a combination of poor site selection, trench design, and operating practices. The Sheffield site was closed in March 1979, after it had reached its capacity and the operator decided not to expand the site. Although water problems were not encountered during operations at Sheffield, as had happened at the other two closed sites, the U.S. Geological Survey subsequently found that an undesirable layer of sand beneath the site was more extensive than previously believed.

Since these three disposal sites have been closed, the criteria to be used for siting and establishing future shallow land burial facilities have been strengthened and improved. They include more stringent requirements for such things as groundwater conditions, terrain, precipitation, geology, and soil type. The technical problems encountered at the West Valley, Sheffield, and Maxey Flats sites have provided valuable information for future use in locating, designing, and operating disposal sites. Thus, both NRC and DOE officials believe that the technology, if conscientiously applied, now exists to select sites properly and dispose of low-level wastes safely.

The problems now associated with low-level waste disposal are largely political, logistical, and institutional. While the experience gained at the three closed sites may have provided a valuable lesson, their closure created a geographical mismatch between the location of the remaining disposal sites and the location of low-level waste generators (see the following map). While most of the waste is generated in the East, two of the three remaining disposal sites are located in the far West.

Furthermore, in 1979, the Governors of Nevada and Washington temporarily closed the Beatty and Hanford commercial disposal sites because of packaging and shipping safety problems. The problems included a fire on a truck carrying radioactive medical waste and leaking containers on trucks carrying nuclear power-plant and radiopharmaceutical wastes. At about the same time, the Governor of South Carolina ordered the Barnwell site to start reducing the volume of waste it was accepting so that by the fall of 1981 it would be burying only about half as much as it did in 1979. Although Nevada and Washington reopened the Beatty and Hanford disposal sites, the Governors of the three States made it clear that they would no longer bear the entire burden of low-level waste disposal--their States would not become the Nation's nuclear dumping grounds.

could also affect the operations of others, such as hospitals and research laboratories, even though they might have some storage capacity of their own.

The possibility exists that all these generators, including nuclear powerplants, will have to eventually cease operation if new disposal sites are not opened. This issue finally came to a head in 1979 when the States of Nevada and Washington temporarily shut down their disposal sites and the State of South Carolina restricted the volume of waste it would accept at its site. We have previously reported that some institutions, many of which use radioactive isotopes to treat or diagnose illness, claimed they were within 2 weeks of stopping their nuclear medical research services had the two closed sites not reopened.⁶ Other sources of low-level waste, such as some nuclear powerplants and industrial users, were similarly affected by a lack of disposal space. It was this situation and the impending shortage of disposal space that led to the passage of the Low-Level Radioactive Waste Policy Act in December 1980 (P.L. 96-573).

THE ACT GIVES THE STATES
RESPONSIBILITY FOR DISPOSING
OF COMMERCIAL LOW-LEVEL WASTE

The Low-Level Radioactive Waste Policy Act placed the responsibility for disposing of commercial low-level wastes squarely on the States.⁷ Consequently, each State must now provide enough disposal capacity for all applicable low-level waste generated within its borders.⁸ Rather than have 50 separate disposal sites, however, the act encourages the States to form interstate compacts and establish regional disposal facilities. While the act does not suggest regional boundaries or provide specific guidance on how the compacts should be formed, it does require congressional consent before any compact can take effect. More importantly, the act establishes January 1, 1986, as the date when congressionally approved regional compacts can refuse to accept out-of-region waste for disposal. Consequently, the States (particularly those without existing

⁶"The Problem Of Disposing of Nuclear Low-Level Waste: Where Do We Go From Here?", EMD-80-68, Mar. 31, 1980.

⁷As defined in the act, States include U.S. territories.

⁸The act specifically excludes low-level radioactive waste generated by atomic energy defense activities of the Department of Energy or Federal research and development activities.

disposal sites) consider this date very important and view it as the target when new disposal facilities should be available.

In general terms, the States have taken (or will take) several steps to develop new regional disposal facilities. First, they have been negotiating with surrounding States to form regional groupings and draft interstate compact agreements. Currently six compact agreements have been drafted, and one other is nearing completion. In addition, two States (California and Texas) are acting independently in developing new disposal facilities. (See listing of States by region on p. 16.)

Second, the draft agreements must be ratified (approved by the State legislature and signed by the Governor) by every State wanting to participate in the particular compact. However, all eligible States do not have to ratify a compact agreement before it becomes an official document. Instead, the draft agreements require ratification only by either two or three States to become official. Presently, only one agreement (Northwest) has been ratified by the required number of States. One other agreement (Southeast) had been ratified by enough States to be official but has recently been revised to incorporate changes made by the various States during the ratification process. Consequently, this agreement must be reratified by the participating States.

Third, the ratified agreements must be approved by a majority of both Houses in the Congress before they can go into effect. As of December 1982 only one compact agreement (Northwest) had been formally introduced in the Congress. Because the 97th Congress did not act on this agreement, however, it must be reintroduced in the 98th Congress.

Finally, once the compact agreements receive congressional approval, or possibly even before, each region can proceed to create a commission to administer its compact.⁹ This commission, is responsible for ensuring that its member States (1) screen the region to identify suitable disposal areas, (2) perform environmental assessments of selected disposal sites, (3) prepare a licensing application and facility design, and (4) construct and operate the disposal site.

⁹Nothing in the Low-Level Radioactive Waste Policy Act would prevent the compact commission from being formed and starting site selection work prior to congressional approval.

FEDERAL AGENCIES STILL HAVE RESPONSIBILITIES
FOR LOW-LEVEL WASTE MANAGEMENT

While the Low-Level Radioactive Waste Policy Act made the States responsible for disposing of low-level waste, several Federal departments and agencies are to help the States fulfill this responsibility, as well as set standards for and regulate this activity.

DOE is the lead agency for overall national planning and coordination with States and others for low-level waste management and disposal. DOE has provided, and is still providing, the States funding and other support in forming regional compacts and establishing site selection procedures. In addition, DOE is responsible for improving the efficiency and safety of low-level waste disposal.

NRC regulates and licenses the disposal of commercial low-level radioactive wastes, as well as the activities of its generators and users such as power reactors, medical facilities, research institutions, and industry. NRC has discontinued some of these responsibilities in 26 States (called "Agreement States") that have been willing and qualified to assume it. These States license and regulate low-level waste disposal facilities within their borders. NRC has recently issued final Federal regulations (10 C.F.R. 61) establishing criteria for locating and licensing new commercial low-level waste disposal sites.

The Environmental Protection Agency (EPA) is responsible for setting general radiological criteria and standards for siting and operating low-level waste disposal sites. Although EPA does not expect to issue these standards in final form until late 1984 or early 1985, it does not believe that this will have an adverse effect on the selection of new disposal sites.

The Department of Transportation has responsibility for regulating the interstate transportation of hazardous materials, including radioactive waste. Department regulations cover radioactive material packaging and labeling, carrier mechanical and personnel standards, operating procedures, and highway routing.

The U.S. Geological Survey does not have any direct responsibility for low-level waste management or disposal. It does, however, advise other Federal agencies and the States, as earth science consultants, in providing an objective assessment of geologic and hydrologic aspects of areas being considered as disposal sites.

OBJECTIVES, SCOPE, AND METHODOLOGY

By letters dated November 12, 1981, and February 5, 1982, Congressman Barney Frank and the Chairman of the House Committee on Energy and Commerce, Subcommittee on Energy Conservation and Power, requested that we evaluate the States' progress toward fulfilling their responsibilities under the Low-Level Radioactive Waste Policy Act. Specifically, they asked us to

- evaluate the problems facing the States in forming regional low-level waste disposal compacts;
- assess whether the States will be able to form regional compacts and establish new regional or State disposal sites by 1986; and
- recommend contingency plans for alternative actions that Federal agencies or the States could take if some States have not entered into regional compacts or established new regional or State disposal sites.

In response to these requests we interviewed and obtained information from responsible officials of key States in all seven compact regions and of the two States that are acting independently to establish low-level radioactive waste disposal sites. The key States, in this case, were those which had taken the initiative and were actively involved in establishing the regional compact agreements.

--Northwest Compact

Idaho
Washington

--Rocky Mountain Compact

Colorado

--Central Compact

Kansas

--Midwest Compact

Illinois
Michigan

--Northeast Compact

Connecticut
Pennsylvania

--Mid-Atlantic Compact

Virginia

--Southeast Compact

South Carolina

--Independent States

California

Texas

We also interviewed and obtained information from State organizations that were active in forming regional interstate compacts and supporting site selection activities of the regions and States. These were the

--National Governors' Association,

--National Conference of State Legislatures,

--Southern States Energy Board,

--Western Interstate Energy Board, and

--Coalition of Northeastern Governors.

We interviewed and obtained information from responsible officials of Federal agencies--DOE, NRC, EPA, and U.S. Geological Survey--which have program, regulatory, or support responsibilities affecting the disposal of commercial low-level waste. We also reviewed and used information that the States had provided to DOE for its response to a similar request by the Chairman of the Senate Committee on Energy and Natural Resources.

To get a broad understanding of the low-level waste problems from the private sector point of view, we interviewed a cross-section of representatives of industries and institutions that generate low-level radioactive waste, including the

--Pacific Gas and Electric Company, San Francisco, California;

--Hershey Medical Center, Hershey, Pennsylvania;

--Michigan State University, East Lansing, Michigan;

--DOW Chemical, Midland, Michigan;

--Northeast Utilities, Wethersfield, Connecticut; and;

--Edison Electric Institute, Washington, D.C.

We also interviewed representatives of private contractors that operate the three existing low-level waste disposal sites:

--U.S. Ecology, Inc. and

--Chem-Nuclear Systems, Inc.

We limited the scope of our review to the specific questions in the requests. We did not attempt to determine the number of new commercial low-level radioactive waste sites that will be needed, the economic viability of these sites, or the cost of these new sites to waste generators and consumers.

The transportation of low-level waste also complicates its disposal because of the multitude of Federal, State, and local regulations concerned with transporting hazardous and radioactive waste. However, because this problem is essentially unrelated to the location of regional disposal sites and will be encountered regardless of where they are located, we did not include it in the scope of our review and did not contact the Department of Transportation or States and local governments on this subject.

This review was performed in accordance with generally accepted government audit standards.

CHAPTER 2

STATES ARE MAKING PROGRESS BUT FACE A NUMBER OF

PROBLEMS IN ESTABLISHING NEW LOW-LEVEL

WASTE DISPOSAL SITES

The States are generally committed to promptly establishing new regional low-level waste disposal sites and have made progress in meeting the objectives of the Low-Level Radioactive Waste Policy Act of 1980. It is extremely doubtful, however, that new regional or State disposal sites can be operating by January 1, 1986. Thus, some parts of the country--those without access to existing disposal sites--might not have any permanent place to send their low-level wastes after January 1, 1986. The probability that this date will not be met is primarily due to the length of time needed to negotiate regional compacts, obtain State ratification of and congressional consent to the compacts, locate sites for the new disposal facilities, and license and construct those facilities.

At present, it appears that only the Northwest and Southeast regions will have regional disposal sites operating by January 1986. These regions already had commercial disposal sites operating when the act was passed. In fact, the compact agreement for the Northwest region has already been ratified by a sufficient number of States and submitted to the Congress for approval. The Rocky Mountain region also has an operating disposal site at Beatty, Nevada, but under the compact agreement terms, this site will be closed within 6 years of the formation of the compact and a new disposal site must be established.

THE TIME NEEDED TO FORM REGIONAL COMPACTS LEAVES LITTLE TIME TO LOCATE AND LICENSE NEW DISPOSAL SITES

To manage commercial low-level waste disposal on a regional basis, the States must first enter into interstate compacts. Almost 2 years after the Congress gave this responsibility to the States, we found that (1) membership in the seven compact regions has not been decided, (2) one of the seven regions has not yet negotiated compact agreements, (3) five of the six draft compact agreements have not been ratified by the required number of State governments to be official, and (4) only one of the compact agreements has been submitted to the Congress for its consent. The earliest these steps can be completed for all the compact regions is mid-1983. This leaves only 2-1/2 years for some regions to locate, license, and construct new disposal sites--a process that is expected to require 5 years. (See

app. I for a detailed discussion of progress being made by the States.)

Membership of regional compacts
has not been determined

Although the States have formed tentative regional compact groupings, the membership of these compact regions is still uncertain. As shown below, many States are still eligible to join more than one compact. Most of these States are still negotiating with more than one region to obtain compact arrangements that are the most beneficial to them. This creates uncertainties as to the quantity and origin of low-level wastes that will be handled by each region and complicates the selection of an appropriate disposal site.

<u>Northwest</u>	<u>Rocky Mountain</u>	<u>Central</u>	<u>Midwest</u>
Alaska	Arizona	Arkansas	<u>a/</u> Delaware
Hawaii	Colorado	<u>a/</u> Iowa	Illinois
Idaho	Nevada	<u>a/</u> Kansas	Indiana
Montana	New Mexico	Louisiana	<u>a/</u> Iowa
Oregon	<u>a/</u> Utah	<u>a/</u> Minnesota	<u>a/</u> Kansas
<u>a/</u> Utah	<u>a/</u> Wyoming	<u>a/</u> Missouri	<u>a/</u> Kentucky
Washington		<u>a/</u> Nebraska	<u>a/</u> Maryland
<u>a/</u> Wyoming		<u>a/</u> N. Dakota	Michigan
		Oklahoma	<u>a/</u> Minnesota
			<u>a/</u> Missouri
			<u>a/</u> Nebraska
			<u>a/</u> N. Dakota
			Ohio
			S. Dakota
			<u>a/</u> Virginia
			Wisconsin
<u>Southeast</u>	<u>Northeast</u>	<u>Mid-Atlantic</u>	<u>Independent/ unaffiliated</u>
Alabama	Connecticut	<u>a/</u> Delaware	American
Florida	<u>a/</u> Delaware	District of	Samoa
Georgia	Maine	Columbia	California
Mississippi	<u>a/</u> Maryland	<u>a/</u> Kentucky	Guam
<u>a/</u> N. Carolina	Massachusetts	<u>a/</u> Maryland	Northern
S. Carolina	New Hampshire	<u>a/</u> N. Carolina	Mariana
Tennessee	New Jersey	Puerto Rico	Islands
<u>a/</u> Virginia	New York	<u>a/</u> Virginia	Texas
	Pennsylvania	Virgin	
	Rhode Island	Islands	
	Vermont	West Virginia	

a/States eligible for more than one compact grouping.

For example, 10 of the 16 States eligible to join the Midwest region are also eligible to join other compact regions. Whether or not these 10 States join the Midwest region will significantly affect the amount of disposal capacity required, as well as the location of a disposal site or sites. If all 16 States join, almost a million cubic feet of disposal capacity would be needed annually. On the other hand, if these 10 States join other regions, less than one-half million cubic feet of disposal capacity would be required annually.

Also, five of the nine States (or entities) eligible to join the Mid-Atlantic compact are eligible to join either the Midwest, Southeast, or Northeast regions. If all nine entities were to join the compact, about one-half million cubic feet of disposal capacity would be needed. However, if only two States--Virginia and North Carolina--were to join other regions, the remaining States would need less than 4,000 cubic feet capacity annually.

The State of Virginia is a good example of the uncertainty associated with regional compact memberships. Currently, Virginia is not only eligible for membership in the Midwest, Southeast, and Mid-Atlantic regions but has also studied the feasibility of independently constructing a low-level waste facility in Virginia. In addition, Virginia's legislature has ratified both the Mid-Atlantic and Southeast compacts. State officials said Virginia will select its most advantageous alternative within the next few months. At this time, State officials said it is likely that Virginia will join the Southeast region which already has an operating disposal site at Barnwell, South Carolina.

One compact agreement has not yet been negotiated

As of January 1983, only one of the seven tentative compact groupings--the Northeast--did not have a compact agreement ready for legislative ratification. This is particularly important because the States eligible to join this region generate over 40 percent of the Nation's low-level wastes.

According to the executive director of the Coalition of Northeastern Governors (CONEG) and Connecticut and Pennsylvania State officials, a draft compact agreement for the Northeast region should be ready for State legislative action by March 1983. Connecticut and Pennsylvania officials said that compact negotiations have taken longer than in other regions because State legislators had been involved in developing the compact language. They believe this involvement is creating a more acceptable compact agreement and should save valuable time when the agreement goes before the legislatures for approval. The CONEG's executive director believes the compact will be ratified by the required three States by September 1983.

State legislative ratification of the compact agreements has been a slow process

While six of the seven compact regions have negotiated compact agreements, only one of these agreements has been ratified by enough State legislatures to be forwarded to the Congress for approval. The other five agreements are not likely to be ratified by enough States (and submitted to the Congress) until sometime in 1983. Even if these regions begin the process of locating a disposal site before congressional consent is obtained, less than 3 years remains to locate the site and design, license, and construct a disposal facility. As discussed beginning on page 20, this process is expected to take up to 5 years.

State legislatures have not ratified compact agreements for a variety of reasons. In one case (Southeast), ratification by enough States was obtained in mid-1982. However, because of changes made to the agreement during the ratification process, it had to be revised and resubmitted to each member State. At this point, a Southern States Energy Board official believes that this agreement will be reratified in early 1983. In other regions, some State legislatures (1) had short budgetary sessions or no session at all in 1982 or (2) did not, for a variety of reasons, ratify or even consider the compacts. For example, five of the six States eligible to join the Mid-Atlantic compact did not introduce the compact before their State legislatures. These States still view joining the Mid-Atlantic compact as only one of their options. In fact, two of its potential members (North Carolina and Virginia) are leaning heavily toward joining the Southeast region. If this happens, it is possible that the Mid-Atlantic region may cease to exist. Without Virginia and North Carolina, it is unlikely that enough waste would be generated to make a separate Mid-Atlantic disposal site economically viable.

In the Central region, Kansas and Louisiana are the only States that have ratified the compact agreement. Neither Arkansas or North Dakota had a regular legislative session in 1982. Compact legislation was introduced but not passed by the Iowa and Missouri legislatures and was not even introduced in the Minnesota or Oklahoma legislative sessions. While the Nebraska legislature considered the compact, it only passed a resolution that the State should ratify the agreement during its 1983 legislative session. According to the Kansas compact negotiator, while compact ratification by the required three States is expected, it will have to wait until sometime in 1983. Similar situations exist in other compact regions.

State officials fear congressional consent to regional compacts will not come quickly

The act requires that the Congress consent to each regional compact agreement before it can go into effect. After this consent is obtained, a region can (after January 1, 1986) restrict its disposal site to the burial of waste generated within the region. This means that other regions (without operating disposal sites on January 1, 1986) might not have anywhere to send their low-level wastes. For this reason, most State officials and others we spoke with felt that the Congress would be reluctant to quickly approve regional compacts, particularly for those regions that surround the existing disposal sites.

As could be expected, the Northwest and Southeast compact regions, which surround the two existing sites which now accept 96 percent of the Nation's waste, have made the most progress in forming compacts. In fact, the compact for the Northwest region has already been introduced in the Congress while the Southeast compact may be introduced in mid-1983.¹⁰ State officials believe that members of the Congress representing States without disposal sites--particularly those in the Northeast and Midwest regions and California, which together generate 57 percent of the Nation's waste--will not support compacts which could prevent their States from using the two existing disposal sites¹¹ before new sites are available.

In addition, State officials fear the Congress might delay giving its consent to the compacts because the language in those currently drafted gives the States different or broader authority than specified in the act. For example, the Northwest compact, as ratified by the States, would allow the region to exclude out-of-region waste after January 1, 1983. This contradicts the January 1, 1986, date specified in the act. Also, all the compacts, as now ratified or drafted by the States, give the regions responsibility for waste "management" rather than "disposal." This could include authority over such things as

¹⁰As discussed on page 18, the Southeast compact agreement had been ratified by the required members of States in mid-1982 but had to be revised and reratified because of changes made to the agreement during the State ratification process.

¹¹Although the Rocky Mountain Region also has an existing disposal site in Beatty, Nevada, this site currently takes only 4 percent of the Nation's waste. Further, the Rocky Mountain compact requires that a new regional site be established in another State.

waste generation, transportation, packaging, and treatment. The act authorizes the States to enter into compacts that deal with low-level waste disposal only.

EVEN AFTER COMPACTS ARE FORMED, LOCATING
AND LICENSING NEW DISPOSAL SITES WILL
REQUIRE CONSIDERABLE TIME

Once a sufficient number of States have ratified the regional compact agreement, the regions can proceed to establish a compact commission, choose a State to host a site, select a specific site, and license and construct a disposal facility.¹² Because this process may take 5 years, and most of the compact regions or independent States have not yet begun, it does not appear that the goal of having all regional sites in operation by January 1986 is any longer attainable.

For instance, four compact groupings--Central, Midwest, Mid-Atlantic, and Northeast--as well as Texas and California, do not include any of the three existing disposal sites. Therefore, they will have to go through the time-consuming process associated with identifying and establishing new facilities. A similar situation exists in the proposed Rocky Mountain region. Although it includes the Beatty, Nevada, waste site, the compact agreement requires that a new regional site be established in another State. Fortunately, Colorado (a member of the Rocky Mountain compact) has agreed to be the host State and is already looking for a suitable disposal site. This could reduce considerably the lead-times for that region. In fact, Colorado officials believe it is possible to have a new site operating in that State by 1986. Much depends on the length of time needed to complete the siting, licensing, and construction process.

Because no commercial site has been established in the past decade, however, determining how long this process will take is difficult. Most of the State and Federal officials we spoke with, as well as disposal site operating contractor officials, project that it could take up to 5 years to select a site and design, license, and construct a new low-level waste disposal facility. The following chart illustrates the length of time expected for each of these steps. Because the regional compacts differ somewhat in assigning responsibilities among the compact commissions, member States, and site operators for completing these steps, the information that follows is, of necessity, generalized rather than specific.

¹²Even though this process can be started prior to congressional approval, many State officials doubted that significant progress would be made until the compact is approved by the Congress.

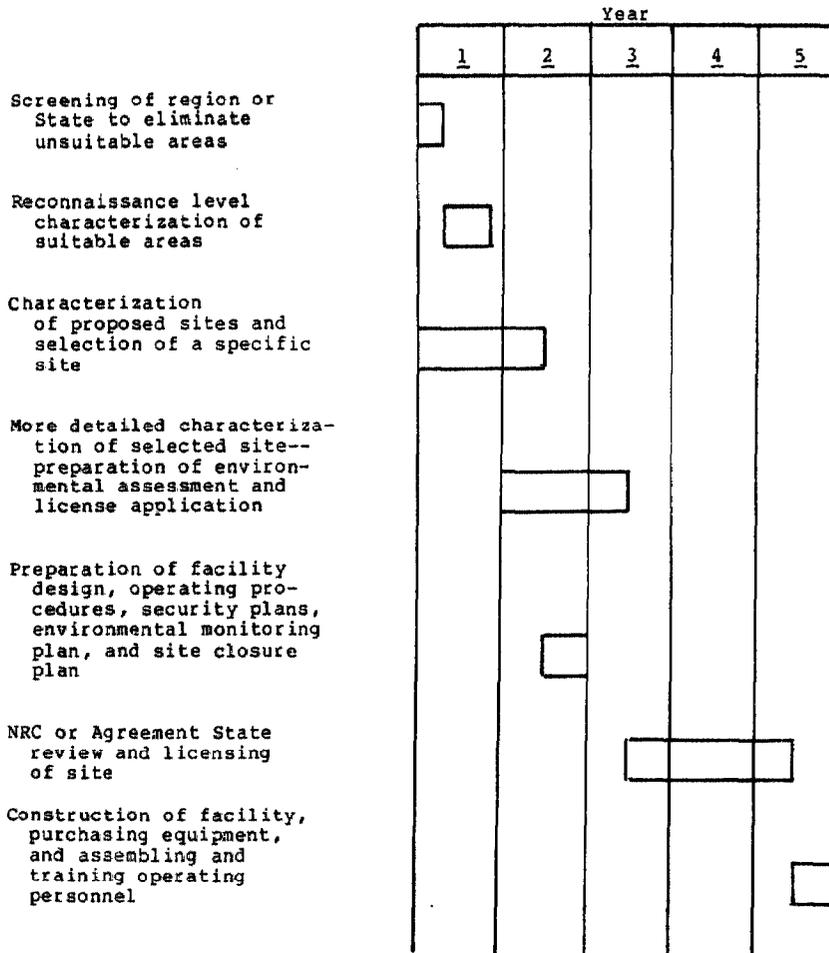


Figure 5: Illustration of the length of time needed to select a site and design, license, and construct a low-level waste disposal facility.

Choosing locations for new low-level waste sites undoubtedly will cause controversy, and siting a disposal facility promises to be an uncertain, time-consuming process, even after the regions and States have demonstrated the need for a new site. The site selection and licensing process promises to be made lengthier because of the public's greater involvement in such decisions in recent years. Siting a new disposal facility may be subject to strong public opposition based on fears about safety, health risks, and environmental degradation; the "not in my backyard" sentiment; or any number of political attitudes.

A potential problem that creates additional uncertainties for the States in locating and licensing new low-level waste disposal sites is EPA's delay in providing firm site radiological standards. Although given the responsibility to develop radiological standards in 1970, EPA has been slow to do so

because it believes other work has higher priority. State officials said that continued delays in this area may discourage commercial disposal site operators from participating in the development of new sites.¹³ Also, some officials feared that if they started site selection now, results of their efforts might be inconsistent with the final EPA guidelines. This could cause substantial cost increases and/or delays in establishing new disposal sites.

The inability of EPA to develop radiological standards was the subject of our recent report on the decontamination and decommissioning of nuclear facilities.¹⁴ In that report we noted that EPA has consistently given radiological standards a low priority and, consequently, could cause delays in several programs dealing with the disposal of nuclear wastes. We recommended that EPA reevaluate its priorities and suggested that the Congress assume a greater role in assuring that radiological standards are issued as soon as possible. Also, we suggested that the Congress consider transferring the responsibility for establishing radiological standards to another agency if EPA's performance did not improve.

In commenting on a draft of this report, EPA said that it "is now placing emphasis on and has improved its performance greatly in developing radiation related standards and guidance that the Agency is mandated to develop." It cited the examples of final standards for the disposal of mill tailings at inactive mill sites, proposed standards for the disposal of high-level wastes, and an advance notice of proposed rulemaking for radio-frequency radiation. EPA also said that it did not believe that the States' concern about the current lack of low-level waste disposal standards is justified. It gave several reasons for this view, the chief one being the existence of NRC criteria for siting and operating low-level waste disposal facilities. Although NRC's criteria could be affected by the development of future EPA standards, EPA said that initial disposal site selections by the State or regions should not be adversely affected if they are made on the basis of NRC regulations. (See app. IV.)

¹³Although the States or Regions are responsible for developing the disposal site, commercial contractors will probably build and operate the site.

¹⁴"Cleaning Up Nuclear Facilities--An Aggressive And Unified Federal Program Is Needed," EMD-82-40, May 25, 1982.

CHAPTER 3

THE STATES NEED TO PLAN FOR THE PROBABILITY

THAT NEW DISPOSAL SITES

WILL NOT BE OPERATING BY 1986

It is extremely doubtful that any new regional or State disposal sites will be established and operating by the January 1, 1986, date included in the act. The general view of State and Federal officials we contacted is that an additional 2 to 4 years are needed to locate and license sites; therefore, a 1988 to 1990 target date would appear to be more realistic for most of the States. Unless the Congress extends the 1986 date after which compact regions may exclude "out-of-region" waste from regional sites, most States or the Federal Government must explore other options for managing commercial low-level wastes until new regional or State disposal sites can be established.

THE 1986 TARGET DATE IS IMPORTANT FOR MAINTAINING THE STATES' MOMENTUM

Because of the difficulties facing the States in forming regional compacts and having new disposal sites in operation by January 1, 1986, the Congress could amend the act to extend this date by 2 to 4 years. This would give the States additional time to develop new sites before the two existing sites are closed to out-of-region waste.

Even though most Federal and State officials we contacted considered the 1986 target date to be unrealistic and unachievable, they stated it had encouraged, and still was encouraging the States to form regional compacts and new disposal sites. These officials almost universally agreed that extending the date would merely give some States a temporary "out" and send a signal that the Federal Government would continue to resolve their low-level waste problems--a message that could reduce the momentum that the States have already established. Based on our discussions with these officials, we agree that extending the 1986 date, while perhaps providing a more realistic target, could delay the establishment of new disposal sites.

The question then arises as to whether Federal agencies or the States should plan for the contingency that new sites will not be operating by 1986. A second--and more important--question arises as to what options are available for taking care of low-level waste generated in regions or States without disposal sites until new sites can be established. These two questions are discussed below.

THE STATES SHOULD, AND CAN, PLAN FOR THE
CONTINGENCY OF NEW DISPOSAL SITES NOT BEING
READY BY 1986

Should Federal agencies or the States be responsible for planning for alternatives that can be taken if new commercial low-level waste disposal sites are not operating by 1986? The consensus of those we contacted is that the States themselves, not Federal agencies, should do this planning. The Low-Level Radioactive Waste Policy Act placed the responsibility for low-level waste disposal--including establishing new regional or State disposal sites--squarely on the States. The States, which have generally fully acknowledged and accepted this responsibility, have begun action to fulfill the responsibility and establish new sites. However, they recognize--as do such Federal agencies as DOE, NRC, and EPA--that it will be extremely difficult, if not impossible, to have new disposal sites operating by 1986. Therefore, the States realize that they have a responsibility for finding and implementing alternative solutions until new permanent disposal sites can be established.

Neither the States nor involved Federal agencies consider it desirable or even appropriate for the Federal Government to develop contingency plans to use if new disposal sites are not operating by 1986. State and Federal waste management officials universally agreed that Federal contingency planning could be counterproductive in that it would relieve the States from having to deal with a politically unpopular issue and cause them to lose the momentum already achieved toward solving the problem. These officials also stated that, because the act had given the States full responsibility for disposing of commercially generated low-level radioactive waste, it would be inappropriate for the Federal Government to develop contingency plans.

The National Governors' Association, for instance, has taken the position that contingency planning is necessary--but the States should do this planning rather than Federal agencies. The Association's Associate Staff Director for Energy and Environment said that for Federal agencies to develop a contingency plan would give regional groupings or individual States an "out" and invite reluctant States to let "someone else" handle the problem.

WHAT OPTIONS DO THE STATES HAVE IF
NEW DISPOSAL SITES ARE NOT READY BY 1986?

As a practical matter, three options appear to be available to the States if new disposal sites are not ready by 1986. The first option, which would require congressional and Federal agency action, is to dispose of commercial low-level waste at

DOE sites until the regions or States can establish their own disposal sites. The second and third options are for the regions or States without sites to (1) negotiate for the continued use of existing sites and, at the same time, (2) plan to develop interim storage facilities if negotiations fail. As discussed below, we believe the second option is preferable; the third is also feasible and could be used if the first fails.

Using DOE sites poses certain problems
and could require congressional action

In 1979, when the Governors of Nevada, South Carolina, and Washington expressed their objections to being the nuclear dumping ground for the Nation, a "popular" solution was that DOE should allow disposal of commercial low-level wastes at DOE sites. DOE has 13 of these sites presently active--located in the States of California, Idaho, Kentucky, Nevada, New Mexico, New York, Ohio, South Carolina, Tennessee, and Washington. These sites are used for the disposal of DOE defense-generated waste.

Authority for DOE to accept commercial low-level wastes for either storage or disposal at any of these sites could be derived from section 161.b of the Atomic Energy Act of 1954, as amended. Under this section, NRC, after consultation with DOE, also could order its licensees to deliver their wastes to DOE facilities, if it determines that adequate non-Federal facilities for waste storage or disposal are not available and this poses a specific danger to public health and safety. However, before accepting these wastes in large volumes for extended periods DOE believes that it would need specific statutory authority to (1) set fees and recover the cost of disposal from the commercial waste generators and (2) spend appropriated moneys to initially expand and operate the existing disposal facilities.

In addition, none of DOE's larger sites is located in those parts of the country (the Northeast and the Midwest) most likely to need interim storage capacity. Seven of DOE's 13 active sites, including those in New York (Northeast compact grouping) and Ohio (Midwest compact grouping), are small and used solely to support operations at local DOE plants. Because of their size, design, and use, DOE does not consider these sites practical for storing or disposing of commercial waste. The larger DOE disposal sites are located in Idaho, Nevada, New Mexico, South Carolina, Tennessee, and Washington (all in or adjacent to regional compact groupings that already have commercial disposal sites).

More importantly, DOE officials believe that disposing of "commercial" wastes at DOE sites may require an environmental

impact statement under the provisions of the National Environmental Policy Act and make them subject to NRC regulation. In a July 1981 report to the Congress, required by the Low-Level Radioactive Waste Policy Act, DOE pointed out that the intrusion of an independent regulatory authority (NRC)--which has no responsibility for or understanding of defense program requirements and needs--together with all the regulatory procedures applicable to commercial low-level waste, could have an adverse impact on DOE's national security functions. DOE officials expressed concern that the possible regulation or Environmental Impact Statement process could open up to public scrutiny and opposition the continued operation of its defense-oriented waste facilities.

Despite these difficulties, DOE officials believe that its three largest DOE sites have sufficient capacity and are accessible enough to be used for storing or disposing of commercial low-level wastes until the States can establish new commercial sites. However, these DOE sites are located in the States of Nevada, South Carolina, and Washington--the three States that have already expressed unwillingness to dispose of the entire country's commercial low-level waste.

In this respect, DOE officials stated that DOE would not accept commercial low-level waste at any of its disposal sites without first consulting with and obtaining the concurrence of the State in which the DOE site is located. State low-level waste officials in South Carolina and Washington told us that both States were opposed to disposing of commercial low-level waste at the DOE sites in those States. Both States have reduced, or have attempted to reduce, the volume of low-level waste entering the States, and they are as much concerned with low-level waste coming into DOE sites as into their own commercial disposal sites. In 1979, when Nevada temporarily closed the Beatty commercial disposal sites, the Governor of Nevada strongly protested to the President about the possible use of DOE sites for commercial wastes, claiming that to use DOE sites for commercial low-level waste was a subversion of States rights.

In our 1980 report on low-level waste management, we evaluated the feasibility of using DOE sites for commercial low-level wastes.¹⁵ At that time we concluded that DOE's reasons for not using its sites for commercial wastes were not persuasive and we did not support dismissing the use of those sites to alleviate the existing regional imbalance of commercial disposal sites.

¹⁵"The Problem Of Disposing Of Nuclear Low-Level Waste: Where Do We Go From Here?", EMD-80-68, Mar. 31, 1980.

However, since that evaluation was made, the Congress passed the Low-Level Radioactive Waste Policy Act, placing the responsibility for disposing of low-level waste directly on the States. Therefore, except in extreme emergency situations, we do not now believe that DOE sites should be used as an alternative for disposing of commercial low-level wastes. Federal and State officials say (and we agree) that opening DOE disposal sites to commercial waste would have the same effect as Federal agencies developing contingency plans to use if new commercial sites are not ready by 1986. It would reduce the States' motivation to move quickly and forcefully in developing new disposal sites.

Two other options will maintain the States' momentum toward establishing new commercial disposal sites

Although the use of DOE sites could perhaps be considered a practical option if all else fails, the States have other options which are more palatable to them and thus easier to implement if needed. Further, we also see these options as being more conducive to the prompt development of additional permanent commercial disposal sites. The first option is for regions or States to negotiate for the continued use of existing sites until new permanent sites can be developed. The second option, for use if these negotiations fail, is for the regions or States to plan for temporary storage of low-level waste until new permanent disposal sites are ready. The planning for this second option should be done concurrently with negotiations under the first option, to avoid delay in the event it is needed.

Continued use of existing commercial sites may be allowed under regional compact agreements

The compact agreements for those regions which already have disposal sites allow the continued use of those sites for "out-of-region" waste, contingent upon a favorable vote of member States and the approval of the State where the site is located. Most Federal and State officials we contacted felt that the States having sites will continue to accept "out-of-region" waste after 1986 as long as the regions or States where it originated can demonstrate that they are making progress toward establishing their own disposal sites.

Compact negotiators for South Carolina and Washington, where the Barnwell and Hanford sites (which now accept 96 percent of the Nation's commercial waste) are located, told us that while these States will have no incentive to accept out-of-region waste after January 1, 1986, they would consider the

progress being made by the States that generated the waste in deciding whether to continue accepting their waste. Because the regions or States without sites would have to demonstrate progress toward establishing sites, the incentive and motivation to develop their own disposal sites would be maintained. The disadvantage of this option, of course, is that South Carolina and Washington might not elect to keep the disposal sites open to "out-of-region" waste.

Use of "in-region" or State temporary storage until new permanent disposal sites are ready

Because the continued use of existing sites is not certain, those compact regions and States without operating disposal sites should also plan to temporarily store low-level wastes (in warehouse-type facilities) until new disposal sites can be opened. In fact, both DOE and NRC officials told us they consider temporary storage a technically acceptable option. The Chief of NRC's Low-Level Waste Licensing Branch, for instance, stated that other than to stop generating waste, the States' only practical option without Federal intervention or the continued use of existing sites is temporary storage. In commenting on a draft of this report, however, EPA cautioned that before this type of alternative is endorsed, a complete quantitative analysis should be conducted to consider the increased risk of normal and possible abnormal conditions. (See app. IV.)

Temporary storage could be accomplished at either the waste generators' plants or at central regional or State facilities, or both. Commercial power reactors, which produce roughly half the low-level waste being generated commercially, already have the flexibility under their NRC licenses to store up to 5 years' accumulation of waste. Central storage sites (essentially warehouses) could be used for industrial, institutional, and medical low-level wastes. In December 1981, a Low-Level Waste Strategic Task Force to DOE's lead contractor for low-level waste management recommended a combination of onsite temporary storage up to a maximum of 5 years for powerplant waste and offset storage for other wastes until permanent disposal sites could be established.

Because there is some increase in the risk of exposure to workers and the general population, we ranked temporary storage as the second option available to the States. Because permanent disposal of the waste will ultimately be required, it must be handled twice. This will result in a small increase in radiation exposure for disposal workers. Nevertheless, DOE and NRC consider interim storage to be technically safe. According to the Chief of the NRC Low-Level Waste Licensing Branch, the

increased exposure and health and safety risks are negligible, and temporary storage is a satisfactory option to use until new permanent disposal sites can be established. Further, in this regard, it should be noted that temporary storage must be licensed by either NRC or an Agreement State.

Another disadvantage of temporary storage--its cost--should serve to maintain the momentum that has been generated toward developing new permanent disposal sites. In June 1981, DOE estimated that onsite storage, such as at commercial powerplants, could cost more than \$45 a cubic foot a year, while storing institutional waste at central facilities could cost about \$11 a cubic foot a year. These estimates do not include the cost of decommissioning the storage facility, the cost of transporting the waste to a permanent disposal site, or the cost of final disposal. In comparison, permanent disposal at one of the three existing sites costs \$12 to \$14 a cubic foot--a one-time cost. We believe the additional cost of interim storage provides a good incentive for the early development of permanent regional or State commercial low-level waste disposal sites.

Some States have already begun to consider what options they will have if new permanent disposal sites are not operating by 1986 or if regional sites, once opened, should be closed for any reason. For example, even before the Congress passed the Low-Level Radioactive Waste Policy Act, State of Michigan officials had discussed contingency actions they could take if the three existing disposal sites were closed. In April 1980 the Governor directed the State Department of Public Health to analyze the low-level waste problems and provide recommendations for establishing emergency temporary storage facilities. In response to this request, the department issued a report in September 1980, which contained several recommendations centering around onsite interim storage and various volume reduction techniques. As of August 1982, the Governor had not yet dealt with the recommendations pending the outcome of Midwest regional compact negotiations. However, State low-level waste officials told us that temporary storage is the only alternative they are seriously considering if the Midwest region has not established a permanent regional disposal site by 1986.

In March 1982, California, one of the two States addressing the problem independently, passed legislation requiring the State Department of Health to develop a contingency plan for short-term storage which should be released to the State legislative in early 1983. This plan is to include waste volume reduction. Texas, the other independent State, already has temporary storage capacity sufficient for 2 years of waste ready to use if the State has not established a permanent disposal site by 1986.

CHAPTER 4

OBSERVATIONS AND CONCLUSIONS

The basic problem facing most States in implementing the Low-Level Radioactive Waste Policy Act is one of time. The 1986 target date for excluding out-of-region wastes will not allow most States or regions enough calendar time to (1) negotiate regional compacts, (2) obtain State legislative ratification, (3) obtain congressional consent, (4) select a State to "host" a site, and (5) locate a specific site and license that site. A potential problem that could make locating and licensing new sites even more difficult is EPA's slowness in issuing regulations providing site radiological standards.

Nevertheless, States have made progress in forming regional compacts as the first step toward resolving the low-level radioactive waste disposal problem. They have formed seven compact regional groupings although the final membership in each has not been decided. Six of these regions have negotiated compact agreements, and one of the agreements has been ratified by enough States for it go to the Congress for approval; however, the five other regions with draft compacts agreements will be unable to get State legislative ratification and forward their compacts to the Congress until at least mid-1983.

The time that will be needed to obtain congressional ratification of the compact agreements is another unknown. This is of serious concern to many State officials, as they do not know if the Congress will approve the compacts quickly. These officials recognized that many members of the Congress represent States in regions now without disposal sites. Consequently, they will want to ensure that their States have other storage options, at least until new disposal sites are established.

State officials also feared the Congress might be reluctant to ratify compacts because they are worded to give the States broader authority than spelled out by the Low-Level Waste Radioactive Waste Policy Act. The act says that the States are responsible for disposing of commercial low-level waste generated within their borders; but the compacts are written to give the States responsibility for waste management as well--including its generation, transportation, packaging, and treatment. This reflects the States' growing concerns about all aspects of radiation safety, not just low-level waste disposal.

Because no new commercial site has been established in the past decade, it is difficult to know how long it will take to select a State to "host" a site, locate the site, and license

that site. However, siting, licensing, and constructing a facility promises to be an uncertain, time-consuming process. State and Federal officials, as well as disposal site operators, generally believe that even after regional compacts are in place and a host State has been selected, up to 5 years might be required to get a new disposal site ready for use. Therefore, most of these officials thought that new disposal sites would not be ready for use until sometime between 1988 and 1990.

Consequently, as of January 1, 1986, those States outside of the Northwest and Southeast regions could be excluded from using the two available commercial disposal sites. It is important, therefore, that these States or the Federal Government consider alternatives for managing low-level wastes until the new regional disposal sites can be opened.

One such alternative would be for the Congress to extend the January 1, 1986, exclusion date in the act--possibly to 1988 or 1990. This would give the States additional time to develop regional disposal facilities before the two existing sites are closed to out-of-region wastes. Most of the State and Federal officials we spoke with, however, did not favor this alternative. They said that the date had provided a common goal for the States and was encouraging them to quickly form interstate compacts and establish new regional disposal facilities. A change at this time, they felt, would send a signal to the States that the Federal Government would continue to resolve their low-level waste problems--a message that could reduce the momentum that the States have already established. We agree with this assessment.

Another alternative would be to dispose of commercial low-level wastes at one or more of DOE's 13 low-level waste burial sites. These sites are currently being used to dispose of low-level wastes generated by DOE's defense programs. Under existing law, however, DOE does not believe it can accept large volumes of commercial wastes at these sites for an extended period. Thus, other than for emergency or short-term situations, DOE believes it would need separate statutory authority to carry out this alternative. More importantly, this action could have the same effect as changing the 1986 date; it would involve Federal intervention and could reduce the incentive for the States to quickly resolve their own low-level waste problems.

The best and least disruptive alternative, in our view, is for the States to convince the Northwest and Southeast compact regions to temporarily accept out-of-region waste after January 1, 1986. In fact, the compact agreements for these two regions allow this to happen, contingent upon a favorable vote of member States and approval of the State where the site is located. In addition, officials from these regions said that,

although there was no incentive to do so, they might continue to accept out-of-region waste from those States or regions that were making adequate progress in establishing new sites. The advantages of this alternative is that it does not require Federal assistance or intervention and the States would have increased incentive to carry out the provisions of the act. The disadvantage, naturally, is that the Northwest and Southeast regions might not elect to keep the disposal sites open to out-of-region waste.

Therefore, States should also plan to temporarily store low-level wastes (in warehouse-type facilities) until the new disposal sites are available. This could be done at either the waste generators' plant or at central regional or State locations, or both. NRC and DOE officials told us that this was an acceptable option, and some States are already planning to develop this type of temporary storage capability. The disadvantage of this option is that it requires the wastes to be handled twice--once when put into temporary storage and again when transferred to permanent disposal facilities. For these and other reasons, this option is more costly than one-time disposal and results in a small increase in the risk of exposure to workers and the general population. Yet it maintains the States' responsibility in the area and encourages them (because of the disadvantages mentioned above) to quickly seek a permanent solution to the low-level waste problem.

To facilitate the progress being made by the States, there are some Federal actions which should be taken or continued. First, it is important to the States that the Congress act quickly in ratifying regional compact agreements. While the regions can begin to establish new sites without this approval, State officials doubted that substantial progress would be made until this step is completed.

Secondly, DOE, NRC, and EPA can continue to help the States form regional groupings and help resolve technical problems associated with locating, designing, constructing, and operating new disposal facilities. DOE, for instance, is already providing funding support to help States form interstate compacts and locate new disposal sites; it should continue to do so. The NRC has issued final Federal regulations governing commercial low-level radioactive waste disposal site selection, licensing, and operation and will be responsible for licensing many of the new sites.

Also, EPA is responsible for developing general environmental standards for siting and operating low-level waste disposal facilities. Expeditious completion of these standards would eliminate one of the uncertainties facing the States in establishing new disposal sites. As it now stands, EPA does not

expect to issue these standards until late 1984 or early 1985-- after some States and regions have already made their initial disposal site selection. However, because EPA generally endorses NRC's criteria in this area, it does not expect that its future standards will adversely affect any of the initial site selections. Nevertheless, EPA should ensure that adequate priority is assigned to low-level waste standards so that they do not become a limiting factor in future licensing activities.

AGENCY COMMENTS AND OUR EVALUATION

We obtained comments on a draft of this report from DOE, NRC, EPA, the States of South Carolina and Washington, and the National Governors' Association. All of these groups suggested factual changes which we incorporated in the report as appropriate. In addition, DOE, NRC, EPA, and the States of South Carolina and Washington provided general comments which are included as appendices to this report. A brief summary and our evaluation of those comments follow.

DOE comments

DOE said that it generally agreed with the information in the report and commended us for a timely and concise report on the development of regional low-level waste disposal facilities. (See app. II.) However, it felt that the following items needed clarification:

- DOE felt that we had given the false impression that the States and/or regions had not made any substantial progress in developing new disposal sites. It identified several States, particularly Colorado, which are conducting first year site development work as depicted in our 5-year schedule.
- DOE agreed that 5 years was a good estimate for developing new disposal sites but thought that the schedule could be reduced in some instances by close coordination and cooperation among Federal, State, and local authorities. Again, Colorado was used as an example where site development activities are moving quickly.
- DOE felt that we had overstated its responsibilities in the development of new disposal sites. In particular, DOE noted that it does not have responsibility for planning disposal options.

--DOE noted that only DOE defense-related, low-level wastes are disposed of in DOE low-level waste facilities. Low-level wastes generated by other Federal research programs and the Department of Defense are disposed of in commercial facilities.

In response to these comments, we adjusted the draft report to better describe DOE's responsibilities for developing new low-level waste disposal facilities and to clarify the type of waste accepted by existing DOE disposal facilities. We did not, however, make any substantial change to the way that we described the progress being made by the States or the time they need to develop new sites.

While we agree that some States have made progress in establishing regional compacts and are in the preliminary stages of the site selection process, we believe that our report adequately reflects the current situation. For instance, DOE cites Colorado as one State which is "quite far along" in site development work. We recognize Colorado's progress in the report and note that it could considerably reduce the lead-time for developing a new disposal site in the Rocky Mountain region.

We have the same type of view of DOE's comment on our estimated 5-year site development schedule. This schedule was based on the best estimates of Federal, State, and private sources that expect to participate in the disposal site selection and licensing process. While it may be possible to reduce this time frame as DOE suggests, those we spoke with, including Colorado State officials, were not optimistic that the 5-year schedule could be substantially reduced. In fact, Colorado officials recently told us that the first sites they surveyed in the State may not be technically acceptable. If this is true, Colorado may have to look at other areas and might not open its disposal site as quickly as it once thought.

NRC comments

While NRC did not provide any overall comments on our report, it did list eight specific items of a clarifying or factual nature. (See app. III.) For the most part, we adjusted our report as necessary to reflect NRC's concerns. However, we believe that two items need further elaboration.

First, NRC was concerned about our description of EPA's responsibilities in establishing radiological standards and suggested changes based on those concerns. For the most part, we made it clear that (1) EPA has the responsibility to set general environmental standards for protecting the environment from radioactive materials and (2) NRC uses those general

standards to develop specific regulations and operating criteria for such facilities as those used to dispose of low-level wastes.

We should note, however, that EPA has not yet developed the general environmental standards for low-level waste disposal. Consequently, NRC has established its own environmental standards in this area and developed the necessary regulations for siting and operating low-level waste disposal facilities. These will be in effect until EPA completes its standards in late 1984 or early 1985. As shown in the next section, EPA does not believe that its low-level waste standards will substantially deviate from those established by NRC.

Second, NRC took exception to the position that special statutory authority would be needed for DOE to set fees and recover the cost of disposing of commercial low-level wastes in DOE disposal facilities. NRC noted that 31 U.S.C. 483a already gives DOE this authority. Accordingly, we changed our report to make it clear that DOE believes it needs this authority if it were to accept commercial wastes in large volumes for extended period of time.

EPA comments

In commenting on our draft report, EPA was most concerned about our reference to a past report¹⁶ which concluded that EPA had given the development of radiation standards a low priority and that the Congress might want to take that responsibility away from them. (See app. IV.) EPA stated that it was now placing increased emphasis on radiological standards and cited some recent examples where it had issued final or proposed radiological standards. We included this information in the body of the report where we discussed the findings of our past report.

EPA also did not believe that the lack of low-level waste standards would have an adverse effect on the selection of new disposal sites by the States and/or regional compacts. This contradicted the views of most of the State officials we spoke with during our review. These officials feared that if they started site selection now, results of their efforts might be inconsistent with final EPA guidelines. This could cause substantial cost increases and/or delays in establishing new sites.

To support its views, EPA referred to (1) the acceptability of current NRC regulations for low-level waste site selection,

¹⁶See footnote 14 on page 22.

(2) information on site selection already published by EPA, (3) the fact that final EPA standards should be available by the time needed to license and operate new disposal facilities, and (4) the efforts EPA, in conjunction with the U.S. Geological Survey, has already taken in identifying and publishing low-level waste siting criteria. In addition, EPA said that the social, political, economic, and technical factors discussed in our report are more likely to cause delays in opening new burial grounds than the availability of EPA environmental standards.

While we tend to agree with these points, we nonetheless believe that EPA should elevate the priority on establishing low-level waste disposal standards. This will eliminate one of the uncertainties facing the States in establishing new disposal sites. As now scheduled, EPA does not plan to issue final low-level waste disposal standards until late 1984 or early 1985-- after some States are due to make their initial siting decision.

South Carolina and Washington comments

The States of South Carolina and Washington (see apps. V and VI) agreed with our conclusion that the January 1, 1986, exclusion date in the Low-Level Radioactive Waste Policy Act should not be adjusted. Such action, the States said, could seriously hamper efforts to implement the act. However, both States disagreed with the order of the three alternatives we present in the report for temporarily storing or disposing of low-level waste until new sites are opened.

These two States thought that the option of negotiating for the continued use of the existing disposal sites (in South Carolina and Washington) should be viewed as the least favorable of the three alternatives. As such, the States recommended that we rearrange the order and preference in which we discuss the alternatives.

We did not make this change, however, because we still believe that the use of the existing disposal site is the best and least disruptive of the alternatives available to those States which will not have new disposal sites open by 1986. We point out in the report that this alternative is dependent on the concurrence of the States of South Carolina and Washington and, consequently, might not be a viable alternative. For this reason, we suggested that the States and regions concurrently plan to store low-level waste in temporary facilities. This is not, in our view, inconsistent with the message presented by the States of South Carolina and Washington.

PROGRESS BEING MADE BY THE STATES
IN FORMING REGIONAL COMPACTS AND
ESTABLISHING NEW COMMERCIAL DISPOSAL SITES

The States are generally committed to forming regional compacts and establishing new commercial low-level waste disposal sites and are making progress in this direction. However, as described below, region by region, this has been a slow and drawn out process.

REGIONS ALREADY HAVING DISPOSAL SITES

Three of the seven tentative compact regions already have operating commercial disposal sites--and had these sites when the act was passed. However, unless each of the States in these regions wanted to establish their own sites, they still had to form regional compacts governing the use of the sites by member States. Although compact agreements have been drafted, only one of the three has been ratified by enough States and sent to the Congress for approval.

Northwest region

The Northwest Interstate Compact was the first regional agreement to be completed and to receive State legislative ratification. The eight eligible States began negotiating in late 1980, and in March 1981 Washington and Idaho introduced the compact in their State legislatures. Since that time, however, Hawaii, Idaho, Oregon, Utah, and Washington have ratified the compact. Although Montana has become a party to the compact by a State executive order, the compact needs the State's legislative approval by July 1, 1983. The two remaining eligible States, Alaska and Wyoming, have not yet acted on the compact. The compact has now been submitted to the Congress for its consent. The commercial disposal site at Hanford, Washington, will continue to be the regional site.

Rocky Mountain region

The Rocky Mountain Low-Level Waste Compact, which was completed in January 1982, has six eligible States--Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming. Although the compact has been negotiated and is complete, it will not be ratified by the required two States until 1983. During the 1982 legislative session, Colorado ratified the compact, while Arizona, New Mexico, and Wyoming did not. These three States held short budgetary sessions, which made legislative action on the compact practically impossible. Nevada did not hold a regular session this year, while Utah joined and ratified the Northwest

rather than the Rocky Mountain compact. According to the Colorado negotiator, the other States will act on the compact, and ratification can be expected during the 1983 regular legislative sessions. Consequently, the Rocky Mountain region is not expected to submit its compact to the Congress for ratification until mid-1983 at the earliest.

The Rocky Mountain region's time frame for getting a new site in operation has been shortened because Colorado, as a compact condition, has already begun the process of selecting and licensing a new disposal site. Also, a county within the State has expressed strong interest in hosting a disposal site. Colorado officials still do not know how long licensing the site will take; however, they believe it may be possible to have a site operating by January 1, 1986, depending on the length of time needed to locate, license, and construct the site. For the time being, the Beatty, Nevada, disposal site is expected to continue to serve as the regional site.

Southeast region

The Southeast Low-Level Radioactive Waste Compact was completed in October 1981 and has been introduced as legislation in seven of the eight eligible States. Although the States of Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee, and Virginia had already ratified the compact, it now needs to be reratified because of amendments made by the States during the ratification process. Since the compact has to be reratified by the required three States, the compact is not expected to be submitted to the Congress until mid-1983. The existing disposal site in Barnwell, South Carolina, will serve as the first regional site until its expected closure on December 31, 1992. By December 31, 1991, a new site is supposed to be established in another Southeast Compact State.

FOUR OTHER REGIONS HAVE NOT YET BEGUN TO ESTABLISH DISPOSAL SITES

The four remaining regions are negotiating or have negotiated regional compact agreements but none of these agreements has been ratified by enough States to be sent to the Congress. Further, since many States are negotiating with more than one region, the membership of the compacts is still undecided. Finally, although none of the regions has selected a location for a new disposal site, all are developing procedures and criteria for this selection. Thus, all four of the regions still have to go through the time-consuming process required to select a regional site and license and construct a new disposal facility. Since this process is projected to take 5 years, it is extremely doubtful that any will have an operating disposal site by 1986.

Northeast region

The Northeast compact agreement is still being negotiated, but according to the Coalition of Northeastern Governors' (CONEG) executive director and Connecticut and Pennsylvania State officials, a completed agreement should be ready for State legislative ratification by March 1983. The negotiating States are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. According to the Connecticut and Pennsylvania negotiators, completing the compact agreement is taking longer than in other regions because State legislators have been helping to develop the compact language. The legislators are helping State negotiators incorporate language they think will be acceptable to the State legislatures. By doing this the region hopes to save valuable time in getting the agreement ratified by the various State legislatures. A CONEG official believes, however, that the compact agreement will not be ratified by the required three States and submitted to the Congress before September 1983 at the earliest.

Because the region does not have an operating disposal site, the region will have to go through the time-consuming process to determine the host State and location for a regional site. According to a CONEG official, the compact negotiators are to develop a process for selecting the host State and a disposal site, which will be part of the final Northeast regional compact scheduled to be completed by year's end. Considering the compact's current status, a Connecticut State official believes it is not possible to have a regional site operating by 1986.

Midwest region

The Midwest region has drafted a compact agreement, which has been enacted by Michigan and which other State legislatures are acting to introduce. According to Michigan and Illinois compact negotiators, they will consider the legislative comments and complete the compact agreement before the end of 1982. Sixteen States--Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Virginia, and Wisconsin--are eligible to join the Midwest compact. However, the final makeup of the region has yet to be decided, because 6 of the 16 States are also eligible to join the Central compact, 3 States are eligible to join the Mid-Atlantic compact, and one State (Virginia) is eligible to join both the Mid-Atlantic and Southeast compacts. The compact should be ready for ratification during the 1983 State legislative sessions. Michigan and Illinois compact negotiators and Southern States Energy Board (Board) officials are optimistic that the Midwest compact will

be introduced in early 1983 and that, by midyear, at least three States will have ratified it. Then it can be submitted to the Congress for its consent.

Since it does not have an operating disposal site, the region will also have to go through the lengthy process required to determine the host State and location for a regional site. Even though the draft compact agreement allows each party State the opportunity to volunteer as a host for a regional site, because of public opposition this has not happened and it is not expected to happen in the future. Consequently, the compact commission, to be formed after three States have ratified the compact, will have to choose a host State and a site location. This commission has to adopt procedures and criteria for selecting a host State before it can recommend the number and types of waste sites needed and identify the possible host States. Michigan and Illinois State officials did not believe it is possible to have a regional site operating by 1986, because a host State has not been selected and the site selection process has not started.

Mid-Atlantic region

The draft Mid-Atlantic Interstate Low-Level Radioactive Waste Compact agreement was completed in 1982. Eligible party States are Delaware, Kentucky, Maryland, North Carolina, Virginia, West Virginia, and the District of Columbia. Puerto Rico and the Virgin Islands are also eligible to join, but neither has stated its intent. Final makeup of the region has yet to be decided because five of the eligible Mid-Atlantic compact States are also eligible to join either the Northeast, Midwest, or Southeast compact.

According to Board officials who initiated formation of the compact, most States and territories did not submit compact legislation during 1982 because they consider the Mid-Atlantic region only as one option. Even Virginia, whose legislature has enacted both the Mid-Atlantic and Southeast compact agreement, is considering other alternatives. For example, Virginia State officials said they are also considering joining the Midwest compact as well as siting and operating a low-level waste facility independently. State officials thought that the Governor would select Virginia's most advantageous option within the next few months.

A Board official said, if the States do decide to go with the Mid-Atlantic compact, he expects at least the three required States to ratify the compact during their 1983 legislative sessions. Immediately thereafter the compact could be submitted for congressional consent.

Since the region does not have an operating disposal site, it would also have to go through the lengthy process required to determine the host State and location for a regional site. Even though the compact agreement allows each party State to volunteer as a host for a regional site, this has not happened and it is not expected to happen. Consequently, the compact commission--which cannot be formed until three States have ratified the compact--will have to choose a host State and site location. The commission must first adopt procedures and criteria for selecting site locations before it can designate site locations for development. A Virginia State official did not believe it is possible to have a regional site operating by 1986 because a host State has not been selected and site selection has not started.

Central region

The draft Central Interstate Low-Level Radioactive Waste Compact agreement was completed in January 1982. Nine States--Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, North Dakota, and Oklahoma--are eligible to join the compact. However, final makeup of the region has yet to be decided because six States are also eligible to join the Midwest compact. Kansas and Louisiana are the only States which have ratified the compact.

The seven remaining eligible States have not acted to ratify the compact. Arkansas and North Dakota had no regular legislative session in 1982, while compact legislation was not introduced during the Oklahoma and Minnesota sessions. In Iowa and Missouri, compact legislation was introduced but not enacted. The Nebraska legislature passed a resolution recommending only that the State of Nebraska ratify the compact. According to the Kansas negotiator, at least three States can be expected to ratify the compact during 1983, and the compact can be submitted to the Congress for its consent in mid-1983 at the earliest.

Since the region does not have an operating disposal site, it will also have to go through the lengthy process to determine the host State and location for a regional site. The compact agreement allows party States to volunteer as a host for a regional site, but again this has not happened and is not expected to happen. Consequently, the commission--which cannot be formed until three States have ratified the compact--will have to choose a host State and a site location. Under the terms of this compact, the commission can take applications from potential facility operators (private contractors) and choose which proposal(s) will best serve the region's need. A Kansas State official was optimistic that the region could have a site

operating by 1986 even though he did not know when the region's site selection and licensing process would begin. Even if the Congress approves the compact during its 1983 session, however, only 2-1/2 years will remain to select, license, and develop a site. This process is universally expected to take 5 years and perhaps longer. (See chapter 2.)

UNAFFILIATED STATES

Texas and California are acting independently rather than joining a regional compact, although neither State has foreclosed the option of joining a compact. Neither State has a disposal facility.

Texas

In 1981, the Texas legislature enacted legislation providing statutory authority to create a State-operated low-level waste disposal facility. This legislation also established the Texas Low-Level Radioactive Waste Disposal Authority; the Governor recently appointed the authority's board of directors, which will develop and operate the facility. Even though this initial step has been taken in the site selection and licensing process, Texas officials consider having a site ready for use by 1986 to be unrealistic. They do believe it possible to have a site operating by 1988.

California

The Governor's office introduced legislation (which was signed into law in March 1982) which provides for a study of disposal options within California. Legislation became necessary when neither the Northwest nor Rocky Mountain regional compacts included California as an eligible member. This law requires the State to develop an overall plan for managing, treating, and disposing of low-level waste. In addition, the law requires California's Department of Health to develop contingency plans for short-term storage needs by December 1982. It also directs the department to develop criteria for 5-year interim storage, a method of classifying low-level waste, a plan to encourage waste volume reduction, and siting criteria for permanent treatment and disposal sites. The law further provides that the State is to complete studies for identifying a permanent disposal site by June 1984. A California State official did not believe it possible to have a State site operating by 1986.



Department of Energy
Washington, D.C. 20585

FEB 7 1983

Mr. J. Dexter Peach
Director, Resources, Community and
Economic Development Division
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Peach:

The Department of Energy (DOE) appreciates the opportunity to review and comment on the General Accounting Office (GAO) draft report "Regional Low-Level Radioactive Waste Disposal Sites--Progress Being Made But New Sites Will Not Be Ready By 1986." We are in general agreement with the information, analysis, and recommendations presented. The GAO is to be commended for a timely and concise report on the status of States establishing regional low-level waste disposal facilities as recommended in the Low-Level Radioactive Waste Policy Act.

The report, we feel, could be improved by clarifying a few items. The assessment of the interplay between compacting and new disposal site development should be expanded. The report presents the view that no substantial site development work is ongoing. It is correct that site development will tend to proceed only to a certain point prior to a compact being ratified or a decision being made by a State to go it alone. However, the way a State pursues site development is often very State dependent. Virginia, Pennsylvania, Massachusetts, Tennessee, Texas, California, Colorado, and Illinois have been and are conducting activities that support site development. Several States are only in the preliminary stages, but others, Colorado in particular, are quite far along. All are accomplishing first year site development work as depicted in the report's 5-year schedule.

The 5-year site development schedule as presented does not display the flexibility inherent in the site development process. An estimate of 5 years has been used by the DOE as an anticipated duration for site development, but not as the minimum time required. A revised estimate for license review by the Nuclear Regulatory Commission, 18 months rather than 24, is not reflected. The schedule projected for licensing by Colorado, 3 years, is also not taken into account. The Colorado schedule is viable and is being closely examined by others. This approach maximizes coordination of Federal, State, and local reviews and encourages early public involvement. Additional time can be saved by early close communication between the site developer and regulators. Solid lines of communication can be established with a clear understanding of regulatory requirements. These actions serve to reduce license review time.

The role and practices attributed to the DOE's Low-Level Waste Management Program and the operation of Defense Program's low-level waste disposal sites need clarification. The DOE's Low-Level Waste Management Program does not have control over all low-level waste management activities nationwide. The Program has jointly pursued with the Nuclear Regulatory Commission, Environmental Protection Agency, and other Federal agencies and States, a close cooperative approach for improved management of low-level radioactive waste. This is especially true in providing support for State low-level waste management activities. The DOE does not have responsibility for planning disposal options. This is a State responsibility as prescribed by the Low-Level Radioactive Waste Policy Act.

The DOE's current practice is to dispose of DOE wastes generated as a result of its field operations at DOE disposal sites. This does not include waste from other Defense and Federal research programs. Department of Defense, Agriculture, and Veterans Administration facilities' wastes, to cite a few, are disposed of at commercial facilities. In order for other Defense and Federal research programs to send waste to DOE sites, on a non-emergency basis, DOE would require new authority.

The DOE appreciates the opportunity to comment on this draft report and trusts that these comments will be useful in preparing the final report.

Sincerely,



Martha O. Hesse
Assistant Secretary for
Management and Administration



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JAN 3 1 1983

Mr. J. Dexter Peach
Director, Resources, Community, and
Economic Development Division
United States General Accounting Office
Washington, DC 20548

Dear Mr. Peach:

This letter is in response to your letter of January 11, 1983 to Chairman Palladino requesting NRC review and comment on a draft GAO report concerning State efforts to form interstate compacts and establish regional low-level radioactive waste disposal facilities.

NRC staff comments are attached. If there are any questions regarding the specifics of the attached comments, please contact Mr. Paul Lohaus at 427-4500 or Mr. George Pangburn at 427-4574.

Sincerely,

A handwritten signature in cursive script, appearing to read "William J. Dircks".

William J. Dircks
Executive Director for Operations

Enclosure:

1. NRC Staff Comments on GAO Draft Report on State Compacts
2. Marked-up copy of Draft Report

NRC STAFF COMMENTS ON GAO DRAFT REPORT ENTITLED
 "REGIONAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITES--
 PROGRESS BEING MADE BUT NEW SITES
 WILL NOT BE READY BY 1986"

<u>Reference</u>	<u>Comment</u>
1. Page ii, first paragraph last line	The description of EPA's responsibility should be modified to be consistent with Reorganization Plan No. 3 of 1970, which states that EPA is authorized to establish "generally applicable environmental standards for the protection of the general environment from radioactive material..." In 1973, the Office of Management and Budget (OMB) in the course of resolving a jurisdictional dispute between EPA and the Atomic Energy Commission (AEC) regarding limits on radioactive discharges from light-water-reactors, stated that EPA should not issue standards for specific types of facilities, such as low-level disposal sites.
2. Page ii, third paragraph lines 9-12	Several developments have taken place with respect to the compacts since September 1982. Where appropriate these have been marked in the accompanying report. In this particular instance, a sixth compact agreement has been drafted and the seventh agreement is nearing completion.
3. Page v, first paragraph lines 1-4	For the reason discussed in Item 1 above, we believe that EPA does not have authority to set operating standards for low-level waste disposal facilities. (This same comment applies to statements found on pp. ix, 11, 21, 32, and 33.)
4. Page iv, last paragraph and page v, first paragraph lines 4-7	These paragraphs should be modified to reflect the fact that NRC has issued its final regulation 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." This regulation provides adequate guidance to the states. To the extent that GAO is implying that NRC regulations must await EPA standards,

Enclosure 1

GAO Note: We have changed NRC's page references to reflect their location in the final report.

410.8.3/GCP/83/01/19

<u>Reference</u>	<u>Comment</u>
	such an implication is incorrect. There is nothing in the Atomic Energy Act of 1954, or any other statute, that requires NRC to delay its promulgation of requirements for low-level waste disposal facilities until EPA sets environmental standards.
5. Page 9, second paragraph	The section frequently mentions that the Low-Level Radioactive Waste Act of 1980 gives the states responsibility for disposal of low-level waste. However, the recently issued Nuclear Waste Policy Act (P.L. 97-425) somewhat modifies this position of state responsibility, by giving the states the option of transferring title and custody of a properly decommissioned LLW disposal site to the federal government. GAO may wish to modify the draft to reflect the impact of this recent legislation.
6. Page 11, third paragraph second sentence	This sentence should be modified to state that "NRC discontinues its responsibilities in 26 states...." The "delegation" of authority carries certain legal implications which are inconsistent with the Atomic Energy Act of 1954. The Commission does not delegate its authority in Agreement States; rather the Commission discontinues its authority in Agreement States so those states can assume regulatory responsibility under their inherent police powers. <u>NRDC v. NRC</u> , 8 ELR 20163, No. 77-1670 (D.C. Cir. January 6, 1978).
7. Pages 25, second and third paragraphs	The draft states that DOE has authority to accept commercially generated low level wastes if NRC orders its licensees to deliver their wastes to DOE because non-Federal facilities are not available and that fact poses a specific danger to public health and safety. NRC believes that DOE has authority to accept commercial low level waste and no order from NRC is necessary. NRC regulations already allow licensees to transfer licensed material to DOE. See 10 CFR 30.41(b)(1), 40.51(b)(1), 40.51(b)(1) and 70.42(b)(1). The draft also states here that DOE would need specific statutory authority to set fees if it received commercial waste. Such authority already exists in 31 U.S.C. 483a.

410.8.3/GCP/83/01/19

<u>Reference</u>	<u>Comment</u>
8. Page 25, last paragraph	DOE is reported as believing that the disposal of commercial wastes at DOE sites would make those sites subject to NRC regulatory authority. This is incorrect and the reason it is wrong should be included in the report. Under the Energy Reorganization Act of 1974 (ERA), the Commission is authorized to license only certain high-level DOE waste disposal facilities. The Commission is not authorized to regulate DOE low-level waste facilities.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
POLICY AND RESOURCE MANAGEMENT

FEB 23 1983

Mr. J. Dexter Peach
Director
Resource, Community and Economic
Development Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

The Environmental Protection Agency (EPA) has reviewed the General Accounting Office (GAO) draft report, "Regional Low-level Radioactive Waste Disposal Sites--Progress Being Made But New Sites Will Not Be Ready By 1986" (GAO/RCED-83-48). Public Law 96-226 requires the Agency to review and prepare comments on the draft report so that GAO may consider EPA's view prior to publishing the final report.

We believe that the subject of availability of the necessary shallow land burial disposal capacity for the Nation's low-level radioactive waste is indeed appropriate for GAO review. The identification of potential alternatives also seems appropriate. Among the alternatives listed in the report was the use of temporary above ground storage. We believe that before this or any other alternative is endorsed that a more complete quantitative comparison of the health impacts of such an alternative would be prepared. This analysis should consider the increased risks due to normal conditions of storage and possible abnormal conditions such as deterioration of containers or fires.

This draft report references and quotes from the GAO report "Cleaning Up Nuclear Facilities--An Aggressive and Unified Federal Program is Needed" (EMD-82-40, May 25, 1982). At several points in the draft report (pages v, 11, and 22), the findings of the earlier report are reiterated. This emphasizes the previous report's conclusion that EPA has given the development of radiation standards a low priority and that Congress might consider giving that responsibility to another agency or group if EPA's performance did not improve. We believe the facts support the opposite conclusion and that EPA is now placing emphasis on and has improved its performance greatly in developing radiation related standards and guidance that the Agency is mandated to develop.

GAO Note: We have changed EPA's page references to reflect their location in the final report.

For example, on January 5, 1983, 6 months after the GAO report was published, EPA issued a final standard for the disposal of mill tailings from inactive uranium mills. Further, on December 29, 1982, EPA proposed a standard for the disposal of high-level radioactive waste. The Agency also published an Advance Notice of Proposed Rulemaking dealing with radiofrequency radiation on December 23, 1982. If the perspective of the May 1982 report is to be quoted, we believe these recent accomplishments should also be noted.

Clearly, EPA has had to establish relative priorities for the various radiation standard activities that require action. We have attempted to schedule these projects so that they coincide with legislative mandates of Congress, as well as the needs of other agencies, States, and industries, and to make optimum use of our resources to ensure that standards are available when they are needed. We believe that our program on low-level radioactive waste has been managed consistent with these priorities while at the same time preserving the overall radiological quality of the environment.

The draft report also gives the impression (pages v, 22, and 30) that the current absence of EPA standards for low-level radioactive waste disposal may have an adverse effect on disposal site selection and discourage the participation of potential site developers. Although some may hold that view, EPA does not believe that this viewpoint is justified for the following reasons:

1. We pointed out in our comments on the Nuclear Regulatory Commission's (NRC's) proposed 10 CFR 61 regulations on shallow land burial of low-level radioactive waste that we believe their performance requirements for general public exposure are based on the proper range of from 1 to 25 millirem per year. NRC's detailed requirements should be compatible with an EPA standard in that range. EPA's standards for low-level radioactive waste disposal would be developed in a more rigorous way recognizing tradeoffs for environmental and economic costs and benefits and would cover additional exposure modes and methods of disposal. However, we would not expect our standards to adversely affect any initial site selections made on the basis of the NRC regulations.

2. EPA's views on site selection were expressed in a 1974 joint publication with U.S. Geological Survey (USGS) on siting criteria. These were recently reiterated at the NRC sponsored meetings on the subject. Therefore, the present published EPA information should be useful to the States and NRC, and also be adequate for site selection.

3. As the GAO draft report points out, the U.S. is over five years away from a final operating license for a new site. As indicated in the President's budget request for FY 1984 regulatory action for low-level waste should be completed by the time that States and disposal site operators need them for operation of the facilities.

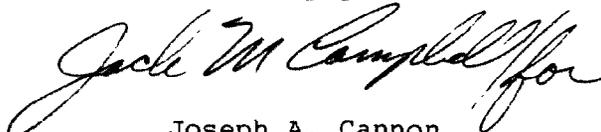
4. We should note that EPA has had an active low-level radioactive waste program for several years. The Agency's Office of Air, Noise and Radiation has been responsible for many of the studies and findings that have led the Nation to realize the need for improved disposal facilities. Our studies at two of the previously used sites, Maxey Flats, Kentucky, and West Valley, New York, were instrumental in pointing out the necessity of thorough efforts in site selection, and led us to work with USGS on site selection criteria. These joint efforts led to the previously mentioned joint publication which has served as a basis for such criteria, both nationally and internationally.

5. EPA believes that the several social, political, economic, and technical factors discussed are far more likely to cause delays in opening of new burial grounds than the availability of EPA environmental standards.

Based upon the above discussion the Agency recommends that appropriate changes be made in the GAO draft report. We have enclosed suggestions of specific changes which we believe will more accurately reflect EPA activities and the context in which they should be viewed.

We appreciate the opportunity to review this GAO draft report.

Sincerely yours,



Joseph A. Cannon
Associate Administrator for
Policy and Resource Management

Enclosure



State of South Carolina

Office of the Governor

RICHARD W. RILEY
GOVERNOR

February 16, 1983

POST OFFICE BOX 11450
COLUMBIA 29211

Mr. Dexter Peach
Director, Resources, Economic, and
Community Development Division
U.S. General Accounting Office
441 G. Street, Northwest
Washington, D.C. 20548

Dear Mr. Peach:

The Draft Report, "Regional Low-Level Radioactive Waste Disposal Sites -- Progress Being Made But New Sites Will Not Be Ready by 1986" (GAO/RCED -83-48), addresses the issue of how low level radioactive waste (LLW) covered by P.L. 96-573 will be handled after January 1, 1986 if one or more regions of the country have been unable to establish an operating disposal site by that date.

We are very much encouraged that the Draft Report recommends that the Congress not extend the date for exclusionary authority to 2 to 4 years beyond that established in the 1980 Act. Such an action would seriously hamper efforts around the country to implement this Act.

As for the three options which are discussed in the Draft Report,

- ° negotiate for continued use of existing sites
- ° plan for interim storage within the "site-less" regions
- ° secure access to DOE sites for storage or disposal

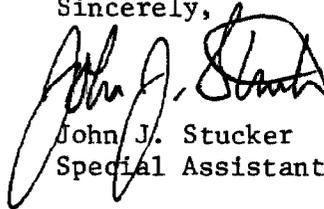
we recommend that the Final Report change the preference ordering of these options from the rank order contained in the Draft Report.

The option which most nearly conforms to the intent of the 1980 Act would be to plan for interim storage within the region. NRC has stated that such storage could be undertaken for a period up to five years. This approach would provide a "siteless" region with the means to handle their LLW through 1990.

The second option should be to negotiate with DOE for access to Federal sites within the region for temporary storage or possible disposal. The option would be particularly attractive to those regions which contain FUSRAP sites. DOE has indicated its desire to have the waste from these project sites disposed of at regional facilities to be established in the region. Cooperative efforts between regional LLW compact commissions and DOE to resolve both near-term and long-term LLW disposal problems in these regions would fulfill both the spirit and the letter of the 1980 Act.

The option of negotiating for continued use of existing sites should be viewed as the last of these three alternatives. While technically feasible, this option departs most dramatically from the intent of the 1980 Act. In this law, Congress mandated state responsibility for assuring safe management and disposal of LLW and encouraged regional efforts to carry out this responsibility. Continued reliance on out-of-region facilities and resources does not reflect the spirit of state responsibility and regional problems solving envisioned by Congress in passing the Low Level Radioactive Waste Policy Act of 1980.

Sincerely,



John J. Stucker
Special Assistant to the Governor

cc: David W. Stevens
Office of the Governor
State of Washington



State of Washington

JOHN SPELLMAN, Governor

OFFICE OF THE GOVERNOR

February 22, 1983

Mr. Dexter Peach, Director
Resources, Economic, and Community
Development Division
U.S. General Accounting Office
441 "G" Street Northwest
Washington, D.C. 20548

Dear Mr. Peach:

Thank you for the opportunity to review the draft GAO report entitled "Regional Low-Level Radioactive Waste Disposal Site - Progress Being Made But New Site Will Not Be Ready By 1986" (GAO/RCED-83-48). Our overall reaction is that the report contains a significant amount of pertinent background and information concerning development of regional compacts. We are pleased to see the analysis made of the implementation phase of the compact building process.

We are gratified that the draft report recommends that the January 1, 1986, exclusionary date, not be changed to a later date. Any adjustment in that date would seriously impede current efforts existing around the country to implement the compacts on a timely basis.

The draft report lists three options which could be utilized to deal with the need for temporary disposal facilities following January 1, 1986, until all regions have operating sites.

1. Negotiation with regional compacts, having existing sites, for continued use of those sites on an interim basis.
2. Developing a plan for interim storage within states that would not have a regional site available by the exclusionary date.
3. Securing access to Department of Energy sites for temporary storage or disposal.

We strongly recommend that the final GAO report change the order of these options and fully reflect feasibility of each one. The option which most nearly conforms to the intent of the 1980 Act would be to develop plans for interim storage within a region developing a site. The Nuclear Regulatory Commission has stated that such storage could be undertaken for a period of up to five years. This approach would provide a "site-less" region with the means to handle their low-level

waste through 1990. A plan for interim storage could take either of two paths - one being the use by generators of storage capacity on-site, or the development of a facility for either state or regional use for the interim period.

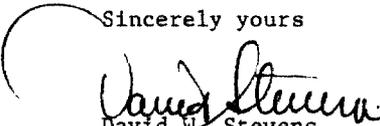
The second option should be to negotiate with the Department of Energy (DOE) for access to Federal sites within the region for temporary storage or possible disposal. This option would be particularly attractive in those regions which contain FUSRAP sites. DOE has indicated its desire to have the wastes from these project sites disposed of at facilities to be established in the region. Cooperative efforts between regional low-level waste compact commissions and the DOE to resolve low-level waste disposal problems in these regions would fulfill both the spirit and the letter of the 1980 Act and would provide a feasible alternative that could be used in conjunction with other temporary storage plans.

The option of negotiating for continued use of existing sites by other regions should be used only as the last alternative. Since the primary intent of the 1980 Act was for regions to take care of their own waste, the contracting with a region with an existing site should be viewed as both a limited and temporary opportunity. In the Federal law, Congress mandated states' responsibility for assuring safe management in disposal of low-level wastes and encouraged regional efforts to carry out their responsibility. A continued reliance on out-of-region facilities and resources does not reflect that spirit of state responsibility and regional problem solving which was envisioned by Congress and their passage of the Low-Level Radioactive Waste Policy Act of 1980.

The Northwest Compact states expect that other regions will be able to take care of their own wastes, with the possibility of some limited temporary access under carefully developed conditions to the extent that other feasible methods are not available. To the extent that other options can be utilized, the achieving of the national objectives of a system of regional sites at the earliest possible time will be stimulated.

Thank again for the opportunity to review the draft report.

Sincerely yours



David W. Stevens
Washington Representative,
Chairman, Northwest Compact
Committee

DWS/jl

cc: John Stucker, South Carolina
Holmes Brown, NGA

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