BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Cleaning Up Nuclear Facilities-- An Aggressive And Unified Federal Program Is Needed

The Federal Government needs to take a more unified and aggressive approach to cleaning up and decommissioning nuclear facilities if the United States intends to effectively meet current and future decommissioning challenges. The limitations of current Federal agency decommissioning programs

--make it difficult to locate facilities in need of decommissioning actions and

--increase decommissioning costs not only for licensees but also for the public and the Federal Government.

Until the Federal Government establishes a national decommissioning strategy and designates a lead agency responsible for monitoring implementation of that strategy, these problems will likely continue. More importantly, the chances of hazards to the public's health and safety will be increased because nuclear facilities may not be properly cleaned up.

GAO/EMD-82-40
MAY 25, 1982

Request for copies of GAO reports should be sent to:

U.S. General Accounting Office
Document Handling and Information
Services Facility
P.O. Box 6015
Gaithersburg, Md. 20760

Telephone (202) 275-6241

The first five copies of individual reports are free of charge. Additional copies of bound audit reports are $3.25 each. Additional copies of unbound report (i.e., letter reports) and most other publications are $1.00 each. There will be a 25% discount on all orders for 100 or more copies mailed to a single address. Sales orders must be prepaid on a cash, check, or money order basis. Check should be made out to the "Superintendent of Documents".

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-207237

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses Federal efforts and activities directed at cleaning up nuclear facilities and sites once they are no longer needed. The report can assist the Congress and responsible Federal agencies in achieving a more aggressive and unified program.

The review was made as part of our continuing effort to identify issues in the nuclear area, which will provide increased public health and safety through better Federal program administration. The four Federal agencies discussed in the report have commented on its contents and their comments are included in the report's appendices.

Copies of this report are being sent to the Director, Office of Management and Budget; the Secretaries of Energy and Defense; the Chairman, Nuclear Regulatory Commission; the Administrator, Environmental Protection Agency; and the House and Senate committees and subcommittees having oversight responsibilities for the matters discussed in the report.

Charles A. Bowsher

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

CLEANING UP NUCLEAR FACILITIES--AN AGGRESSIVE AND UNIFIED FEDERAL PROGRAM IS NEEDED

D I G E S T

The Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), the Department of Defense (DOD), and the Environmental Protection Agency (EPA) are the principal Federal agencies involved in either cleaning up, regulating, or establishing standards for the cleanup of thousands of radioactively contaminated sites and facilities once their useful life is over--a process called decommissioning.

In 1977, GAO reported on the decommissioning problems facing the Nation and recommended actions needed to resolve these problems. The 1977 report identified several problems including the need for a national policy or strategy to help solve the country's decommissioning problems. While Federal agencies are moving to correct some of the problems identified in the prior review, GAO found that progress has been slow and many of the same weaknesses still exist.

More importantly, the United States still does not have a national policy or strategy for decommissioning nuclear facilities or sites. Unless a national policy is developed to provide for unified and effective decommissioning actions and a lead agency is designated to monitor implementation of that policy, GAO believes the impact will be, at best, additional costs to the Federal Government, and, at worst, potential hazards to the public's health and safety. GAO believes that NRC should be designated as the lead agency for the reasons discussed on page 36.

IMPROVED RECORDKEEPING SYSTEM NEEDED TO DOCUMENT THE DISPOSITION OF NUCLEAR FACILITIES

Nuclear facilities and sites which require or eventually will require cleanup or other disposition can be tracked, evaluated, and recorded for followup action if needed. In the past, nuclear facilities and sites were abandoned or decommissioned without adequate documentation of their

radiological status or even a record of their existence. As a result, Federal agencies are uncertain about the location or status of some facilities and sites that may be in need of decommissioning.

At old, inactive sites, NRC, DOE, DOD, and EPA are attempting to locate and evaluate the hazards. Based on the difficulty involved in identifying the old sites, GAO believes the agencies are making reasonable progress and providing good assurances that hazardous sites will be found. However, this has been a costly and time-consuming effort, and no matter how many resources are devoted to the effort, there can be no assurance that all sites and facilities will be found. (See p. 8.)

Despite the problems that inadequate recordkeeping systems have caused Federal agencies in the past, only one agency, DOE, is revising its current recordkeeping system to provide sufficient information on the location and radiological condition of its current and future nuclear facilities and sites. The recordkeeping systems at NRC, DOD, and responsible States remain inadequate. As a result, the problems that Federal agencies currently are experiencing in attempting to identify nuclear facility locations and determine the radiological status could exist in the future. (See p. 12.)

BETTER PLANNING NEEDED TO FACILITATE THE DECOMMISSIONING OF NUCLEAR FACILITIES

Selection of a tentative decommissioning method during the design of a nuclear facility is important if the owner of the facility, as well as Federal regulators, are to effectively plan for decommissioning. An early and precise as possible determination of the method will allow the facility to be designed to facilitate decommissioning, thus reducing cleanup costs and avoiding delays in decommissioning. Early selection will also enable Federal agencies and States to better estimate waste disposal requirements.

Despite these benefits, Federal decommissioning programs in the past have not sufficiently considered and incorporated decommissioning needs during the facility planning and design phase.

However, DOE and NRC are making some progress in developing comprehensive decommissioning policies which include many of the necessary provisions. DOD has not initiated action to develop a comprehensive decommissioning policy. While the efforts of DOE and NRC are commendable, neither of the efforts are final. GAO believes it important that the final policies under development, and any DOD actions, emphasize that

--a tentative decommissioning method be determined early on so that design features can be incorporated to expedite and simplify decommissioning (see p. 18) and

--a funding mechanism be established, based on the tentative method selected, at or before the start of operations to ensure that sufficient money is available to decommission the facility at the end of its useful life. (See p. 21.)

RADIATION STANDARDS NEEDED TO GUIDE DECOMMISSIONING PROGRAMS

Standards prescribing acceptable levels of residual radioactive contamination for decommissioned nuclear facilities are necessary to identify the decommissioning methods, guide cleanup efforts, determine cleanup costs, identify the amounts of radioactive waste to be disposed, and protect the public from unacceptable risks. Such standards, however, are not expected to be available until mid-1986.

EPA is responsible for setting these standards but, with minor exceptions has not done so because it considers their development a low priority. EPA does not expect to begin developing critical standards needed to decommission facilities until 1984. As a result, some Federal decommissioning programs have been delayed. In other cases, NRC licensees, DOE, and DOD have used interim guidelines to develop site-specific decommissioning standards negotiated on a case-by-case basis. In these cases, agencies are concerned that it may be necessary to do additional cleanup if final EPA standards are more stringent than those used for a specific facility. Conversely, if the standards are less stringent, then unnecessary cleanup will have been done and excessive costs will have been incurred. (See p. 26.)

RECOMMENDATIONS

GAO makes a number of recommendations which if implemented should solve the major problems it identified. Major recommendations are:

--The Congress designate NRC as the lead agency to develop and monitor an overall decommissioning strategy.

--DOD and NRC, through its licensing process, develop adequate recordkeeping systems to provide permanent records of the location and radiological conditions of nuclear facilities and sites.

--DOE, DOD and NRC, through its licensing process, include, as part of their facility planning requirements, early selection of a tentative decommissioning method, design features to enhance decommissioning, and early planning for decommissioning costs.

--EPA reevaluate the priorities assigned to developing radiation standards and develop and present to responsible congressional committees, within 6 months of the date of this report, a plan for developing and issuing these important standards.

GAO also raises several issues for congressional consideration regarding (1) actions that could be taken to better assure adequate funding to decommission Federal facilities, and (2) alternatives that are available to accelerate the development of radiation standards.

The full text of GAO's recommendations and matters for congressional consideration can be found on pages 36 to 40 of its report.

AGENCY COMMENTS AND GAO'S EVALUATION

GAO obtained comments from the four agencies responsible for the decommissioning activities discussed in this report--DOE, NRC, DOD, and EPA. The agencies' more significant comments and GAO's evaluation are contained in chapter 6 of this report. The complete texts of their comments and GAO's detailed evaluation are in appendices V through VIII.

Although DOE, NRC, and DOD generally agreed with the need for improving their decommissioning programs and activities, they disagreed with GAO's recommendation that NRC be designated as the lead agency for developing and monitoring a national decommissioning policy. The underlying reason for their disagreement was that such an action would give NRC additional regulatory authority over their programs. However, GAO does not intend to imply, nor does it advocate, that such authority be given to NRC. The role GAO envisions for the lead agency would be to develop broad decommissioning guidelines and policy for agencies to follow, to the extent possible, thereby resulting in more effective and consistent decommissioning activities.

EPA disagreed with GAO suggesting to the Congress that it consider transferring responsibility for setting certain radiation standards from EPA to NRC. EPA said such an action would further delay development of the standards. However, in light of the delays already experienced in promulgating these standards, GAO questions EPA's ability to complete the task. NRC is also concerned about EPA's difficulties in establishing the standards and, in its comments, said there may be a significant advantage in assigning the responsibility to NRC. Consequently, GAO believes the approach presented in the report is fair and reasonable. GAO has recommended that EPA be given an opportunity to submit its plan for completing the standards to the Congress, and based on the adequacy of the plan, the Congress would decide if EPA should retain the responsibility or whether it should be transferred to another agency or group. GAO has identified two options available to the Congress for transferring this reponsibility.

- - - -

Following up on its 1977 report, GAO, in this review, evaluated the adequacy of Federal agencies' efforts to correct the problems GAO identified with their decommissioning programs and activities. In this regard, the major areas GAO looked at included.

--adequacy of recordkeeping procedures and documentation,

--effectiveness of planning efforts and

--adequacy of standards development. (See p. 4.)

Contents

ABBREVIATIONS

DOD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency
GAO	General Accounting Office
NRC	Nuclear Regulatory Commission

CHAPTER 1

INTRODUCTION

When a nuclear facility reaches the end of its useful life, the facility and the site must be decontaminated, and the radioactive materials must be removed or reduced to acceptable levels. This process is called "decommissioning."

Aside from the future need to decommission the 75 commercial nuclear reactors currently licensed for operation in the United States, numerous other nuclear facilities will also have to be decommissioned. For example, thousands of organizations are currently using radioactive materials for industrial, medical, and academic research purposes. The military uses radioactive materials in nuclear ships, training reactors, as well as in other facilities. In addition, Federal nuclear weapons production and energy research programs have resulted in hundreds of surplus facilities and piles of uranium mill tailings. At some time in the future, all of these facilities will require some form of decommissioning.

FEDERAL AGENCIES RESPONSIBLE FOR DECOMMISSIONING ACTIVITIES

Three Federal agencies are primarily involved in using, regulating, and/or decommissioning radioactive materials and facilities: the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), and the Department of Defense (DOD). The Environmental Protection Agency (EPA) is involved in establishing radiation standards.

Nuclear Regulatory Commission

NRC is responsible for licensing, regulating, and assuring the decommissioning of commercial nuclear facilities, and, with some exceptions, private and public users of radioactive materials. 1/ NRC's responsibilities range from licensing the largest commercial nuclear power reactor to licensing an individual doctor who handles radioactive drugs. In all, NRC is responsible for regulating 75 nuclear power reactors licensed to operate, about 90 nuclear power reactors in construction or pending operator licensing review, 73 non-power reactors used primarily for research programs, and 44 fuel-cycle facilities, consisting mainly of fuel fabrication, conversion plants, and uranium mills, which support reactor operations. Each of these facilities must be decommissioned before NRC can terminate its license.

1/The exceptions are DOE activities involving national defense and some DOD programs.

NRC also participates in an Agreement States Program, whereby 26 States exercise regulatory authority on behalf of NRC over some 12,000 of the more than 21,000 materials licensees. 1/ (See app. I for map showing Agreement States.) Under this program, NRC can delegate responsibility to the States to regulate users of certain radioactive materials. States entering the program agree to use their best efforts to assure that the licensing and regulatory policy and procedures continue to be compatible with those of NRC.

By September 1981, 68 reactor facilities and 7 nonreactor facilities had been decommissioned. The reactor facilities include research, test, and demonstration power reactors considerably smaller than the power reactors presently in service. In addition, NRC data indicated that at least 16,000 non-fuel cycle licensees have had their facilities decommissioned and licenses terminated.

Department of Energy

DOE is responsible for decommissioning Federal property contaminated as a result of DOE-sponsored nuclear work, including its weapons production program. Most of the contaminated sites and facilities are located on nine DOE field operations office reservations. However, DOE is also responsible for other inactive contaminated facilities and sites away from the controlled environment of DOE reservations. DOE was given responsibility for these facilities either through recent legislative directives or through the Atomic Energy Act of 1954, as amended. This authority permitted DOE to identify facilities and sites contaminated from earlier nuclear weapons production activities and to take corrective action, as necessary.

In response to its decommissioning responsibilities, DOE established a Remedial Action Program. The program is composed of four subprograms:

--The Grand Junction Remedial Action Program (Grand Junction Program), authorized by Public Law 92-314, provides for the removal of uranium mill tailings from the premises of about 740 structures at Grand Junction, Colorado, where radiation exposure levels exceed the Surgeon General's 1970 guidelines.

1/Most of these licensees are not involved in the production or use of nuclear fuel for power reactors.

--The Uranium Mill Tailings Remedial Action Program (Mill Tailings Program), authorized by Public Law 95-604, provides for decommissioning and stabilizing uranium mill tailings at 25 inactive uranium processing sites and associated vicinity properties contaminated with residual radioactive materials derived from the processing site. (See app. II for map of sites.)

--The Formerly Utilized Sites Remedial Action Program (Formerly Utilized Sites Program), established by DOE's predecessor agency in 1974, provides for identifying and decommissioning former nuclear materials storage and processing facilities, as well as vicinity properties which have become contaminated as a result of material removed from these former sites. (See app. III for map of sites.)

--The Surplus Facilities Management Program (Surplus Facilities Program), established by DOE in 1978, provides for decommissioning 500 DOE owned or operated radioactively contaminated surplus facilities. (See app. IV for locations of DOE surplus facilities.)

Department of Defense

DOD uses radioactive materials as extensively as the commercial nuclear industry. For example, DOD operates hospitals which use radiological equipment, performs research and testing using radioactive materials, operates a large fleet of nuclear-powered ships, and uses various radioactive materials for instrumentation on airplanes, ships, and tanks. In the past, DOD also operated six nuclear power reactors to produce electricity for military bases and several small research reactors.

Some of the radioactive material DOD uses is licensed and controlled by NRC, while some is controlled by the individual military services. Three services (Army, Navy, and Air Force) presently have about 380 separate NRC licenses, and had about 300 previous licenses terminated under NRC procedures.

Certain radioactive material under direct control of the services is legislatively exempt from NRC licensing and control for national security reasons. The largest program operated by DOD under such a legislative exemption is the Navy's nuclear program, which includes 127 nuclear-powered ships, 6 land-based training reactors, several refueling facilities, and docking areas. DOD also controls other nuclear materials which are exempt from NRC licensing because only small quantities of materials are involved.

Each service is responsible for the eventual cleanup of contaminated facilities and disposal of radioactive materials, whether they are licensed or not. However, in the case of a licensed activity, NRC requirements must be met by the licensee before the license is terminated. For the exempt facilities, the services are responsible for providing guidance and facilitating the cleanup and disposal of nuclear materials.

Environmental Protection Agency

EPA is responsible for setting radiation standards for all aspects of decommissioning, including acceptable levels of residual contamination for sites and facilities, mill tailings cleanup and disposal, and low- and high-level waste disposal.

OUR PRIOR REVIEW

In 1977, we issued a report on the decommissioning programs at NRC and DOE. 1/ At that time, we found numerous problems and made several recommendations to NRC and DOE, which we believed, if implemented, would solve the problems.

The major problems noted in the previous report included

--a lack of front-end decommissioning planning and funding requirements for commercial facilities, which include, (1) designing a facility to enhance decommissioning, (2) selecting a decommissioning method early-on, and (3) establishing a funding mechanism to assure availability of funds at the time of decommissioning;

--a lack of action on DOE's part to establish policies or criteria for selecting decommissioning methods, incorporating decommissioning design features in facility planning, and disclosing decommissioning costs during project authorization; and

--a lack of a national policy or strategy to govern all aspects of decommissioning.

OBJECTIVE, SCOPE, AND METHODOLOGY

The overall objective of this review was to determine the status of Federal efforts to correct decommissioning problems identified in our previous report to the Congress. In addition to following up on the recommendations made to correct these problems, we also evaluated how effectively NRC's, DOD's, DOE's and

---

1/"Cleaning Up the Remains of Nuclear Facilities--A Multibillion Dollar Problem," EMD-77-46, June 16, 1977.

EPA's decommissioning and standard setting programs were functioning. We evaluated such programs by using criteria we developed during our survey through discussions with appropriate agency officials and reviews of numerous studies, reports, testimonies, and legislation. Although the criteria may not be all-inclusive, we believe they do represent the basic elements of an effective decommissioning program. Listed below are the criteria we used.

--Each agency should have adequate recordkeeping procedures and documentation to (1) identify all contaminated sites and facilities, both surplus and active, needing decommissioning and (2) provide future generations with permanent records of the location and radiological condition of decommissioned sites and facilities.

--Each agency should have in its up-front facility-planning process steps to ensure (1) design of a facility to facilitate decommissioning, (2) identification of a specific decommissioning method, and (3) a mechanism for funding decommissioning costs.

--Standards should exist which govern acceptable levels of residual radiation that may remain after decommissioning.

Our overall approach included (1) interviewing Federal, State, and contractor officials; (2) reviewing the policies, procedures, and guidance for decommissioning and cleaning up radioactive contamination; and (3) reviewing records and files. This review was performed in accordance with GAO's current "Standards for Audit of Governmental Organizations, Programs, Activities, and Functions."

Our review of NRC's decommissioning program and activities was carried out at NRC headquarters; NRC's Chicago, Dallas, and Philadelphia regional offices; and two NRC Agreement States--New York and Texas. In addition, we contacted the NRC's regional office in San Francisco and the State of California, which is also an Agreement State. We selected these NRC regional offices because of the large volume of licenses for which they are responsible. We also selected the three Agreement States for essentially the same reason--these States accounted for about 42 percent of the 12,000 active non-fuel-cycle licenses within the 26 Agreement States.

In evaluating DOE's decommissioning programs, we concentrated primarily on the Mill Tailings Program, Formerly Utilized Sites Program, and Surplus Facilities Program. We conducted our work at DOE headquarters in Germantown, Maryland; and at DOE operations offices in Albuquerque, New Mexico; Richland, Washington; Oak Ridge, Tennessee; and Idaho Falls, Idaho. The Albuquerque office is responsible for carrying out the remedial action for the Mill Tailings Program; Richland for the Surplus Facilities Program; and Oak Ridge

for the Formerly Utilized Sites Program. We included the Idaho Falls office because it is responsible for determining low-level waste disposal needs.

We did limited work on the Grand Junction Program because it is the least costly of the four decommissioning programs, and the program is well underway toward meeting its objectives. Nevertheless, for the four decommissioning programs, we reviewed pertinent studies, reports, and records to determine the extent to which the three critical elements are being considered in each. In addition, we discussed with DOE and contractor personnel the problems associated with each program and the impact that applying the three critical elements would have on the programs.

At DOD, we concentrated primarily on determining the adequacy of recordkeeping procedures and documentation. We accomplished this by determining whether DOD or the services had records which identified all contaminated sites and facilities needing decommissioning and which showed their operational status. Our coverage of the remaining two elements was limited to obtaining DOD officials' views because, except for the nuclear Navy, DOD does not have a major program underway to construct new nuclear facilities. In performing our work on DOD's program, we contacted:

--Defense officials in Washington, D.C.

--Air Force officials at Wright-Patterson Air Force Base, Columbus, Ohio; Andrews Air Force Base, Washington, D.C.; and Brooks Air Force Base, Texas.

--Army officials at Fort Belvoir, Virginia.

--Navy officials at Port Hueneme, California.

--DOE officials at Germantown, Maryland; and Albuquerque, New Mexico.

At EPA headquarters in Washington, D.C., we interviewed officials and obtained information on EPA's efforts to develop standards for cleanup of various radioactive materials. We obtained information from EPA concerning the estimated completion or issuance dates of standards which affect the decommissioning activities we reviewed.

- - - - -

The following chapters of this report discuss problems we found in applying our criteria to the Federal decommissioning programs and efforts. Specifically, the following chapters discuss:

--weaknesses in past and present recordkeeping systems,

--the need for better planning to facilitate the eventual cleanup and decommissioning of nuclear facilities, and

--the need to develop standards to guide decommissioning efforts.

Chapter 5 presents our conclusions on the problems we found and recommendations to NRC, DOE, DOD, and EPA for improving their programs. It also presents recommendations to the Congress and matters for its consideration on action it needs or may want to take to provide for a more unified and aggressive Federal decommissioning program. Chapter 6 contains a discussion of the more significant agency comments and our evaluation of them.

CHAPTER 2

IMPROVED RECORDKEEPING SYSTEM NEEDED TO DOCUMENT THE DISPOSITION OF NUCLEAR FACILITIES

Nuclear facilities and sites which require or eventually will require cleanup to protect public health and safety must be clearly identified so that their ultimate disposition can be tracked, evaluated, and recorded for further followup action if needed. In the past, nuclear facilities and sites were abandoned or decommissioned without adequate documentation of their radiological status or even a record of their existence. Consequently, DOE, NRC, DOD, and EPA are conducting programs to locate and evaluate the hazards of old sites and facilities. Based on the difficulty involved in identifying these sites, we believe that the agencies are making reasonable progress. However, it must be recognized that no matter how much effort and resources are devoted to these programs, there can be no complete assurance that all sites and facilities will be found. The important point is that these costly and time-consuming programs can be avoided in the future by establishing adequate recordkeeping systems.

In this respect, DOE has recently revised its recordkeeping procedures, and it believes the revised system will provide better documentation of the facility disposition status in the future. However, NRC's, DOD's, and Agreement States' recordkeeping systems remain inadequate since they do not ensure that permanent and adequate information is maintained on the radiological status of nuclear facilities. As a result, the problems that these Federal agencies currently are experiencing in attempting to identify nuclear facility locations and determine the radiological status of those facilities will most likely continue to exist in the future.

ADEQUATE RECORDS NOT MAINTAINED ON ABANDONED OR TERMINATED SITES AND FACILITIES

In the past, DOE, NRC, Agreement States, and DOD have not maintained adequate records on the location, condition, and status of abandoned or terminated radioactively contaminated sites and facilities, and even when records were accumulated, some have since been destroyed in accordance with records management practices. As a result, these agencies have had to perform costly and time-consuming studies to locate these facilities and, as necessary, clean them up. Although we believe the agencies' efforts are commendable, it may be impossible to identify all such sites and facilities.

DOE efforts hampered by lack of records

Since World War II, many sites and facilities where radioactive materials were used, stored, or discarded have been abandoned or released for unrestricted use. Many of the sites were part of the nuclear weapons program conducted by the Manhattan Engineer District and its successor, the Atomic Energy Commission. In most cases, a permanent record of their existence, the type and amount of remaining radioactive contamination, and any constraints on future use were not maintained. Other sites contained piles of uranium mill tailings left over from closed-down mills which separated uranium from its ore for use in the defense program. These tailings, which were not then considered hazardous, were often hauled off-site and used as fill materials in construction and for leveling open land. Accurate records were not maintained of the material removed or where it was placed.

Subsequently, radiation exposure standards became more stringent. As a result, two programs--the Formerly Utilized Sites Program and the Mill Tailings Program--were established to reevaluate the safety of these old sites and facilities, using current radiation exposure standards.

DOE initiated the Formerly Utilized Sites Program in 1974 to determine the location of the sites and facilities of the old Manhattan Engineer District/Atomic Energy Commission. Changes in ownership and land use, however, and the absence of licensing procedures prior to 1955 have made locating the sites and facilities difficult. In addition, documentation relating to both site operations and decontamination activities had been retired to Federal records-storage centers. In many instances, these records were either destroyed, in accordance with Government records management practices or, when available, were found to be incomplete. This often made it impossible to determine final radiological conditions of the sites and facilities.

Consequently, in the past 8 years, DOE has spent $7 million attempting to identify old potentially hazardous sites and facilities. DOE officials interviewed current and former site owners and former employees of the early nuclear weapons program, visited sites and facilities, and made radiological surveys to identify and evaluate the old sites and facilities. As of May 1981, a total of about 130 sites had been identified and studied, 35 of which appeared to require some form of remedial action. However, DOE has no assurance that it has located all of the old facilities and sites; therefore, additional sites may be designated for remedial action at a later date.

The lack of records has also hampered DOE efforts to determine its authority to clean up the old sites and facilities.

In many cases, insufficient contractual, property, or other historical records prevented clear determinations of the extent of Government involvement in, and implied remedial action authority over, the sites. DOE identified 15 sites where it has sufficient authority to proceed with remedial action, but believes specific legislative authority will be required for it to proceed with remedial cleanup measures on the remaining 20 sites. According to DOE, the Congress, in the fiscal year 1978 DOE Authorization Act, expressed its intent that DOE seek additional legislative authority as necessary to clean up the sites. DOE drafted legislation to gain the necessary authority. But according to an Office of Management and Budget official, since the legislation did not support the administration's budgetary program, the Office did not forward it to the Congress for consideration. This official also said that if DOE still believed the authority was needed, it would have to resubmit the legislation during the next session of Congress.

A second major DOE remedial action effort, the Mill Tailings Program, was established by the Uranium Mill Tailings Radiation Control Act of 1978. The problem created by lack of records here differs from the prior program in that the old mill tailings sites were, in most cases, large and easy to locate and there are fewer of them. However, records were not available to show where tailings were removed from processing sites to vicinity properties for construction or landfill. Removal of tailings was not controlled and no records were maintained since the mill tailings were not considered to be hazardous. As a result, DOE had to conduct an extensive search to obtain that information. According to DOE officials, they have spent about $6.2 million since the program started 6 years ago trying to locate and characterize the radiological conditions at inactive uranium mills and associated vicinity properties.

NRC records inadequate to evaluate terminated licenses

NRC is facing similar problems in attempting to determine the adequacy of cleanup actions taken by thousands of licensees whose licenses to use nuclear materials terminated prior to 1965. NRC is reviewing the old license files for evidence showing whether the facilities were properly cleaned so it can follow up on those facilities where cleanup does not meet current standards for unrestricted use. This review, initially planned to be completed in 1 year, has been underway for over 3 years, is not complete, and has already cost $554,000.

NRC's review has been hampered because of its inadequate records control system. The system does not allow NRC to locate all files, and the files located were, in many cases, incomplete and unclear, and did not contain evidence of cleanup action taken. Weaknesses identified in the files included the following:

--Lack of radiological surveys and other pertinent data.

--Unclear disposition of material.

--Ambiguous site identification.

--Incomplete files.

As a result, the study has been delayed, study costs have increased, and no assurance exists that all facilities needing further cleanup have been identified.

NRC's review included about 16,000 nuclear material license files. Approximately 600 of these licenses were identified as having inadequate cleanup documentation. NRC, with the assistance of 13 Agreement States, is currently conducting followup reviews on 250 of the 600 questionable licenses to determine if the sites were properly cleaned up. However, NRC has not initiated followup work on the remaining 350 licenses identified as having inadequate cleanup documentation. Concerning the 250 licenses where work has begun, NRC regional offices have completed work on some of the licenses for which they are responsible, but results have not been summarized and the overall status of the review is unknown. NRC also requested the Agreement States to follow up on the licenses for which they are responsible and report the results by August 22, 1980. The States did not meet that date and the information was still not available 1 year later. NRC plans to continue this effort until all 600 licenses have been reviewed for potential problems.

DOD records on old facilities inadequate or nonexistent

DOD has also had to conduct searches to locate old contaminated facilities because it lacked the appropriate records. The problems created by the lack of adequate records is exemplified by an Army program which is trying to identify old sites that may be radioactively contaminated. An Army official said that when some radioactive operations were shut down, all the records were destroyed. Consequently, the Army has asked its installations where operations took place to determine if contamination is present. The Army has already identified 3 contaminated sites, and about 17 others are being assessed for potential contamination. A survey--which typically costs about $200,000--will be performed at those sites suspected of being contaminated.

The Navy has set up a similar program for identifying radioactively contaminated sites. The Navy has identified four contaminated radium facilities for which no records exist and another contaminated site which was used for radioactive isotope separation.

CURRENT AGENCY RECORDKEEPING PROCEDURES INADEQUATE TO PREVENT RECURRENCE OF PAST PROBLEMS

In spite of the problems that inadequate recordkeeping systems have caused Federal agencies in the past, only one agency, DOE, is revising its current recordkeeping system to provide sufficient information on the location and radiological condition of its nuclear facilities and sites.

NRC, DOD, and Agreement States recordkeeping systems still need substantial improvement if past problems are to be avoided in the future. Permanent records need to be maintained which specifically identify all facilities or sites where radioactive materials were used, stored, or discarded; describe the operations and materials used; and document the radiological conditions existing after operations ceased or decommissioning activities were completed. By maintaining this type of information, if the radiological standards and criteria were to be revised, Federal agencies would be better able to assess the adequacy of cleanup activities at these facilities without incurring the additional time and expense of conducting detailed studies.

DOE-planned documentation system meets key needs

DOE's planned system for documenting radioactive facilities and sites provides all the key elements needed to prevent the recurrence of past problems--particularly as it relates to facilities and sites cleaned up for unrestricted use. For situations where the use of the facility or site is still restricted after cleanup, however, additional documentation may be needed to prevent potential misuse of sites which could endanger public health and safety.

The plans for the Formerly Utilized Sites, Surplus Facilities, and Mill Tailings Programs all require preparation of a final report, documenting the decommissioning activities undertaken, and the radiological condition of the sites on completion. In the case of a surplus facility, for example, the report includes such information as the location of the facility, the decommissioning method used, and the radioactive release levels achieved. Reports prepared for facilities and sites decommissioned under each of the programs are to be forwarded to the Remedial Actions Program Information Center, located at DOE's Oak Ridge National Laboratory in Tennessee. An official at the center told us that the final decommissioning reports will be permanently stored at the center.

The above actions should meet any future needs for re-evaluating facilities and sites cleaned up to standards permitting unrestricted use. These actions, however, may not be

adequate when cleanup was only sufficient to allow restricted use of the site. For example, certain radioactive materials, such as uranium mill tailings, may be disposed by stabilization in place with appropriate coverings of earth or other material. According to a DOE official, the public's health and safety would be adequately protected by this means, and the site could even be used for open-space activities, such as parks, with no adverse effects. However, construction of buildings over the site or disturbance of the tailings cover could cause potentially hazardous conditions. Thus, use of the site would have to be restricted.

In our opinion, recording restricted-use designations in local land records would help prevent misuse of such sites. Recording at the local level would be particularly important when (1) the facility or site is not located on a controlled-access Federal or State site or reservation and (2) the facility or site has only been decommissioned to a point which requires a restricted-use designation. In this respect, DOE has prepared a draft order for comment which according to DOE, requires that all remedial actions be recorded in local land records.

Also, Section 104(d) of the Uranium Mill Tailings Radiation Control Act directs the Secretary of Energy to issue rules or regulations requiring the State(s) to record in local land records the residual radioactive materials located at any processing site and provide notice of the nature and extent of these materials removed from the site. According to a DOE contractor official, this type of action is needed to prevent misuse of such sites. He indicated that restricted-use properties would be most appropriately identified by placing deed restrictions on the land, describing what kind and how much contamination remained, and what uses were precluded. He also stated that deed records or restrictions are about as permanent as can be attained, and would be available at the local level, where land-use decisions are made.

Another DOE contractor official assigned to the Surplus Facilities Program suggested that the locations of decommissioned surplus facilities be recorded on county maps and deeds to assure the permanent existence of a record on these facilities at the local level. He said that, as an example, after a surplus facility has been decommissioned at DOE's Hanford site, the facility location is recorded on county maps.

Although local level recording is required for the Mill Tailings Program and has apparently been used at Hanford, it is not being required in other DOE programs or by NRC and DOD. However, DOE is preparing a draft order which would require local level recording for remedial actions.

NRC does not adequately document status of decommissioned and inactive facilities

NRC policy requires that public health and safety be protected, not only during the term of a license, but also following termination. NRC procedures, however, do not assure that permanent and adequate records are maintained on decommissioned facilities. Further, NRC lacks a reliable system for identifying, controlling, and reporting on the status of facilities which are inactive but have not yet been cleaned up and decommissioned.

Records are neither adequate nor permanent

NRC's review of files on licenses terminated prior to 1965 showed that records on decommissioning actions were often inadequate. Our review of files for licenses terminated since 1965 indicates such problems still exist. For example, we noted the following problems in NRC's Materials Licensing Branch records:

--Terminated files did not always show whether termination resulted from decommissioning or if the licensed material was transferred to another license.

--Files did not contain explicit justification for termination.

--One license covering three locations was terminated. Of the three sites, the file contained explicit documentation for only one site. These sites were subsequently released for unrestricted use.

NRC's records control system also has weaknesses. Specifically, NRC needs additional control over files on terminated licenses. NRC officials could not provide us complete inventories of either decommissioned sites or terminated licenses. In addition, they could not readily locate some files. For example, in mid-July 1981, we requested information on 20 reactor operating license terminations. NRC was unable to locate certain documents and had not provided us any of the requested data by the time we completed our audit work at the end of August 1981.

NRC officials also had not transferred to Agreement States all the pertinent information showing the status of sites within the Agreement States' boundaries. In at least one case, a State agency discovered that an unlicensed, contaminated site had been federally licensed. Under the Agreement States Program the State should have been notified of the transfer in 1963. However, the State was not made aware of the transfer until an inquiry was made in 1980--17 years later.

In addition to inadequacies in its terminated license records, NRC does not require their permanent retention. NRC officials told us that records have been kept as a matter of practice, but how long or how strictly this informal practice has been followed is unknown. NRC now plans to adopt a formal records retention policy; however, this policy will permit the destruction of records after 10 or 20 years for most facilities. As a result, NRC may face the same problems in the future as it, DOE, and DOD are facing now in following up on previously decommissioned facilities.

In our opinion, NRC needs to develop an overall policy on documentation to correct weaknesses in its records system for terminated licenses. The policy should require that necessary records are developed and maintained, controls are established over them, and key data on decommissioned facilities are retained permanently in a central location.

Controls are needed over inactive facilities

NRC also does not have adequate controls over inactive, licensed facilities which have not been cleaned up and decommissioned. The agency permits nuclear materials licensees to stop operations and still retain possession of radioactive materials. In this situation, NRC issues a "possession only" license and the licensee, because its license is not terminated, is not required to clean up the facility.

Unless properly monitored and controlled, these situations can result in health, safety, regulatory, and economic problems. Thus, NRC or the Agreement State needs to know the conditions when operations cease and must be assured that the licensee maintains control over the facility pending cleanup and decommissioning.

NRC regulations and guidelines specifically require licensees to notify NRC when operations are permanently discontinued. These requirements, however, have not been totally effective. For example, while NRC officials were able to provide a list of licensed contaminated reactor sites which had discontinued operations, they were unable to provide a similar listing covering inactive material licenses. Furthermore, NRC lacks a comprehensive system for identifying, controlling, and reporting on inactive sites which have cleanup problems. NRC could not even provide us a comprehensive report on inactive problem sites. As a result of this lack of information and effective regulatory control, problems have developed at some of the inactive sites. For example:

--A site at West Chicago, Illinois, is licensed by NRC for possession of radioactive material. Although

production at this site ended in 1973, the site still contains tailings and facilities from past thorium operations. Because the tailings were not controlled, contamination has been allowed to migrate off-site.

--NRC licensed a Tennessee Valley Authority uranium mill at Edgemont, South Dakota. This mill last operated in 1974. Uranium tailings from the mill were not stabilized, which has resulted in contamination being dispersed offsite. Surveys conducted through April 1981 showed excessive radiation levels at 71 structures and 7 vacant lots.

--NRC and the State of Illinois both licensed a watch dial facility in Ottawa, Illinois. Dual licenses existed because the State licensed radium and NRC licensed tritium used at the facility. The company went out of business, leaving a badly contaminated site. State officials are concerned about public access to the site and are pursuing legal efforts to force cleanup.

NRC also does not require Agreement States to report cleanup problem case inventories. Consequently, while Agreement States maintain information on problem cases for their current licensed activities, they do not prepare inventories of problem cases for terminated licenses.

DOD recordkeeping does not meet needs

DOD also does not have an effective recordkeeping system for its nuclear activities. Neither DOD nor its three services (Air Force, Army, and Navy) maintain a permanent records system which (1) identifies all facilities and sites where radioactive materials are or have been used, (2) describes the nature of operations, and (3) specifies the radiological conditions of cleaned-up facilities and sites.

In DOD, responsibility for maintaining records on radioactive sites, facilities, and operations belongs to the respective military base at which the nuclear work is being conducted. DOD has not issued any guidance on records maintenance, nor has it or any of the services developed a central recordkeeping system. As a result, not only is incomplete and inconsistent information being maintained by each service, but there is also no central location with information available specifying the location and radiological status for all of DOD's facilities.

Within each service, several units are responsible for controlling and maintaining the records on NRC-licensed materials and activities. As a result, DOD's records are not centralized, but are at several different locations, which makes it difficult to identify every DOD nuclear facility and activity. In fact, one responsible NRC official told us that NRC is not even aware of the total extent of DOD's nuclear activities.

A similar situation exists for DOD nuclear materials and activities which are exempt from NRC licensing. Once again, among and within the services, several units are responsible for controlling and maintaining the records of DOD materials and activities. Furthermore, DOD has not established a policy which specifies the type of information to be included in the records or the length of time they should be maintained. As a result, DOD's records are fragmented and inconsistent, and fall short of providing sufficient information on the status of DOD's nuclear materials and activities.

CHAPTER 3

BETTER PLANNING NEEDED TO FACILITATE THE DECOMMISSIONING OF NUCLEAR FACILITIES

Federal decommissioning programs in the past have not sufficiently considered and incorporated decommissioning needs during the facility planning and design phase. However, both DOE and NRC are in the process of formulating programs which will provide some of the necessary requirements. DOE has issued a draft order which contains requirements for design features to enhance the decommissioning process. NRC is developing a comprehensive decommissioning policy. Neither agency has yet finalized its efforts, and therefore, each is subject to change. DOD has not initiated any action directed toward developing a comprehensive decommissioning policy.

While the programs being developed at DOE and NRC include some of the essential elements, it is imperative that as a minimum, the finalized programs at DOE and NRC, and any DOD actions, emphasize that

- --a tentative decommissioning method be determined during the facility planning phase so that design features can be incorporated to expedite and simplify decommissioning and waste disposal needs and

- --a mechanism, based on the tentative decommissioning method selected, is in place that will ensure sufficient money is available to decommission the facility at the end of its useful life.

The lack of emphasis on such planning considerations has and will continue to increase decommissioning costs, delay the decommissioning of facilities, and result in excessive costs to Federal and State agencies. Furthermore, early determination of tentative decommissioning methods aid in planning for future waste disposal needs.

EFFECTIVE DECOMMISSIONING REQUIRES TENTATIVE SELECTION OF THE CLEANUP METHOD DURING FACILITY PLANNING

Selection of a tentative decommissioning method, as early as possible, is important if the owner of the facility, as well as Federal regulators, are to effectively plan for decommissioning. Early determination of the method will allow the facility to be designed to facilitate decommissioning, thus expediting the decommissioning process and reducing cleanup costs. Early

selection will also enable DOE, DOD, NRC, and Agreement States to better estimate and plan for waste disposal requirements. Despite these benefits, Federal agencies, in the past, have not emphasized the selection of a tentative decommissioning method during the facility planning phase. As a result, nuclear facilities have been planned and designed without eventual decommissioning needs in mind. Consequently, when the time comes to decommission these facilities, the decommissioning costs, as well as the time required for and the waste generated by decommissioning activities will be greater than they need to be.

NRC guidance provides three methods for reactor decommissioning. They are:

--Mothballing. The facility is put into protective storage. It is left intact, except that fuel assemblies, radioactive fluids, and waste are removed from the site. 1/

--Dismantling. The facility is taken apart to remove contaminated material for disposal at a waste disposal site. This may not require complete removal of the facility.

--Entombment. The facility is encased in a long-lived material such as concrete.

The cost of decommissioning and the quantities of waste generated by decommissioning activities will vary, depending upon the decommissioning method used. For example, the table on the following page shows NRC's estimates of the cost and low-level radioactive waste volumes associated with decommissioning a large commercial power reactor using each of the three decommissioning methods.

Regardless of the decommissioning method used, it is important that the method be selected early in the facility-planning process. By doing so, engineers can incorporate features in facility design which will facilitate decommissioning and reduce cleanup costs. For example, facilities can be located away from populated areas and situated so that natural topographical features assist in preventing dispersion of radioactive material instead of contributing to it. Buildings can be designed to include such things as slanted floors to assist in wash-downs; removable roof and wall panels to assist in dismantlement; liners on floors, ceilings, and walls which can be removed without dismantling the entire structure; construction materials which will not form undesirable isotopes when bombarded

---

1/Mothballing is only temporary and must be followed by complete dismantlement at the end of a specified period.

with radiation; and surface polishing to remove imperfections which would trap radioactive contaminants. These features often not only aid in decommissioning, but they also result in easier and less costly facility operation and maintenance.

Decommissioning method	Cost (note a) (millions, 1978 dollars)	Volume of waste (note a) (cubic meters)
Mothballing with subsequent dismantlement after 30 years	$42.8 - $58.9	17,900 - 18,900
Entombment	b/21.0 - 35.0	c/1,740 - 8,046
Dismantling	33.3 - 43.6	17,900 - 18,900

a/First figure is for a pressurized water reactor. Second is for a boiling water reactor.

b/Does not include estimated annual maintenance and surveillance costs of $40,000.

c/Does not include volume of entombing structure or of wastes inside. Entombed structure in effect becomes a new radioactive-waste burial ground.

Source: U.S. Nuclear Regulatory Commission

Early determination of the decommissioning method will also aid in estimating future waste volumes so that adequate disposal capacity will be available when needed. As shown in the table above, the volume of waste generated by decommissioning will vary depending on the cleanup method used. Since Federal agencies are uncertain about what decommissioning method will be used, they have not been able to estimate the future volumes of waste and when these wastes will be generated. The short-term impact of this situation is that reliable estimates of waste disposal site capacity needs cannot be made, and appropriate planning for waste disposal sites cannot be done. The potential long-term impact could be that waste disposal site capacity may not be available when needed--particularly for waste from commercial decommissioning activities.

Federal agencies currently do not require or specify the selection of a tentative decommissioning method early in the facility-planning phase. NRC and DOD do not require that features be incorporated in the facility design that would facilitate the eventual cleanup of the site. For example, NRC leaves the selection of methods up to the licensees and does not require the selection to be made before the end of a facility's

useful life. On the other hand, while DOD has never required that design of its nuclear facilities include features specifically intended to facilitate decommissioning, the compactness of the reactors in nuclear ships, and the access provisions for refueling greatly simplify their decommissioning.

In recognition of the significance that early planning for decommissioning has, NRC is developing a proposed policy that would require licensees to consider decommissioning needs at the time facilities are planned and designed. Although this proposed policy represents a step in the right direction, it is somewhat limited because Federal standards do not exist which specify how clean a facility or site must be before a license can be terminated. Without these standards, it is difficult for Federal agencies to provide specific guidance on the optimum decommissioning methods that should be used. For additional information on the problems caused by the lack of decommissioning standards, see chapter 4.

Although standards do not exist, we believe more could be done to guide decommissioning planning at the time nuclear facilities are designed and constructed. Without such planning, too many benefits will be lost and too many disadvantages will be incurred.

EFFECTIVE DECOMMISSIONING REQUIRES RELIABLE FUNDING SOURCES

Decommissioning nuclear facilities can be very costly. Whether they are owned by DOD, DOE, or NRC licensees, the cost must be paid in the interest of public health and safety. The costs of decommissioning Federal facilities are paid from funds appropriated to the agencies by the Congress. Each NRC licensee is responsible for paying the costs of decommissioning its own facilities.

DOE and NRC in the past have experienced problems in attempting to decommission facilities for which they have responsibility because funds were not always available to complete decommissioning activities. Specifically:

--NRC procedures have not ensured that licensees pay for decommissioning costs. In some instances, the Federal Government has had to pay these costs because the owner of those facilities lacked the resources to clean them up.

--Federal procedures have not ensured that adequate funds are available when needed to decommission old, inactive DOE facilities. As a result, some facilities have not been decommissioned, creating potential health and safety problems to the public, and site cleanup costs have increased.

As discussed more fully below, we believe that NRC and DOE need additional assurances and guarantees that funds will be available to sufficiently complete cleanup activities when the time comes to decommission nuclear facilities and sites.

NRC procedures need to ensure that licensees pay for decommissioning costs

NRC's current policy is to let licensees independently plan for decommissioning, including estimating the costs and providing limited assurances that funds will be available when needed. With few exceptions, NRC does not require that licensees guarantee that they will pay the decommissioning costs of their facilities after operations cease. For example, in the case of utilities with power reactors, NRC periodically reviews their financial condition to evaluate whether the utilities can obtain decommissioning funds. NRC believes the demonstration of financial soundness is sufficient because utilities routinely spend much larger amounts on refueling and plant construction than is required to decommission a power reactor.

Many facilities have been decommissioned without incident. Other facilities, however, have not been decommissioned when the licensees went out of business. For example, a company in Tennessee defaulted without decommissioning its facility, requiring the State to do it at a cost of about $1 million. In another instance, a nuclear fuel reprocessing plant in West Valley, New York, was not decommissioned by a licensee. According to DOE, neither the State nor the NRC required the operator to clean it up. Consequently, the State and the Federal Government are now forced to decommission the site at a cost ranging from $41.6 million to $1.1 billion, depending upon the decommissioning method selected.

When a licensee in Oak Ridge, Tennessee, barely had sufficient funds to complete decommissioning of a fuel facility before going out of business in 1980, NRC was finally prompted to require more assurances of financial ability to pay for decommissioning. NRC wrote special license conditions for uranium fuel licensees, requiring them to submit decommissioning plans, cost estimates, and provisions for necessary funds. Similar conditions were imposed on uranium mill operators and spent fuel storage installations operators, and a draft rule exists which would require this condition for low-level waste disposal sites. However, other nuclear facility licensees will not be required to comply with these requirements until a decommissioning policy is adopted by NRC.

A proposed decommissioning policy is expected to be finalized and effective in late 1983 and will no longer allow unsecured decommissioning funding assurances. Instead, the

policy will require current and future licensees to demonstrate they have realistically estimated decommissioning costs and have made arrangements to provide secured funding. Two options are available to provide the funding. The first requires licensees to arrange payment by third parties (e.g., insurers, bonding companies, lending institutions) in the event the licensees cannot decommission the facilities. The second is for the licensee to prepay the decommissioning costs either before start of operation or by installment payments to a dedicated fund segregated from company control. NRC feels the installment method is less secure than initial prepayment because it is geared toward accumulating the necessary funds by the end of the facilities' planned life and premature shutdown of facilities could result in deficient funding. NRC feels this fault can be overcome by requiring decreasing insurance or bonding for the unfunded decommissioning costs.

The issuance of this policy has been significantly delayed. It was originally scheduled for issuance in December 1979. This delay, according to the Decommissioning Program Manager, has been due largely to the need to complete decommissioning studies and the press of higher priority work--such as the need to divert staff to accelerate the licensing of nuclear power plants. He said that a paper is currently being drafted for submission to the Commissioners in December 1982. He also said that it is unlikely that this timetable could be accelerated.

Federal procedures need to ensure that funds will be available to decommission surplus facilities

Availability of funding for decommissioning Federal nuclear facilities has been mixed. On the one hand, DOE has experienced difficulty obtaining funds needed to meet its remedial action program requirements. On the other hand, DOD has usually been able to obtain decommissioning funds when needed. Neither DOE nor DOD, however, advise the Congress of expected future decommissioning costs when they request authorization to build nuclear facilities.

DOE regulations do not require that the costs to decommission facilities be determined prior to asking the Congress to authorize the project or during project design. DOE officials acknowledged that it would be beneficial to the Congress if such estimates were available at the time of facility authorization because the Congress would be aware of future decommissioning funding needs. However, these officials did not believe it was practical to determine the specific decommissioning costs for facilities during their design phase or during their early years of operation. They said that at the early stage, estimating decommissioning costs is difficult because the costs will vary

depending on the manner in which the facility is operated and the type of radioactive material that must be handled. In addition, these officials expressed concern that if preliminary decommissioning costs were estimated early in the planning phase for facilities, the Congress may try to hold DOE to that amount when it is time to decommission the facilities. These officials believe it would be better to require that a study be completed shortly before the end of a project's operating life. The study would identify, among other things, the costs associated with decommissioning the facility.

Aside from the lack of funds, DOE officials say that inconsistent funding from one year to the next is the next biggest problem in decommissioning its surplus facilities. Nearly every DOE and contractor official we talked to told us that with the current funding inconsistencies, it is not possible to maintain a staffing continuity from one decommissioning project to the next, unless the project is authorized on a multi-year basis. This problem often results in higher decommissioning costs for the smaller decommissioning projects which depend on annual appropriations.

Annual appropriations have been below the amounts needed to decommission surplus facilities, and this trend is expected to continue. For example, for fiscal year 1982, Surplus Facilities Program officials requested a budget of about $53.4 million to carry out the minimum level of work necessary to meet its decommissioning objectives by the year 2000. The authorized appropriation, however, is expected to be somewhere between about $15.8 million and $22 million.

A significant effect of the reduced funding level is the need to allocate funds away from actual decommissioning activities and direct them toward surveillance and maintenance activities. The first funding priority of the Surplus Facilities Program is to assure that surplus facilities are maintained in a safe manner to prevent exposing the public to hazardous material. However, by postponing decommissioning activities, the sources of the potential health and safety hazards will continue to exist.

To illustrate this situation, if the Surplus Facilities Program does not receive sufficient funding for fiscal year 1982, DOE will be forced to stop its cleanup efforts at two of its highest priority offsite decommissioning projects. These two projects, located at Niagara Falls, New York, and Weldon Spring, Missouri, represent potential health and safety hazards to the public. In fact, at the Niagara Falls site radioactive material has already migrated off site. DOE officials told us that they started decommissioning work at Niagara Falls in fiscal year 1981, but unless sufficient program funds are made available in fiscal year 1982 and subsequent years, work would have to be stopped and available funds

used to provide site surveillance and maintenance. Continuation of this situation over time results in increased cleanup costs and raises the potential for site contamination, which could adversely affect public health and safety.

CHAPTER 4

RADIATION STANDARDS NEEDED TO GUIDE DECOMMISSIONING PROGRAMS

Standards prescribing acceptable levels of radioactivity for decommissioning nuclear facilities are necessary to identify the decommissioning methods, guide cleanup efforts, determine cleanup costs, identify the amount of radioactive waste to be disposed, and protect the public from unacceptable risks. Such standards, however, are not yet available.

EPA is responsible for setting these standards, but with minor exceptions has not done so because it considers their development a low priority. As a result, some Federal decommissioning programs have been delayed. In other cases, NRC licensees, DOE, and DOD have used interim guidelines provided by EPA, NRC, and others to develop site-specific decommissioning standards negotiated on a case-by-case basis. In these cases, agencies are concerned that it may be necessary to do additional cleanup if final EPA standards are more stringent than those used for a specific facility. Conversely, if EPA's standards are less stringent, then unnecessary cleanup will have been done and excessive costs will have been incurred.

RADIATION STANDARDS FOR DECOMMISSIONING NOT DEVELOPED

Although EPA has been responsible since 1970 for establishing radiation standards for all aspects of decommissioning, including acceptable levels of residual contamination, low- and high-level wastes and mill tailings cleanup and disposal, it has not done so. It now plans to have mill tailings standards in place by 1983, and high-level waste disposal standards in 1984, thus freeing up resources to start developing standards for decommissioning nuclear facilities at that time. As discussed below, issuance of these standards are critical to Federal and commercial decommissioning efforts. However, the Director of Criteria and Standards at EPA said it would take about 2-1/2 years or until about mid-1986 before the standards would be finalized.

There are many sites and facilities throughout the United States which are or will become contaminated with varying amounts and different types of radioactive material. Before rational decisions on decommissioning these sites and facilities can be made, standards must be available to judge

--whether cleanup is needed,

--the cleanup methods to be used,

--the amount of cleanup that needs to be done,

--the amount of radioactive waste that will result,

--the time frames needed to complete cleanup,

--the costs of doing the cleanup, and

--the purposes for which the cleaned-up sites and facilities can be used in the future.

Prior to 1970, responsibility for setting radiation standards was unclear. Various organizations developed standards for radiation exposure including the International Commission on Radiological Units, the International Commission on Radiological Protection, the National Council on Radiation Protection and Measurements, the American National Standards Institute, the Federal Radiation Council, and the Atomic Energy Commission. Even though the standards developed by these organizations specified maximum radiation exposure rates for humans, confusion existed as to which standards were the most authoritative. In the absence of a consensus on definitive standards, the Atomic Energy Commission in the 1960s developed written criteria specifying acceptable levels of residual surface radiation for release of decommissioned sites and facilities.

In 1970, Reorganization Plan Number 3 created EPA. Among the functions assigned to EPA was the responsibility for establishing radiation standards to protect the general public and to provide guidance for Federal agencies. Accordingly, NRC, DOE, and other Federal agencies were required to implement, comply with, and enforce EPA's radiation standards.

EPA has prescribed standards for radioactive contamination of drinking water and exposures to the general population from all types of nuclear activities. However, EPA has not finalized standards for (1) inactive and active mill tailings, (2) decommissioning nuclear facilities, and (3) low- and high-level waste disposal. These standards are essential to plan decommissioning.

EPA was legislatively mandated to provide standards for inactive and active mill tailings by 1979 and 1980, respectively. According to an EPA official, these deadlines were not met due to the complexity of the issues and the need for multiple external reviews. EPA staff estimates final standards will be issued for both in 1983.

Standards for decommissioning nuclear facilities, which establish permissible levels of residual radioactivity emanating from contaminated soils and on surfaces of buildings and equipment, have long been needed to guide decommissioning planning and decisions.

EPA has no legislatively mandated timetable to complete these standards and considers their development a low-priority item. In fact, as previously mentioned, EPA does not plan on initiating action on these standards until 1984, then another 2-1/2 years will be needed to finalize the standards.

LACK OF STANDARDS DELAYS DECOMMISSIONING EFFORTS, INCREASES COSTS, AND AFFECTS WASTE DISPOSAL

The lack of radiation standards has delayed decommissioning efforts, may increase decommissioning costs, and has prevented the determination of disposal capacity needs for radioactive waste from decommissioning activities. In addition, when final standards are issued, there is concern that it may be necessary to do additional decommissioning work at those sites and facilities which were cleaned up using negotiated standards developed on a case-by-case basis.

Decommissioning efforts delayed

DOE officials told us that delays by EPA in establishing radiation standards will result in corresponding delays in accomplishing decommissioning activities. For example, DOE planned to begin decommissioning the first of 25 mill tailing sites in 1984 if EPA had issued its final disposal standards for mill tailings by the end of 1981. DOE cannot start this work without these standards, and DOE officials have stated that for every year EPA delays setting standards after 1981, the decommissioning activities will be delayed correspondingly.

Although EPA has issued "interim" standards for mill tailings which will permit the cleanup of land and buildings in the vicinity of the mill tailings piles (which pose a threat to the public health and safety), EPA has not issued any final standards for mill tailings processing sites. EPA has proposed disposal standards, but they are not scheduled to become final until sometime in 1983. Therefore, permanent decommissioning of 25 million tons of mill tailings will be delayed because without final disposal standards, neither DOE nor anyone responsible for cleaning up the tailings can prepare the required environmental impact statements or decide the type and amount of cleanup needed.

A similar situation faces DOE in carrying out its Formerly Utilized Sites Program and Surplus Facilities Program. In February 1981, for example, the DOE Oak Ridge Operations Office reported that disposal of radioactive material from the Formerly Utilized Sites Program will most certainly be subject to EPA's final disposal standards for uranium mill tailings except on DOE sites. Without these standards, DOE cannot be certain how much cleanup will be required. Thus, although DOE has initiated

cleanup for some formerly utilized sites and contaminated vicinity properties using self-developed standards, final disposal of the material (unless it is made on DOE sites), cannot begin until EPA establishes final disposal standards sometime in 1983.

DOE Surplus Facilities Program officials told us that EPA standards prescribing allowable residual radiation in soil and concrete are needed if surplus facilities located off DOE sites are to be cleaned up for unrestricted release. Although some progress has been made without these standards, DOE has been reluctant to decommission surplus facilities for unrestricted release because either too much or too little radioactive material could be removed. Either way, an excessive expenditure of decommissioning funds could result.

NRC licensees may also face delays because EPA has not issued needed standards. In the absence of EPA standards for residual radioactivity levels (1) in soils, (2) on surfaces of equipment and buildings, and (3) in materials with induced radioactivity, NRC, in 1974, issued criteria prescribing acceptable surface contamination levels for the termination of operating licensees for nuclear reactors. NRC officials acknowledge, however, that the lack of EPA standards could delay cleaning up contaminated sites because of uncertainty over the extent of the hazard to public health and safety.

Lack of standards may increase decommissioning costs

The lack of EPA standards to guide cleanup efforts has caused Federal agencies to develop their own standards through negotiations with EPA, NRC, and affected States on a case-by-case basis so that some decommissioning activities can proceed. If final EPA standards are more stringent than the negotiated standards, additional cleanup will be required, probably at greater cost than would have been incurred if the total job had been completed the first time. If the EPA standards are less stringent, excessive costs will have been incurred because unnecessary work was done.

DOE has already taken some cleanup action at the Kellex and Middlesex formerly utilized sites in New Jersey. DOE took this action based on site-specific cleanup standards it developed using EPA's interim and proposed disposal standards. The State of New Jersey agreed to these site-specific standards.

The agreed upon site-specific standards for these two sites, however, are substantially relaxed from the EPA interim and proposed standards. For example, the site-specific standards for the Middlesex site are based on an average level of remaining radioactivity measured from samples taken in a 100-square-meter area. The EPA-proposed standards do not permit this averaging.

Instead, they require that a contaminated site be cleaned up so that no sample taken exceeds the specific standard. Although EPA was notified of the relaxed site-specific standards, it did not question or object to them. As a result, DOE does not know if it has done too much or too little cleanup at the Kellex and Middlesex sites.

The costs to decommission NRC-licensed facilities and DOE facilities could also increase because of the lack of EPA standards. The NRC-licensed facilities, for example, are decommissioned on a case-by-case basis using radiation release criteria tailored by NRC to each specific site. This could result, however, in either the need to further clean up facilities if EPA subsequently prescribes standards which are more stringent than NRC's criteria, or the incurrence of unnecessary costs if EPA's standards are less stringent. Both NRC and EPA officials unanimously agreed that if EPA's standards are more stringent than the criteria used by NRC, applying the standards to the already decommissioned facilities could be very costly.

Lack of standards prevents determination of waste capacity needs

As discussed in chapter 3, decommissioning activities will generate significant quantities of low-level waste, and the quantity generated varies with the decommissioning method used. The amount generated also will depend upon EPA's radiation standards. The more restrictive the standards, the greater the amount of waste. Consequently, without EPA's standards, NRC, DOE, and the States cannot determine how much waste there will be or effectively plan for the capacity needed for disposing of the waste.

DOE's efforts to decommission mill tailing sites and formerly utilized sites will generate about 25 million tons of waste. Most of this waste could be stabilized in place if the long-term durability requirements meet EPA or other appropriate disposal standards. If the standards cannot be met, the waste will have to be moved to disposal sites. The stringency of these standards not only affects the amount of waste but also the funds that will be needed to dispose of that waste.

For example, DOE estimates that if it must move 9 mill tailings piles to comply with EPA's currently proposed disposal standards, it would cost about $770 million in 1981 dollars. However, if the standards are relaxed somewhat, DOE would move only 1 tailings pile, stabilizing all of the others in place at a total cost of about $500 million in 1981 dollars--a savings of about $270 million. In addition, under the formerly utilized sites program, DOE believes that if it can stabilize just 7 landfill sites containing radioactive material similar to the tailing

piles, it could reduce remedial action costs by at least $100 million from the currently estimated cost of $373 million in 1980 dollars.

Continued failure to issue these standards makes it impossible for DOE to determine the disposal action required and present the Congress reliable cost estimates for disposing of this radioactive material.

Currently, there are only three sites in the United States where low-level waste from non-Federal facilities can be disposed of permanently. These sites, however, are either rapidly filling up or have been restricted in the quantity of low-level wastes that can be placed there.

Recent Federal legislation established a policy that (1) each State is responsible for providing the disposal capacity needed for the permanent disposal of non-Federal, low-level wastes generated within its boundaries and (2) such waste can be safely and efficiently managed on a regional basis. Even with the aid of this legislation, however, there are still problems facing the States in permanently disposing of low-level waste resulting from the decommissioning of NRC-licensed facilities. The amount of waste that will result from cleanup activities cannot be determined until EPA's standards are issued and disposal capacity studies have adequately considered low-level waste from decommissioning activities.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS, AND MATTERS FOR CONGRESSIONAL CONSIDERATION

CONCLUSIONS

Since thousands of facilities in the United States currently use nuclear materials, eventually they will have to be decommissioned when their useful lives cease. Decommissioning these facilities requires cleaning and disposing of all facilities, equipment, and materials that are radioactively contaminated. Such action is needed to protect the public from the potential hazards that radioactivity presents to their future health and safety.

In 1977, we found various weaknesses and inconsistencies in Federal agency decommissioning programs and concluded that a national policy or strategy was needed to provide for more effective decommissioning actions. During the past 4 years, Federal agencies have not done nearly enough to correct the problems we identified in our prior review. And, the United States still does not have a national policy or strategy for decommissioning nuclear facilities or sites. Record systems remain inadequate, decommissioning funding continues to be a problem, and advanced planning is insufficient. Unless a policy is developed which provides for consistent and effective decommissioning actions, we believe the impact will generate, at best, additional decommissioning costs to the Federal Government and the public, and, at worst, potential hazards to the public's health and safety.

Four Federal agencies--NRC, DOE, DOD, and EPA--currently operate programs for regulating and establishing standards for the decommissioning of nuclear facilities under their jurisdiction. Although each agency has made some improvements to its decommissioning program, we not only found weaknesses in each program, but we also found inconsistent approaches and requirements among all programs.

For example, despite a long existing need for reliable and accurate information, only one agency, DOE, has started to maintain the types of records that are needed. NRC's, DOD's, and Agreement States' recordkeeping systems are still inadequate. As a result, nuclear facilities and sites have been abandoned or decommissioned without adequate documentation of their radiological status or even of their existence. Without such records, the Federal Government has had to conduct costly studies to locate and evaluate the status of these sites and facilities.

Furthermore, the lack of records has hampered DOE's efforts to determine its authority to cleanup 20 old sites under its Formerly Utilized Sites Program. DOE believes it needs specific legislative authority to proceed with remedial cleanup of these sites. While the Congress has expressed its intent that DOE seek such authority, the Office of Management and Budget did not forward DOE's suggested authorizing legislation during the last session of Congress and says that DOE must resubmit its proposed legislation for the current session if it still believes it needs the authority.

To help avoid these problems in the future, we believe that NRC and DOD should revise their information systems and require that permanent records be maintained which (1) identify all facilities or sites where radioactive materials are or have in the past been used, stored, or discarded; (2) describe the operations and materials used; and (3) document the radiological conditions existing after operations ceased or decommissioning activities were completed. Without such a system, past problems will continue.

In addition, Federal programs in the past have not adequately considered and incorporated decommissioning needs at the time nuclear facilities are planned and designed. The lack of such planning considerations has and will continue to create additional decommissioning costs to Federal and State agencies. NRC and DOE have recently initiated action toward developing comprehensive decommissioning policies which would require this type of planning. These policies, however, have been delayed for several years and NRC expects it will require the remainder of 1982 to complete a paper on the proposed policy for submission to the Commissioners, with the final policy being issued in late 1983.

NRC officials do not believe this timetable can be accelerated. Nevertheless, we believe that development of decommissioning policies have already taken too long and should not be delayed further. Thus, we believe that NRC should reevaluate its timetable and determine whether preparation of the paper to the Commissioners can be accelerated, resulting in the early issuance of a final decommissioning policy.

The lack of a decommissioning policy for all nuclear facilities--not just those subject to NRC regulation--has led to poor planning which, in turn, has led to delays in obtaining adequate funding to cleanup and decommission old commercial and Federal facilities. For commercial facilities, Federal and State agencies have had to provide funds to decommission facilities and sites where licensees either abandoned them or did not have sufficient funds set aside to complete cleanup activities. These situations could have been avoided if NRC had required

that licensees assure adequate, secured funding for decommissioning costs when the facility was licensed. Until such a requirement is developed, similar problems will likely continue in the future.

Our 1977 report recommended such a requirement. At that time, NRC disagreed with our recommendation. However, since that time, NRC has changed its position and, as part of its proposed overall decommissioning policy, will likely require some form of secured funding for current and future licensees. This requirement, when implemented, should assure that adequate funding is available to cleanup and decommission commercial nuclear facilities.

Federal facilities face a similar problem, but the solution may be more difficult due primarily to present budget constraints and the difficulty of assuring adequate funding for Federal facilities which will not need cleanup and decommissioning for many years. The problem is twofold. First, a number of old Federal sites and facilities have been inactivated and need to be cleaned up now; yet, like some commercial facilities, they have not been cleaned up because of lack of funds. These include mill tailing piles and other sites located off Federal lands which represent a potential hazard to public health and safety. Because cleaning up and decommissioning these sites is a multi-year effort, funding must be appropriate to ensure that the entire effort is completed. Such funding continuity has not been provided and, as a result, overall cleanup costs have and will continue to increase, and the potential hazard to public health and safety will continue. Thus, recognizing current budget constraints, the Congress and DOE need to closely examine funding priorities to determine whether these funds can be provided from lower priority programs.

The second aspect of this funding problem centers on the need for a mechanism which will better ensure funding for future decommissioning activities. Unless such a mechanism can be developed, the funding problems facing current facilities will likely also face future decommissioning efforts. In our view, any solution should provide as much certainty as possible for funding these activities while, at the same time, recognizing the difficulty of estimating costs for decommissioning facilities well into the future.

Finally, Federal decommissioning programs are experiencing difficulties because of EPA's inability to establish final standards for decommissioning activities. Standards prescribing acceptable levels of radioactivity for decommissioning nuclear facilities are needed to identify decommissioning methods, guide cleanup efforts, determine cleanup costs, identify the amount of radioactive waste to be disposed, and protect the public from unacceptable health and safety risks.

EPA was given responsibility to develop the standards 11 years ago, but has not done so because it believes other work has higher priority. As a result, Federal decommissioning efforts have experienced delays in cleanup activities and excessive decommissioning costs have been or will be incurred if the final standards differ from the ad hoc standards being used. Moreover, the situation is not likely to change in the near future. As currently planned, EPA will not begin developing critical decommissioning standards until 1984 and barring unanticipated delays, will not publish final standards until at least mid-1986.

In our view, this time frame is too long. In addition, if past experience in developing standards for inactive and active mill tailings--which as currently projected by EPA will not be issued until 1983 (3 to 4 years after the legislatively mandated date)--is any indicator, further delays beyond 1986 in issuing surface contamination standards for the decommissioning of nuclear facilities can be anticipated. While we believe EPA should reevaluate the priority assigned to developing standards, we also recognize the current budget constraints being faced by EPA and the lack of resources to begin this work. Given these constraints, EPA's difficulties in issuing radiation standards in the past, and the importance of these standards to protecting public health and safety, the Congress, working with EPA, may want to explore ways to expedite this process.

With the accumulation of more and more nuclear facilities, the Federal approach for decommissioning them needs to be more unified and aggressive if the United States intends to effectively solve the decommissioning challenges it currently faces and those that await it in the future. The limitations of current Federal agency decommissioning programs identified in this report cause difficulties in locating facilities in need of decommissioning actions, make the costs to decommission facilities greater not only to licensees but also the public and the Federal Government, and result in greater amounts of waste generated during cleanup activities.

Although Federal agencies have made progress in developing decommissioning requirements, much more remains to be done. We continue to believe that a major step forward in developing aggressive and unified Federal and commercial decommissioning programs is the development of a consistent national policy to govern decommissioning activities and designation of a lead agency--such as NRC--to develop and monitor that policy. Until such time that the Federal Government designates a lead agency to establish and monitor implementation of a national policy or strategy, decommissioning efforts will most likely continue to be inconsistent and ineffective. More importantly, the lack of a national policy will increase the chances of hazards to the public's health and safety because of improper decommissioning and decontaminating actions at nuclear facilities.

In our view, designating NRC as the lead agency--as opposed to another agency (such as DOE)--makes sense for several reasons. First, NRC is an independent regulatory agency which has, as its basic responsibility, protection of public health and safety from commercial nuclear activities. This independence is a vital characteristic for assuring public confidence in the national policy that is developed and implemented. Second, NRC has had experience in conducting safety and/or licensing reviews of a number of DOE and DOD nuclear facilities and materials and thus is familiar with those activities. Finally, NRC is already developing a decommissioning policy for commercial licensees which should serve as a solid basis for a national policy. In this role, NRC should, in consultation with DOE and DOD

--establish national policy guidance governing documentation needed for permanent records on decommissioning activities, including the need for recording in local land records the status of uncontrolled, restricted-use sites and facilities which may otherwise be subject to misuse;

--establish criteria for selecting tentative decommissioning methods, including consideration of the differing needs of facilities on controlled Federal sites versus those located offsite; and

--provide guidance on design features which should be considered in facility planning to aid eventual decommissioning.

A national policy should also incorporate funding requirements for decommissioning commercial nuclear facilities as well as any mechanism established to better ensure funding for decommissioning Federal facilities as discussed more fully beginning on page 38.

Each Federal agency would still be responsible for establishing and implementing its own decommissioning program. However, these programs would be based on and consistent with the broad framework specified in the national policy. Such an approach would not only result in more effective decommissioning actions, but also aid in developing projections of future volumes of decommissioning wastes for use in determinining disposal/site capacity needs.

RECOMMENDATION TO THE CONGRESS

Our 1977 report recommended that the Congress designate one lead Federal agency--NRC--to approve and monitor an overall decommissioning policy or strategy. Over 4 years have passed and action has not been taken. This need still exists and can be expected to grow more acute as time passes and more facilities require decommissioning. Thus, we again recommend that

the Congress designate NRC as the lead Federal agency for developing and monitoring the implementation of a national policy for decommissioning of nuclear facilities and sites. The Congress should also ensure that DOE and DOD provide assistance and input to NRC in developing this policy. Pending such a designation by the Congress, we believe that each Federal agency responsible for handling or licensing radioactive materials and facilities should act to strengthen its decommissioning program as discussed below.

RECOMMENDATIONS TO THE CHAIRMAN, NUCLEAR REGULATORY COMMISSION

Pending any congressional action to designate a lead agency to develop a national decommissioning policy and strategy, NRC should make specific revisions to its program that would not only strengthen its decommissioning program but would also place it in a better position should the Congress decide to designate it as the lead agency for developing a national decommissioning policy. Thus, we recommend that the Chairman, Nuclear Regulatory Commission,

--revise NRC's recordkeeping system to provide for prompt identification of licensees who have stopped operations, effective monitoring of licensee control over contaminated facilities, assurance that facilities are cleaned up when licenses are terminated, and the development and permanent retention in a central repository of records documenting decommissioning activities and

--reevaluate and, if at all possible, accelerate NRC's timetable for issuing a decommissioning policy with a view toward shortening the time required to submit a paper to the Commissioners. Shortening the timetable would enable NRC to institute earlier front-end planning and funding requirements for decommissioning NRC-licensed facilities as a condition of licensing. The funding requirements should also be made applicable to currently active licensees.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

We recommend that the Secretary of Defense

--provide DOD-wide guidance on documentation needed to identify and monitor facilities using nuclear materials and provide a permanent, centrally retained record of the radiological status of the facilities, either when operations cease, or when decommissioning is completed and

--establish a decommissioning program that specifies criteria for selecting tentative decommissioning methods

during the facility planning phase, and criteria for design features to be incorporated in facility planning.

RECOMMENDATIONS TO THE SECRETARY OF ENERGY

We recommend that the Secretary of Energy

--establish a decommissioning program that specifies criteria for selecting tentative decommissioning methods during the facility planning phase and

--resubmit DOE's proposed legislation to provide the necessary authority which it currently lacks to proceed with remedial cleanup of all sites under the Formerly Utilized Sites Program.

RECOMMENDATIONS TO THE ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY

Residual radioactivity standards for decommissioning nuclear facilities are the most critical aspect of decommissioning, because without them, sound decisions cannot be made of the most cost-beneficial ways to proceed in planning and implementing cleanup activities and radioactive waste disposal. In light of the importance of these standards and the delays and problems that could be caused by not establishing them, we recommend that the Administrator, Environmental Protection Agency, reevaluate the priority assigned to developing these standards so that this process can be started immediately. We recommend further that the Administrator develop and present to responsible committees of the Congress within 6 months from the date of this report, a plan setting forth the steps that are needed to develop and issue these standards and the milestones (dates) that each step will be completed.

MATTERS FOR CONGRESSIONAL CONSIDERATION

There are four issues raised by our work which warrant consideration and possible action by the Congress--the need to (1) provide adequate funding to complete clean up and decommissioning activities at a number of inactive Federal sites and facilities, (2) provide a mechanism to better ensure funding for decommissioning future Federal facilities, (3) provide DOE authority to undertake remedial action on some formerly utilized facilities, and (4) expedite the development of radiation standards for decommissioning activities.

Solutions to the first issue--providing adequate decommissioning funding for currently inactive sites--is complicated by the current climate of budget cutting and budget restraints.

Simply put, it is a matter of priorities. In our view, cleaning up these contaminated facilities--particularly those facilities not located on Federal lands--should receive high priority in the interest of public health and safety. To do less could further erode the public's confidence in the Federal Government's committment to safe nuclear facilities. However, we are not in a position to judge relative priorities. Thus, the Congress, as part of its oversight and budgetary review responsibilities, may wish to closely evaluate DOE's overall priorities and work with DOE in revising these priorities to provide a consistent flow of funding for cleaning up these inactive facilities.

Solutions to resolving the second issue--providing reliable funding for future Federal facilities which are approved--may be even more elusive. This occurs largely because of the difficulty of predicting decommissioning costs so far in advance--30, 40, or, in some cases, 50 years--and because it is unreasonable to require "up front" funding either at the start of operation or throughout the life of the facility such as is anticipated for commercial facilities. Suggesting such a requirement would ignore the realities of current budget constraints as well as the obvious disadvantages of accumulating a large Federal "fund" which would not be needed until several years in the future.

Nevertheless, a solution is needed to avoid many of the problems we are facing in cleaning up current inactive plants. Any such solution should provide the Congress the necessary information on the costs and trade-offs of cleaning up future Federal facilities far enough in advance of the actual decommissioning need so that adequate funding can be provided. In this regard, we believe the general approach suggested by DOE, and discussed on page 23 of this report, is reasonable and is one that the Congress may wish to consider. Under one variation of this approach, the Congress, when it authorizes a Federal nuclear facility, could also authorize unspecified funding for cleaning up and decommissioning the facility. The authorization could also require that at some specified time before actual funds must be authorized and appropriated--perhaps 1 or 2 years before decommissioning activities would begin--the agency must complete and submit to responsible congressional committees a plan for cleaning up and decommissioning the facility. Such a plan should, at a minimum, identify steps that must be taken in decommissioning the facility and the costs that would be incurred. This approach would put the Congress on notice well in advance of the need for funds and would provide it with a good basis for making funding decisions, thus better ensuring consistent funding in the future.

Regarding the third issue, DOE believes it lacks the authority to carry out remedial cleanup activities for 20 sites under its Formerly Utilized Sites Program. DOE has drafted legislation to provide such authority, but that legislation has not been forwarded to the Congress by the Office of Management and Budget. According to an Office of Management and Budget official

the legislation must now be resubmitted, but there is still no guarantee that it will be forwarded by the Office to the Congress. Thus, because of the hazard to public health and safety that sites may present, the Congress may wish to consider providing DOE such authority.

Finally, with respect to expediting the development of radiation standards, the Congress, through its legislative and oversight committees, may wish to take an active role in assuring that such standards are issued as soon as possible. The longer EPA takes to develop and issue the standards, the more it will cost to clean up and decommission inactive sites and facilities. As discussed in the previous section, we have recommended that the Administrator, EPA, develop and present to responsible committees of the Congress within 6 months of the date of this report, a plan for developing and issuing these standards. These congressional committees may want to monitor EPA's progress in developing the plan and, when submitted, closely evaluate it to determine whether the plan adequately addresses the problems raised by this report. If the committees decide that the plan is not adequate and that the time frame for issuing these important standards is too long, the Congress may wish to consider transferring the responsibility for developing these standards to another agency or group. We have identified two possible options for transferring this responsibility.

First, a bill (S. 2284) has been introduced in the Congress which would establish a Federal Council on Radiation Protection. The Council, which would consist of 13 members from Federal and State agencies and 2 members from the public sector, would provide regulatory guidance for all Federal agencies in the formulation of radiation standards. The Senate Committee on Governmental Affairs, Subcommittee on Energy, Nuclear Proliferation and Government Processes recently asked GAO to evaluate the adequacy of the bill. We found it to be a viable approach which deserves consideration by the Congress. The approach not only could reduce the time frames associated with standards development, but also could improve the coordination among Federal agencies with radiation protection responsibilities or programs. Each agency would have a voice in developing and setting radiation standards which should increase the emphasis and priority assigned to this task.

The second option the Congress may wish to consider is to transfer the responsibility for developing radiation standards to another agency, such as NRC. We believe NRC would be appropriate for the task because it is already responsible for commercial nuclear safety, has been involved in nuclear safety issues at DOE and DOD, and has done research on the health impact of radioactive material. It, therefore, has a great deal of expertise in this area and has already developed such standards, on an interim basis, for its own use.

CHAPTER 6

AGENCY COMMENTS AND OUR EVALUATION

We obtained comments from the four agencies responsible for the decommissioning activities discussed in this report--DOE, NRC, DOD, and EPA. DOE, NRC, and DOD generally agreed with our findings concerning the need for improved decommissioning record-keeping systems, better planning, and radiation standards to carry out decommissioning programs. However, all of the agencies disagreed with certain recommendations and matters discussed in the report. The complete texts of their comments and our detailed evaluation are contained in appendices V through VIII.

DOE, NRC, and DOD disagreed with our recommendation to the Congress to designate NRC as a lead agency for developing and monitoring a national decommissioning policy. Each agency presented different reasons for disagreeing with this recommendation, but the underlying theme of their comments was that such an action would give NRC additional regulatory authority over their programs. For example, DOD said that the recommendation implies a form of NRC regulatory authority over its facilities, even if only ostensibly for decommissioning. DOE stated that NRC does not have the expertise to oversee the complex DOE activities--defense and research facilities--and the knowledge to balance program costs, benefits, and priorities. Finally, NRC was opposed to the recommendation because it said that our report assumes that at the end of facility life, the decontamination and decommissioning of NRC-licensed, DOE and DOD facilities should all be treated in the same manner.

We disagree with these comments and continue to believe that the Congress should designate NRC as the lead Federal agency for developing and monitoring implementation of a national policy for decommissioning. There are several reasons for our position.

First, contrary to DOE's and DOD's interpretation, we do not intend to imply, nor do we advocate, that the Congress give NRC regulatory authority over agencies' facilities or sites for which it currently does not have such regulatory authority. In making this recommendation, we believe each agency should still be responsible for decommissioning sites and facilities for which they currently have responsibility. The primary role we envision for the lead agency would be to develop broad guidelines and policy that Federal agencies would follow, to the extent possible, thereby resulting in more effective and consistent decommissioning activities. Second, concerning DOE's comment that NRC does not have the required expertise, we have recommended that the decommissioning policy and guidance be developed in consultation with DOE and DOD to account for the differing needs of each Federal agency.

Finally, we disagree that our report assumes that all decommissionings should be treated in the same manner. We recognize the differences in facility use as well as decommissioning needs that exist in the numerous types of Federal and commercial nuclear facilities. In fact, we distinguish between different facilities on page 36 of the report. Notwithstanding the differences that exist among these facilities, we still believe a single lead agency is needed to develop an overall decommissioning policy or strategy. This policy would serve as an overall framework to guide future decommissioning activities to ensure that such activities are performed in an effective manner and, to the extent possible, in a consistent fashion. Although actual decommissioning and decontamination actions or procedures may differ among the various Federal agencies, the basic procedures or elements of these actions would still be similar, i.e., recordkeeping systems, planning and design criteria, and funding considerations. The approach we are advocating would consider the different needs of each Federal agency, but also provide consistency, where possible, to resolve the problems we noted in this report.

In requesting comments on the draft report, we also asked NRC and EPA to comment on the feasibility of transferring responsibility for setting certain radiation standards from EPA to NRC. 1/ EPA was against such action stating that it would further delay development of standards and could result in a substantial loss in technical support for standards setting should EPA lose the authority. In addition, EPA stated that NRC may not have the expertise to promulgate such standards.

We disagree with EPA's comment that further delays would occur, because as discussed in chapter 4, EPA has been responsible for setting radiation standards since 1970 and for the most part has failed to do so. For example, EPA was required to issue inactive mill tailings standards in 1979 and active mill tailings standards in 1980. To date, EPA has not issued either standard and does not expect to issue them before 1983. In addition, EPA does not intend to even begin development of general decommissioning standards until fiscal year 1984, an effort EPA anticipates will take 2-1/2 years from the date action is initiated.

We also disagree that transferring radiation standards setting responsibility from EPA to NRC would result in a substantial loss in technical support. Since NRC was established,

---

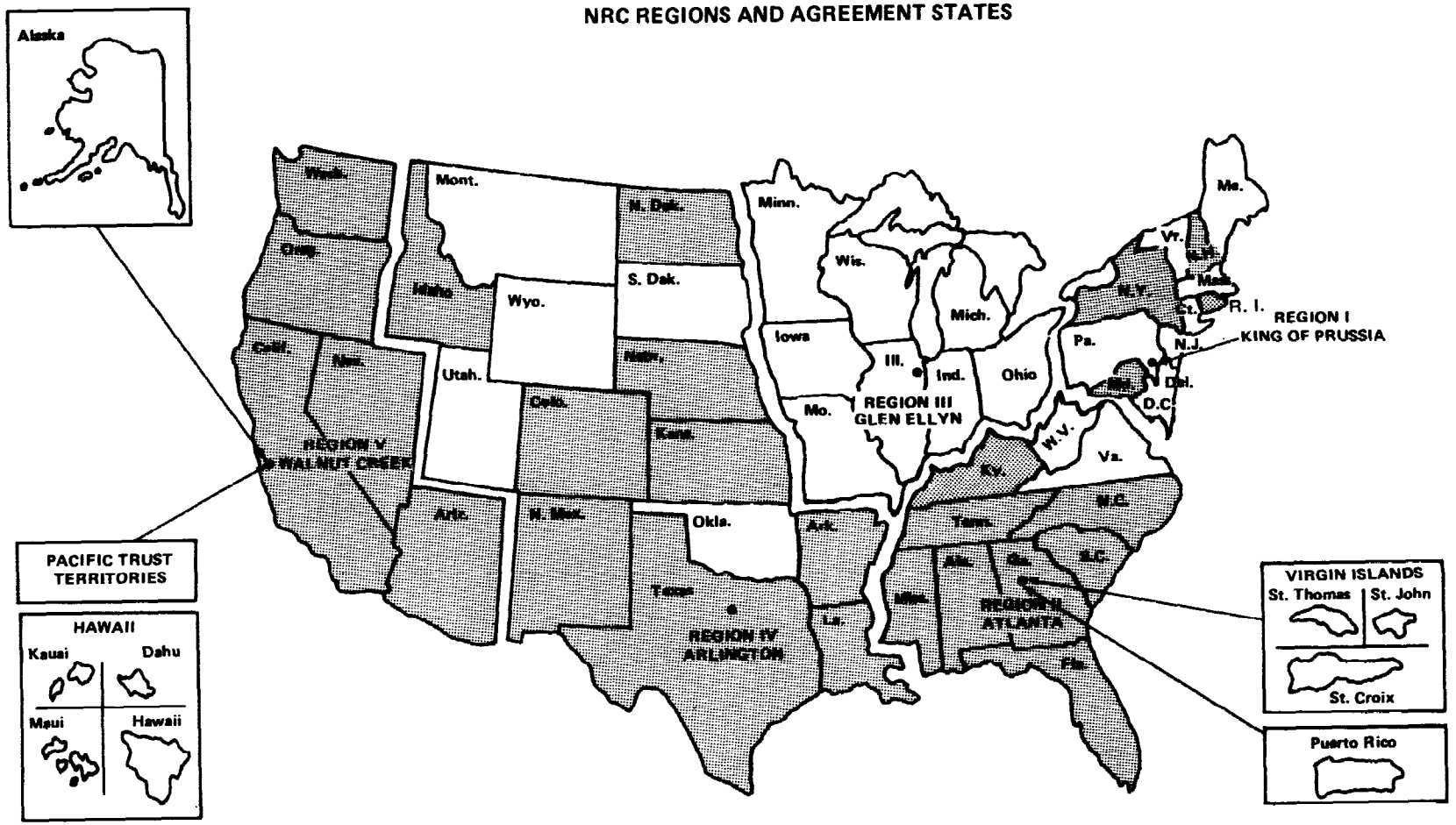
1/At the time NRC and EPA commented on the report, we did not request them to comment on the feasibility of transferring this standards setting responsibility to another entity, such as the Federal Council on Radiation Protection, which is currently being considered by the Congress in a bill.

it has been involved in promulgating numerous standards, rules, and regulations, and we believe it already has the required expertise. However, even if NRC does not have the required expertise, it could obtain the expertise needed to promulgate these standards.

In commenting on transferring the responsibility, NRC expressed concern about the timeliness of EPA standards and stated there may be a significant advantage in assigning the responsibility to NRC.

Because of the inability of EPA to develop timely standards, we recommend on page 38, that EPA present to responsible committees of the Congress, a plan setting forth the steps that are needed to develop and issue these standards. Based on the adequacy of EPA's plan and proposed time frames for setting these standards, the Congress will ultimately be responsible for determining whether EPA should maintain its standard setting responsibility or whether the responsibility should be transferred to another agency or group. On page 40, we discuss two available options for transferring the responsibility for setting radiation standards.

NRC REGIONS AND AGREEMENT STATES



NRC REGIONS

I King of Prussia, Pa.
II Atlanta, Ga.
III Glen Ellyn, Ill.
IV Arlington, Tx
V Walnut Creek, Calif.

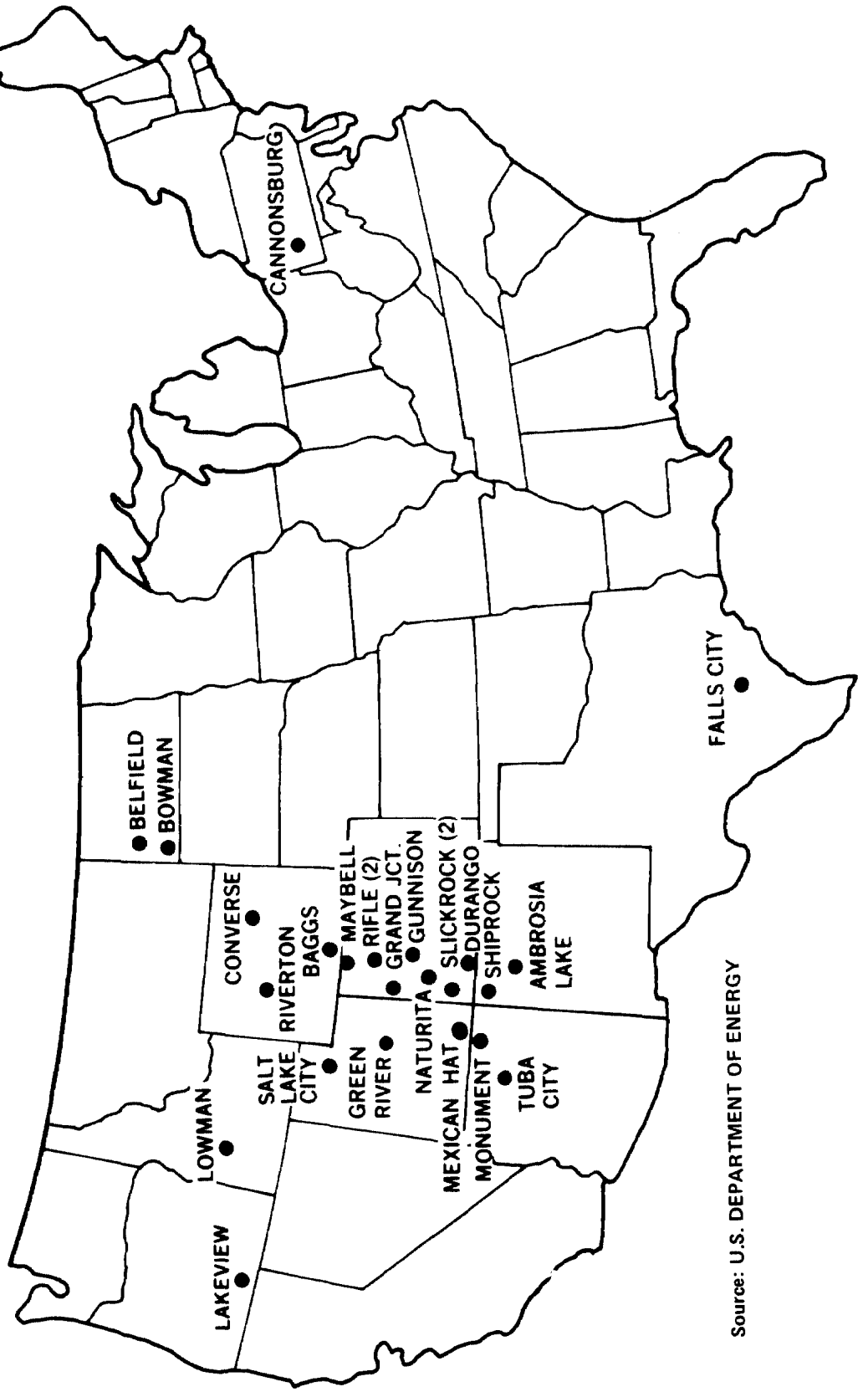
AGREEMENT STATES
(26 as of October 1, 1980)

Source: U.S. Nuclear Regulatory Commission

APPENDIX I

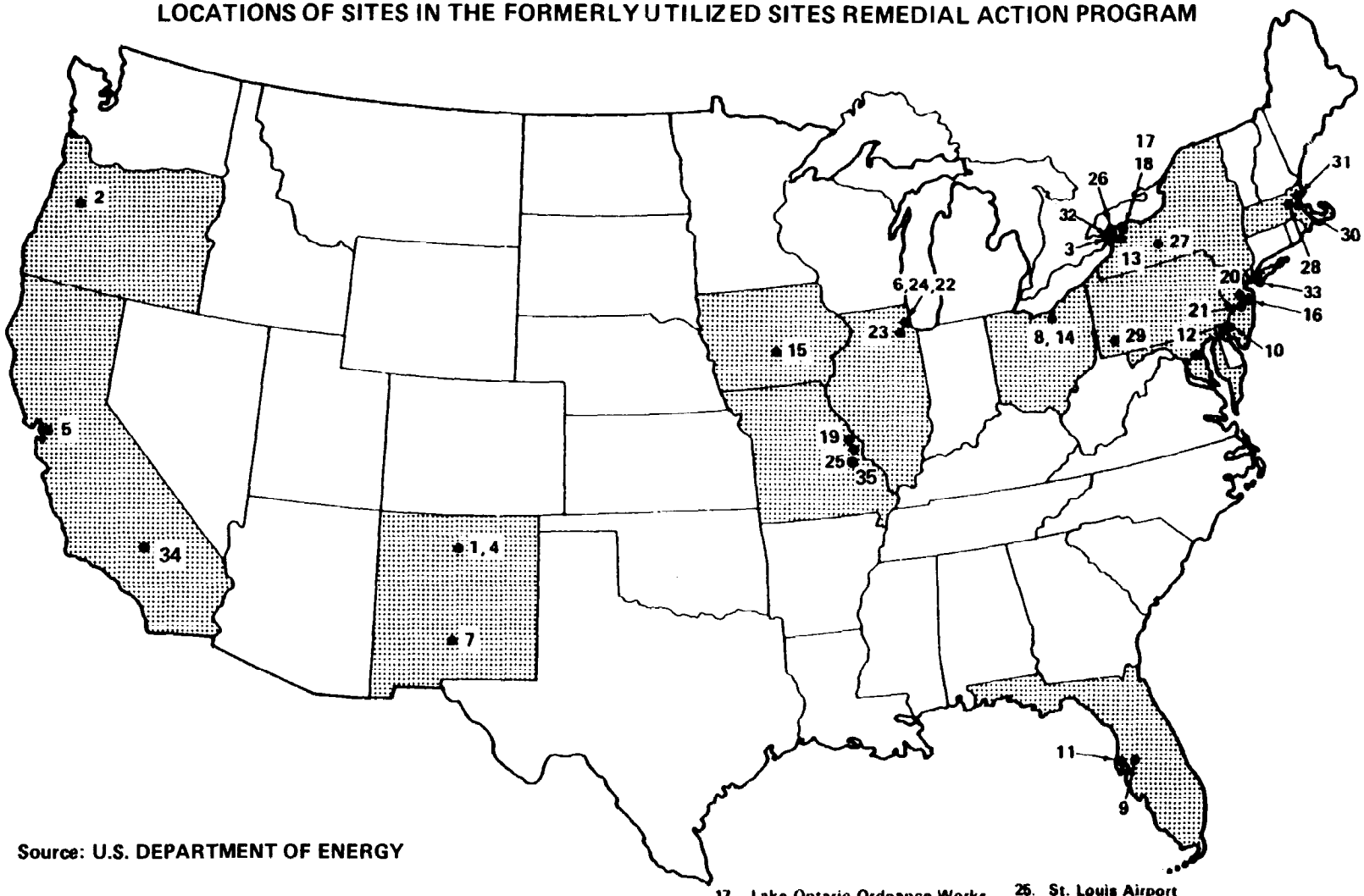
APPENDIX II

LOCATION OF SITES IN THE URANIUM MILL TAILINGS REMEDIAL ACTION PROGRAM



Source: U.S. DEPARTMENT OF ENERGY

LOCATIONS OF SITES IN THE FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

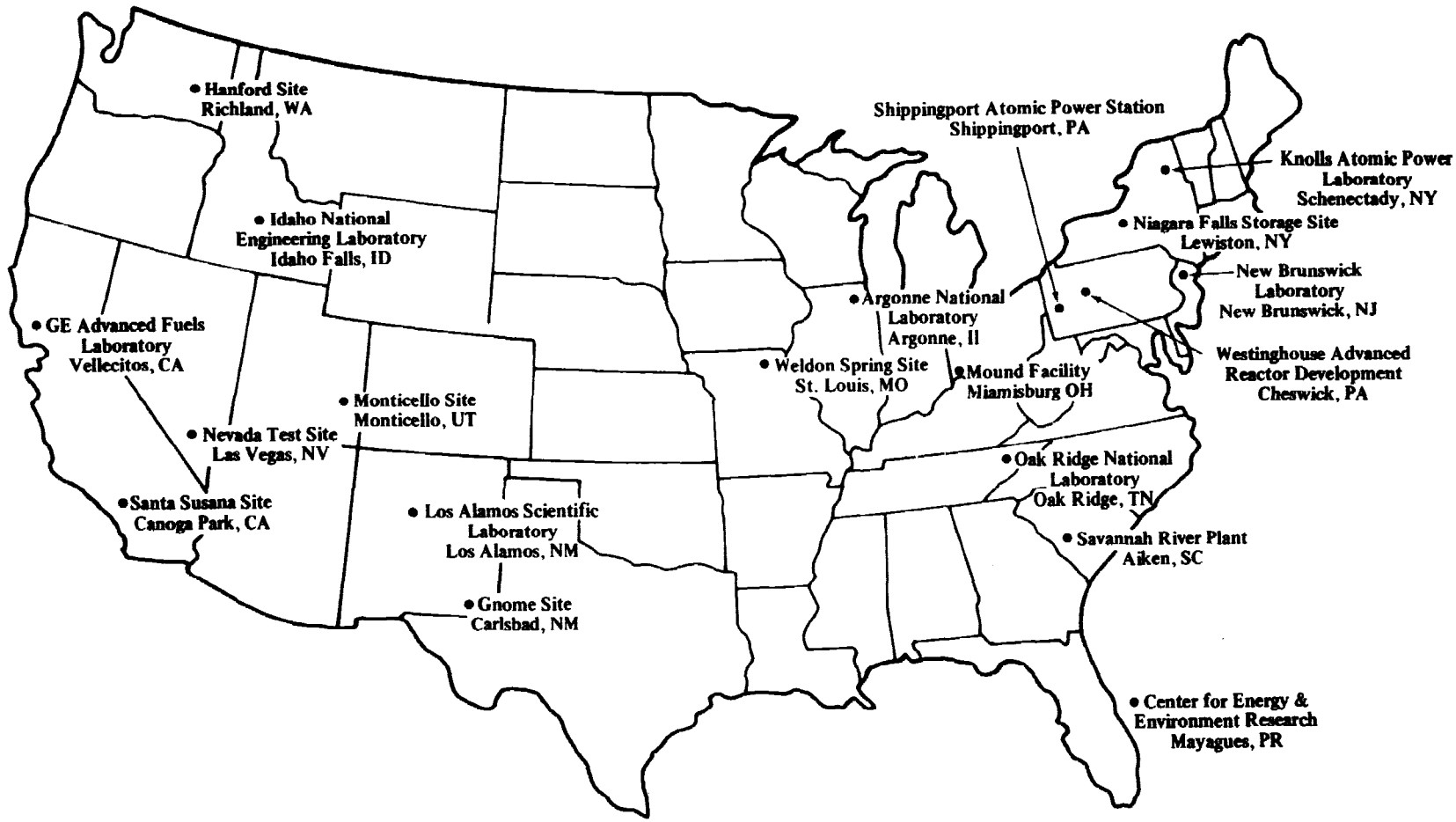


Source: U.S. DEPARTMENT OF ENERGY

1. Acid/Pueblo Canyon
2. Albany Metallurgical Research Center
3. Ashland Company
4. Bayo Canyon
5. University of California
6. University of Chicago
7. Chupadera Mesa
8. Clecon Metals, Inc.
9. Conserv Inc.
10. E.I. du Pont de Nemours & Company
11. Gardinier, Inc.
12. W.R. Grace & Company
13. Guterl Steel Corp.
14. Harshaw Chemical Company
15. Iowa State University
16. Kellex
17. Lake Ontario Ordnance Works Associated Properties
18. Linde Air Products
19. Mallinckrodt, Inc.
20. Middlesex Landfill
21. Middlesex Sampling Plant
22. National Guard Armory
23. Olin Chemical Company
24. Palos Park
25. St. Louis Airport
26. Seaway Industrial Park
27. Seneca Army Depot
28. Shpak Landfill
29. Universal Cyclops, Inc.
30. Ventron Corporation
31. Watertown Arsenal
32. Ashland No. 2
33. Staten Island
34. Pasadena Chemical Company
35. St. Louis Airport Vicinity Properties

APPENDIX III

LOCATIONS OF FACILITIES IN THE SURPLUS FACILITIES MANAGEMENT PROGRAM



Source: U.S. Department of Energy

APPENDIX IV

THE ENVIRONMENTAL PROTECTION AGENCY'S MARCH 15, 1982, COMMENTS ON A DRAFT OF THIS REPORT AND GAO'S EVALUATION OF THE COMMENTS

EPA COMMENT

The Environmental Protection Agency (EPA) has reviewed the General Accounting Office (GAO) draft report, "Cleaning Up Nuclear Facilities--An Aggressive and Unified Federal Program Is Needed," EMD-82-40. Public Law 96-223 requires the Agency to submit these comments on the draft report, so that GAO may consider our views prior to publication of the final report. In addition, we are enclosing specific comments, with citations to the report, that we feel the final report should reflect.

In examining the draft report, we have found several areas in which we feel GAO has inaccurately characterized the problems or issues associated with decommissioning and, as a result, reached erroneous conclusions. Specifically, the report seems to lump together and thus confuse several separate, but related regulatory areas. These areas include standards for decommissioning of nuclear facilities, standards for the cleanup and disposal of uranium mill tailings, and standards for the disposal of high-level and low-level radioactive waste. The characterization presented in the report concerning EPA's efforts in these areas does not accurately reflect the current schedule or priorities of our radiation standards setting program.

GAO EVALUATION

We disagree with EPA's comment that we have inaccurately characterized the problems or issues associated with decommissioning and, as a result, reached erroneous conclusions. Our conclusions are based on review work performed in four Federal agencies involved in decommissioning activities. EPA is the only agency to formally comment that our report reaches erroneous conclusions. Moreover, EPA's comments fail to point out any major factual errors in the report which would require changes to our conclusions. Therefore, we believe there is no substance or basis to EPA's comment concerning the adequacy of the conclusions made in this report.

Concerning EPA's comment about the confusing discussion of the numerous radiation standards for which it is responsible, we agree that our presentation could be improved. By nature, this is a very complex area because of the number and types of standards involved. Consequently, we have revised appropriate sections of this report to further clarify the specific standards discussed.

Finally, we disagree that we have inaccurately characterized EPA's priorities for setting radiation standards. Our discussion of EPA's priorities for setting radiation standards is based on information provided to us by EPA in January 1982. On page 26 of the report we state that EPA plans to have final mill tailings standards by 1983 and high-level waste standards in 1984. EPA plans to start developing general decommissioning standards for buildings, facilities, and contaminated lands in 1984. According to EPA, finalizing these standards will take about 2-1/2 years or until about mid-1986. Until we are provided different information by EPA, we believe our presentation is accurate and, does not warrant any change.

EPA COMMENT

One major thrust of the report concerns the absence of general standards for decommissioning nuclear facilities. EPA considers the development of decommissioning standards for nuclear facilities as important and necessary. This need must, however, be weighed against the competing priorities of Congressionally-mandated standards for airborne radionuclides and uranium mill tailings, as well as Executive mandates to develop standards for high- and low-level radioactive wastes. In balancing these priorities, the Agency has chosen to defer development of general decommissioning standards for buildings, facilities, and contaminated lands until Fiscal Year 1984. This deferral will make personnel and resources available to assist in the speedy completion of standards for the disposal of mill tailings and high-level radioactive waste. As these standards are completed in fiscal year 1983, resources will then become available for the full development of decommissioning standards. EPA feels this is a reasonable approach to the development of decommissioning standards, since very few large scale decommissioning events are anticipated prior to 1986.

In the relatively few instances to date when a need has been felt to proceed with decommissioning, EPA has responded by providing guidance to the Department of Energy (DOE) and the involved State on a site-specific basis. EPA is not aware that this approach has proven unsatisfactory. Until final standards are in effect, EPA will continue to provide such guidance when requested.

EPA is unaware of any significant delays in the Federal remedial action program resulting from an absence of EPA standards. Likewise, EPA does not believe that excessive decommissioning costs will result from its decision to defer standards development. The Agency does believe, however, that

hasty promulgation of rules, in the absence of adequate health, engineering, and cost data, could result in significant delays and prolonged litigation.

GAO EVALUATION

We disagree with EPA's comments. EPA has been responsible for setting radiation standards to guide decommissioning since 1970. Few standards have been established, including standards for mill tailings, low- and high-level waste, and decommissioning nuclear facilities. Even when EPA was legislatively mandated to establish standards for mill tailings, it has not issued the standards within the time frame specified in the law.

We also disagree that no delays are occurring because of EPA's inability to issue final standards. As we state on page 28, DOE stated that the lack of standards will delay its uranium mill tailings remedial action program. In commenting on this report, DOE reiterated its concerns about the lack of standards, stating,

> "Delay in issuance of the EPA standards for processing or disposal sites has hindered and caused problems in proceeding with the Department's Uranium Mill Tailings program because issuance of these standards must precede definitive clean-up work on processing sites as mandated by Public Law 95-604."

Furthermore, we also disagree with EPA's statement that the lack of standards will not result in excessive decommissioning costs. As we state on page 29, the lack of EPA standards has caused NRC to proceed with decommissioning its licensed facilities on a case-by-case basis using standards tailored for each specific site. These decommissioned sites may or may not meet EPA's final standards, thus resulting in additional costs or future problems, if EPA's standards are more stringent than the negotiated standards currently being used. In its comments on the report, NRC also expressed its concern about the timeliness of issuance of the EPA standards, and stated that

> "because the EPA has had such difficulty meeting schedules for radiation standards, there may be significant advantage in assigning to NRC the EPA responsibility in the area of decommissioning radiation standard setting."

Finally, although we agree with EPA that hasty promulgation of these standards would be unwise, we believe that increased priority and greater effort should and can be made to accelerate the standard setting process. Accordingly, as we state on page 38, we recommend that the Administrator of EPA reevaluate the priority assigned to developing these standards so that this process can be started immediately.

EPA COMMENT

With respect to the general question of radiation standards setting authority, the Agency believes that the responsibility for developing generally applicable environmental standards for all categories of radioactive wastes should remain with EPA. The Agency has made substantial progress in accelerating standards for certain waste categories. However, delegation of responsibility for developing the remaining standards to another agency would delay, rather than speed-up, the process. In addition to delays, there could also be a substantial loss in technical support for standards setting should EPA lose this authority. The development of all radiation standards promulgated by EPA are required to include a thorough analysis of costs, benefits, and alternatives under Executive Order 12291. A comprehensive analysis of this nature is not required of independent regulatory agencies, such as the Nuclear Regulatory Commission (NRC), which traditionally has not prepared such analysis as part of their regulatory development process.

We appreciate the opportunity to furnish our comments on this draft prior to its publication as a final report.

GAO EVALUATION

We do not disagree that EPA has the technical capability to promulgate standards for all categories of radioactive waste, but we do question EPA's ability to complete the task. Contrary to EPA's comment, we do not believe that EPA has made substantial progress in accelerating standards for certain waste categories. As we discuss in chapter 4, EPA is behind schedule on a number of standards which were mandated by the Congress. For example, EPA was required to issue inactive mill tailings standards in 1979 and active mill tailings standards in 1980. To date, EPA has not issued either standard and does not expect to issue them before 1983. In addition, as its previous comment stated, EPA does not intend to even begin development of general decommissioning standards until fiscal year 1984, an effort EPA anticipates will take 2-1/2 years from the date action is initiated.

We also disagree that transferring radiation standards setting responsibility from EPA to NRC would result in a substantial loss in technical support. Since NRC was established, it has been involved in promulgating numerous standards, rules, and regulations. We believe that even if NRC does not have the required expertise, which it already may have, it could obtain the expertise needed to promulgate these standards.

In light of EPA's difficulty in developing timely standards, we believe our approach is fair and reasonable. Specifically, as

APPENDIX V

stated on page 38, we recommend that the Administrator present to responsible committees of the Congress, a plan setting forth the steps that are needed to develop and issue these standards. Based on the adequacy of EPA's plan and proposed time frames for setting these standards, the Congress will ultimately be responsible for determining whether EPA should maintain its standard setting responsibility or whether the responsibility should be transferred to another agency.

THE NUCLEAR REGULATORY COMMISSION'S MARCH 16, 1982, COMMENTS ON A DRAFT OF THIS REPORT AND GAO'S EVALUATION OF THE COMMENTS

NRC COMMENT

Thank you for the opportunity to comment on your draft of a proposed report, "Cleaning Up Nuclear Facilities--An Aggressive and Unified Federal Program Is Needed." The proposed report is a good one, and I will restrict my comments to the two recommendations it directs to us and to the two questions raised concerning the possibility of increased responsibilities for NRC as lead agency for national policy on decommissioning and for setting radiation standards for decommissioning. In addition, the staff has some comments which are summarized in the enclosure.

Recommendation 1 to NRC: Improve NRC Recordkeeping System

NRC will take action to improve its recordkeeping system to provide prompt identification of licensees who have stopped operations, effective monitoring of licensee control over contaminated facilities, assurance that facilities are cleaned up when licenses are terminated, and the development and permanent retention in a central repository of records documenting decommissioning activities. It is anticipated that our amended rules on decommissioning will require improved planning and documentation by licensees. These records will formally be docketed and maintained in a central repository until ten years after the NRC determines that the premises are free of residual contamination.

GAO EVALUATION

We agree with NRC's planned actions, but we suggest that NRC maintain permanent records even for sites which are free of residual contamination. By maintaining such records, the radiological status of a site could be determined immediately, thereby precluding the need for a costly survey 20 or 30 years from now, if someone questions the status of the site.

NRC COMMENT

Recommendation 2 to NRC: Accelerate Schedule for Decommissioning Policy

We have reconsidered the possibility of accelerating the schedule for decommissioning policy and rulemaking. Our previous

schedule depended on proceeding with rulemaking with part of the information base missing. The key parts missing were studies of the technology, safety and costs of decommissioning multiple reactor stations, research and test reactors, reactors that had been involved in accidents, and uranium hexafluoride conversion plants. Criticisms of this approach were expressed by a number of parties in their review of our "Draft Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," (NUREG-0586). Accordingly, it was decided to improve the information base before continuing with policy formulation and rulemaking.

The missing parts have recently been completed with the exception of the one on reactors involved in accidents. Reports on this subject are expected from our contractor about April 1982 for a pressurized water reactor and about August 1982 for boiling water reactor. We expect, then, to be in a position to proceed expeditiously with rulemaking with the publication of proposed rule changes about February 1983 and, finally, of effective rule changes about nine months later.

GAO EVALUATION

NRC's comment points out that its time frame cannot be accelerated because of missing studies concerning reactors that have been involved in accidents. The last of these studies is scheduled for completion in August 1982. Since reactors that are involved in accidents represent a very small percentage of all reactors and other nuclear facilities that are to be decommissioned, we believe NRC could expedite the process by proceeding with rulemaking covering all facilities other than those that have been involved in accidents. After its studies are completed on reactors involved in accidents, it would either amend its rule or develop a separate rule for these reactors. We made this recommendation in 1977 and because of the significance of this rule, we still believe NRC's schedule should be accelerated.

NRC COMMENT

Recommendations to Congress on Lead Agency

We think it is unnecessary that there be a single lead agency for developing a national policy on decommissioning of nuclear facilities and sites. This report assumes that at the end of facility life the decontamination and decommissioning, where appropriate, of NRC licensed, DOE and DOD facilities should all be treated in the same manner. However, we believe that the missions of these agencies are sufficiently disparate that such assumptions are not necessarily true. For example,

addition, we do not believe this policy and guidance has to be facility or site specific, but should merely be a broad framework under which all decommissioning actions can be made with as much consistency as possible.

DOD COMMENT

Finally, the report does not differentiate between "spreadable" radioactive materials and those that are "fixed" and not likely to result in contamination (e.g., sealed check sources or neutron induced radioactivity). During operations and decommissioning, these two forms of radioactive material are treated differently, because of their different potential body hazards and the methods of personnel protection. We suggest that the first recommendation to the Secretary of Defense be reworded as follows: --provide DOD-wide guidance on documentation needed to identify and monitor facilities using nuclear materials likely to result in radioactive contamination and provide a permanent, centrally retained record of the radiological status of contaminated facilities, whether operational or decommissioned.

GAO EVALUATION

We agree with DOD that several nuclear activities are unlikely to result in radioactive releases. However, permanent records are still needed to document the specific activities or types of radioactive materials that were used in these facilities, and the radiological status of the sites, regardless of the extent of the hazards. By maintaining such records, if a question is raised in the future about the radiological status of the site or facility, the information will be readily available. Consequently, a determination could be made without having to perform the costly surveys that agencies currently have to conduct to make such determinations.

THE DEPARTMENT OF ENERGY'S MARCH 10, 1982, COMMENTS ON A DRAFT OF THIS REPORT AND GAO'S EVALUATION OF THE COMMENTS

DOE COMMENT

The Department of Energy (DOE) appreciates the opportunity to review and comment on the GAO draft report entitled, "Cleaning Up Nuclear Facilities--An Aggressive and Unified Federal Program Is Needed." The Department believes that planning and accomplishing the decommissioning of nuclear facilities is an important part of its mission. DOE has made substantial progress in this task and has a rational and progressive program to accomplish it. The GAO report should include statements of the Department's commitment to this task and should indicate that significant progress has been made in accomplishment, particularly in regard to the GAO observations and recommendations made in the 1977 report, rather than the view presented in the current draft report that progress has been slow and many of the same weaknesses still exist.

In the 1977 report, the GAO observed that the Energy Research and Development Administration (ERDA) lacked the information to plan this task, and did not know the radiation and contamination problems at its facilities, the decommissioning methods that should be used, the corresponding costs, or priorities. The GAO recommended that ERDA begin to consider and plan decommissioning for all future projects, in addition to planning decommissioning of existing excess facilities. Specifically, the GAO recommended that the Administrator, ERDA:

--determine the (1) acceptable alternative methods of decommissioning, (2) acceptable levels for induced radiation and surface contamination, and (3) extent of the decommissioning problem for accelerators;

--expand and accelerate a program to decommission the nuclear facilities currently excess to its needs; and

--require that program managers plan for future decommissioning and include decommissioning cost information in their program budgets.

GAO note: Page number references in DOE's comments have been changed to reflect their position in this final report.

some of the DOE and DOD facilities would not necessarily be decommissioned (i.e., released for unrestricted use) but only decontaminated and remain in restricted access.

GAO EVALUATION

We disagree that our report assumes that all decommissionings should be treated in the same manner. We recognize the differences in facility use as well as decommissioning needs that exist in the numerous types of Federal and commercial nuclear facilities. In fact, we distinguish between different facilities on page 36 where we state that NRC should establish criteria in consultation with DOE and DOD "for selecting decommissioning methods, including consideration of the differing needs of facilities on controlled Federal sites versus those located offsite."

Notwithstanding the differences that exist among these facilities, we still believe a single lead agency is needed to develop an overall decommissioning policy or strategy. This policy would serve as an overall framework to guide future decommissioning activities to ensure that such activities are performed in an effective manner and, to the extent possible, in a consistent fashion. Although actual decommissioning and decontamination actions or procedures may differ among the various Federal agencies, the basic procedures or elements of these actions would still be similar, i.e., recordkeeping systems, planning and design criteria, and funding considerations. The approach we are advocating would consider the different needs of each Federal agency, but also provide consistency, where possible, to resolve the problems we noted in this report.

NRC COMMENT

Questions on Responsibility for Radiation Standards for Decommissioning

There are four areas where standard setting is required: high level waste disposal, low level waste disposal, active and inactive uranium mill tailings disposal and other nuclear facility decommissioning. In recent discussions, the EPA staff indicated that issuance of final radiation standards for inactive uranium mill tailings and proposed standards for high level waste disposal is imminent. Also, the EPA radiation standards for low level waste disposal are scheduled for issuance in 1984. The EPA staff expects standards for active mill tailings to be proposed in 1982 and made final in 1983. Development of EPA standards for decommissioning other nuclear facilities is scheduled to begin in 1984 with completion in 1986.

NRC was and is concerned about the timeliness of issuance of the EPA standards for low level waste disposal and nuclear

facility decommissioning. Accordingly, in consultation with EPA staff, NRC has developed allowable radiation levels which will be used in preparing NRC regulations in these areas. We recognize that EPA standards could differ from the NRC standards. We hope that with close consultation and cooperation the differences will not be significant. If completed on time, these EPA and NRC activities will satisfy the decommissioning radiation standard needs. However; because the EPA has had such difficulty meeting schedules for radiation standards, there may be significant advantage in assigning to NRC the EPA responsibility in the area of decommissioning radiation standard setting (i.e., residual radioactivity levels). If Congress does transfer this responsibility to the NRC, it will have a significant impact on our limited staff resources in this area. It should be noted that additional NRC resources would be required to meet the objectives of the GAO recommendation.

GAO EVALUATION

We agree with NRC in that there may be certain advantages to transferring standard setting responsibility. On page 40 we identified two options for transferring this responsibility. First, a bill has been introduced in the Congress which would establish a Federal Council on Radiation Protection. The Council would be made up of members from various Federal agencies, as well as the public, and would provide regulatory guidance for all Federal agencies in the formulation of radiation standards. We find this to be a viable approach. The approach not only could reduce the time frames associated with standards development, but also could improve the coordination among Federal agencies with radiation protection responsibilities or programs. However, should this legislation not be enacted, the Congress may still wish to consider transferring certain standard setting responsibilities to NRC.

We recognize that transferring such responsibility to NRC would require additional resources and effort on the part of NRC. However, we believe that first consideration should be given to transferring appropriations and staff from EPA should the Congress decide that such a transfer is warranted. We also recognize that in light of current budget constraints, the Congress may decide to transfer the standards setting authority but not be able to provide additional staff authorization to perform the work. In that event, NRC would need to reexamine its internal program priorities to determine the feasibility of providing the staff from current in-house resources. Once this determination has been made, NRC will be better able to advise the Congress of the staff and time frame needed to complete the work.

THE DEPARTMENT OF DEFENSE'S MARCH 25, 1982, COMMENTS ON A DRAFT OF THIS REPORT AND GAO'S EVALUATION OF THE COMMENTS

DOD COMMENT

This is in reply to your letter to the Secretary of Defense regarding your report dated February 8, 1982, on "Cleaning Up Nuclear Facilities--An Aggressive and Unified Federal Program is Needed," OSD Case #5893, GAO Code Number 301561.

The Department of Defense (DOD) concurs with the overall thrust of the report, in that record keeping should be improved, more effective decommissioning planning would be beneficial, and development of adequate standards is necessary for effective program execution. However, several specifics of the report warrant comment.

While incorporation of decommissioning considerations during the facility planning and design phase is a laudable goal, it is not clear that these considerations should be overriding. Operational utility, cost, and early beneficial occupancy are but a few factors which might outweigh decommissioning considerations prior to construction. Selection of a decommissioning method before construction is considered to be impractical. A nuclear facility is typically designed for a useful life on the order of thirty years and design is typically begun five years before beneficial occupancy. Experience over the past 35 years has shown that laws, standards, regulations, and attitudes have all changed with respect to decommissioning. For example, the National Environmental Policy Act was passed in 1969. A decommissioning method selected in the late 1940s or early 1950s could not be executed today without an assessment of the environmental impact. That assessment could result in the invalidation of the method originally selected. There is no reason to believe that changes will not continue to occur over the next several decades.

GAO EVALUATION

While decommissioning considerations during facility planning and design should not necessarily be the "overriding" factor, we believe the opportunity exists, in most cases, to apply design features which will enhance decommissioning. We recognize that selection of a precise decommissioning method during facility planning will not always be possible. However, we believe, that decommissioning needs and costs should be considered, to the extent practicable, during the planning phase of a facility.

NRC believes this approach is possible and desirable and, therefore, has included this requirement in its draft decommissioning policy. To allow for changes in laws, standards, regulations, and attitudes, we believe the method selected and the cost estimates made should be tentative and subject to change, based on the extent of the radiological contamination at the end of the facility's useful life and the decommissioning technology available at that time. Consequently, we have revised our report to indicate that the decommissioning method selected during the facility planning phase be tentative.

DOD COMMENT

Secondly, the report recommends that the Congress designate the NRC as the lead Federal agency for developing and implementing a national policy for decommissioning of nuclear facilities and sites. There are many DOD facilities which handle radioactive material but are not subject to NRC licensing. This recommendation implies a form of NRC regulatory authority over such facilities, even if only ostensibly for decommissioning. This could lead the NRC into involvement in the design and operation of these facilities, since design and operation ultimately affect decommissioning. Further, the NRC does not have the expertise to make judgments on a number of defense facilities that handle radioactive materials used in facilities not licensed by NRC and classified as Restricted Data. In lieu of the draft GAO recommendation, each agency should retain responsibility for the decommissioning strategy for its facilities. As an alternative, we would suggest a recommendation that DOD, DOE, and NRC form a joint working group to develop general guidelines that each agency could draw on in carrying out their decommissioning activities.

GAO EVALUATION

We do not intend to imply, nor do we advocate, that the Congress give NRC regulatory authority over agencies' facilities or sites for which it currently does not have such regulatory authority. On page 36, we recommend that the Congress designate NRC as the lead agency for developing and monitoring a national policy for decommissioning of nuclear facilities and sites. In making this recommendation, we believe each agency should still be responsible for decommissioning sites and facilities for which they currently have responsibility. The primary role we envision for the lead agency would be to develop broad guidelines and policy that Federal agencies would follow, to the extent possible, thereby resulting in more effective and consistent decommissioning activities. Concerning DOD's comment that NRC does not have the required expertise, we have recommended that this policy and guidance be developed in consultation with DOE and DOD to account for the differing needs of each Federal agency. In

Since the 1977 GAO report, DOE has gathered the information to plan the task and has prepared a program plan for the Surplus Facilities Management Program. This plan provides an inventory of contaminated surplus facilities from commercially-related and defense activities, describes reference decommissioning methods, estimates costs, and provides relative priorities. This plan is now being implemented to the extent funds are made available by Congress. The Department has implemented the program for remedial actions at Grand Junction, Colorado, as required by Public Law 92-314 and initiated the program for inactive uranium mill processing sites and contaminated vicinity properties as required by Public Law 95-604. A program for remedial actions at sites formerly utilized by the Manhattan Engineer District and the Atomic Energy Commission is also underway. For future decommissioning and remedial action projects, DOE directives which have been issued or are in preparation include general design criteria to be applied in planning and design of facilities for future decommissioning and requirements for certification of remedial actions and permanent recording of these actions. Regarding specific recommendations in the 1977 report, DOE has:

--expanded the program for decommissioning DOE facilities from commercially-related and defense-related activities from $7.5 million in 1977 to $15.9 million in FY 1982 (note: Congress reduced the DOE FY 1982 request for defense-related decommissioning from $10.2 million to $4.1 million).

--incorporated in DOE directives requirements that program managers plan for future decommissioning; decommissioning costs are included in some program budgets.

Thus, DOE has made substantial and rapid progress in accomplishing the recommendations made in the 1977 GAO report.

GAO EVALUATION

We disagree with DOE's comment that it has made substantial and rapid progress in implementing the recommendations in our 1977 report on decommissioning for several reasons.

First, in 1977 DOE had essentially completed a program plan for its Surplus Facilities Management Program. At that time, DOE said its plan would be complete in July 1977 and would include decommissioning methods, estimated costs, and priorities for the surplus facilities. We obtained documents in 1977 which did confirm that the program plan was essentially complete. Since 1977 very few of the facilities listed and prioritized by DOE have been cleaned up. In fact, DOE just started on two of its high priority facilities or sites in 1981--the Weldon Spring, Missouri, and Niagara Falls, New York, sites discussed on page 24.

Second, DOE states it has a remedial action program underway for sites formerly utilized by the Manhattan Engineer District and the Atomic Energy Commission. This program has been under way since 1974 and not one site identified as needing remedial action has been cleaned up.

Finally, DOE states it has "expanded" its program funding from $7.5 million to $15.9 million over the period 1977 to 1982. We do not believe this is a significant increase if one considers the rate of inflation and the additional accumulation of facilities which require maintenance and surveillance.

On the other hand, DOE has made progress in some areas. The effort to clean up mill tailings at Grand Junction, Colorado, is over half completed. However, this program was mandated by Congress in 1972 and DOE expects to complete the effort in 1987. DOE also issued a draft directive in June 1981 which specifies general design criteria to be applied in planning and designing facilities for future decommissioning. DOE officials told us that although the directive is in draft and issued for "use and comment," it is still a requirement.

In summary, although these actions do indicate that DOE has made some progress over the last 4 years, we would not characterize this progress as being substantial or rapid. Nevertheless, we have changed appropriate portions of our report to reflect these actions.

DOE COMMENT

The Department's responses to the GAO recommendations on pages iv and 36 to 38 of the draft report are stated below.

The Department does not concur with the recommendation that Congress should designate the Nuclear Regulatory Commission (NRC) as the lead agency to approve and monitor an overall decommissioning strategy. NRC is already involved by statutory assignment in the Uranium Mill Tailings Program and in the common aspects of other remedial action and decommissioning activities at DOE. Although the NRC is charged with concurring in the remedial action plans for the Uranium Mill Tailings Program, it does not have the expertise for the planning of projects with special considerations for defense and research facilities, and the knowledge to balance program costs, benefits, and priorities. To acquire this expertise and oversee the complex DOE activities would require duplication of staff by NRC and would not be cost-effective. The Department is held accountable by Congress for achieving results in its programs because possible differences in judgments and delays in approval could prevent the Department from achieving the results expected by Congress.

Designating NRC as the lead agency for decommissioning is also unnecessary for DOE activities because the Department has several adequate ongoing decommissioning programs stemming from our general and specific responsibilities authorized by Congress, which adequately protect public health and safety. The Department's program plan for Surplus Facilities Management of facilities on DOE sites will be updated annually. Program plans have been prepared for the Uranium Mill Tailings and the Formerly Utilized Sites Remedial Action Programs. Thus, the purposes of the GAO recommendation can be accomplished by ongoing DOE activities and by maintaining the existing DOE-NRC interface. We will arrange additional DOE-NRC interface activities if NRC agrees with the need.

GAO EVALUATION

We disagree with DOE's comment concerning our recommendation that the Congress designate NRC as the lead Federal agency for developing and monitoring the implementation of a national policy for decommissioning of nuclear facilities and sites. In light of the many problems and inconsistencies we found with existing Federal agency decommissioning efforts, we believe that a consistent and aggressive Federal decommissioning policy and approach is needed. In order to effectively ensure such an approach, a lead agency should be designated to develop a decommissioning policy and provide guidance to appropriate agencies to facilitate consistent implementation of the policy. Without such an approach, the decommissioning problems we noted in this report are likely to continue.

We agree that some of DOE's programs and activities are complex. However, as discussed on page 58 in our evaluation of DOD's comment, we do not intend, nor do we advocate, that the Congress give NRC regulatory authority over agencies' facilities or sites for which it currently does not have such authority. The responsibility for decommissioning nuclear facilities and sites should continue to belong to the agency currently responsible for these activities. The primary role we envision for NRC would be to develop broad guidelines and policy that Federal agencies would follow, to the extent possible, thereby resulting in more effective and consistent decommissioning activities.

DOE COMMENT

We concur with the purposes of the recommendations to the Secretary of Energy on page 38 of the draft report. However, the recommendation for the establishment of a decommissioning program that specifies criteria for selecting decommissioning methods during the facility planning phase and criteria for design features to be incorporated in the facility planning should be

changed to indicate that the activities and requirements that have been established by the Department for these purposes should be continued with, possibly, some additional emphasis. DOE has a policy to plan for decommissioning and programs to implement decommissioning at contractors' Facilities Management Program and other decommissioning activities. General design criteria to assist decommissioning were provided in ERDA Chapter 6301 and are extended in draft DOE Order 6430. The latter directive is being implemented. We will review our policies, procedures, and programs for strengthening and emphasis in the design planning phases and to emphasize reuse of materials and facilities where feasible. Reuse of facilities, where feasible, may be more economical than building new facilities that add to the decommissioning problem. NRC efforts to establish levels of contamination below which materials can be recycled without special controls should be accelerated. DOE efforts in conjunction with NRC have been underway for several years to develop de-minimus levels for enriched uranium and technetium--99. These efforts should be completed and should be extended to other common types of radioactive contamination such as transuranic nuclides and fission products.

GAO EVALUATION

GAO agrees and has changed the report accordingly.

DOE COMMENT

In regard to the recommendation to resubmit proposed legislation for formerly utilized sites, we will resubmit this legislation which includes a requirement for EPA to establish additional standards or endorse existing standards within 12 months for cleanup of these sites.

We concur with the GAO recommendations that Congress consider means to provide adequate funding to complete cleanup and decommissioning activities at formerly utilized non-Federal sites and for surplus facilities at Federal sites as well as providing a mechanism to better ensure funding of future Federal activities. The level of funding should provide for a stable, progressively-paced program to clean up the formerly utilized sites and to decommission the backlog of DOE surplus facilities over a reasonable period of time.

In regard to providing reliable funding for future decommissioning activities, we believe reliable cost estimates for decommissioning cannot be developed prior to construction and operation. However, an approximate estimate of the decommissioning cost should be provided and an expected lifetime and disposition statement should be included with any construction authorization

for facilities that involve nuclear contamination. Reference estimates should be developed before the end of operations and a few years before the start of decommissioning. Major projects such as the dismantlement of reactors or large fuel cycle facilities should be authorized as construction-type projects to provide assurance of Congressional intent to complete the project. The many smaller projects should be supported from a stable operating fund requested annually.

GAO EVALUATION

We agree with DOE. This is basically the same approach we discussed on pages 24 and 38.

DOE COMMENT

We strongly concur with the GAO recommendation that Congress urge the Environmental Protection Agency (EPA) to expedite the development of radiation standards for decommissioning activities. We also urge that these standards be based on potential health risks, which are realistic and balanced with consideration of risks and costs accepted by society for non-nuclear activities. In particular, the standards proposed by EPA in 1980 for inactive uranium mill tailings processing sites and disposal sites were too stringent and would have resulted in large, unwarranted costs by Government and industry. Testimony to Congressional committees in mid-1981 led to reevaluation of these proposed EPA standards and suspended Fiscal Year 1982 funding for NRC to enforce related regulations or to require states to adopt these regulations for active mill tailings sites. Delay in issuance of the EPA standards for processing or disposal sites has hindered and caused problems in proceeding with the Department's Uranium Mill Tailings program because issuance of these standards must precede definitive clean-up work on processing sites as mandated by Public Law 95-604. The mill tailings standards will also provide a technical precedent for remedial actions at other sites formerly utilized by the Manhattan Engineer District and Atomic Energy Commission and having similar contamination. The Department has authority to develop standards and to conduct remedial actions at some of these other sites. We have accordingly developed standards based on recognized general criteria for population exposure taking appropriate consideration of the analysis and proposals for standards drafted by EPA and have proceeded with remedial actions at these sites based on such ad hoc standards derived from conservative analyses of potential health effects. These have allowed us to expedite actions and avoid a costly and frustrating hiatus at several of the remedial action sites.

We have resolved most of our detailed comments on an earlier draft of the report through discussions with your staff

who agreed to make modifications. Some remaining comments are provided in the enclosures to this letter. The Department appreciates the opportunity to comment on this draft report and urges that GAO consider these comments in preparing the final report.

GAO EVALUATION

We agree.

(301561)

*U.S. GOVERNMENT PRINTING OFFICE : 1982 0-361-843/2116

21993

AN EQUAL OPPORTUNITY EMPLOYER

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

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE,$300

POSTAGE AND FEES PAID
U. S. GENERAL ACCOUNTING OFFICE

THIRD CLASS