

See Pocket 1 for encl. <sup>73</sup>

MAY 31 1985

109/NLS/85/05/28

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MEMORANDUM FOR: Donna R. Mattson, Section Leader  
Program Control and Analysis Section, WMPC  
FROM: Nancy Still  
Program Control and Analysis Section, WMPC  
SUBJECT: TRIP TO KANSAS CITY, MISSOURI, 5/14-15/85, FOR DOE/OCRWM  
SPRING 1985 INFORMATION MEETING

On May 14-15, 1985, I attended the DOE's Office of Civilian Radioactive Waste Management Spring 1985 Information Meeting in Kansas City, Missouri. Enclosed are the agenda, handouts, and presentations from this meeting. After each presentation, a question/answer session was held; below are the more important observations from these sessions.

Roger Gale, DOE, gave an overview of various parts of the program which included the Mission Plan, Monitored Retrievable Storage (both of which are discussed below and in the handouts), and the Price Anderson Act. Jim Palmer, Mississippi, asked that since the commingling decision has been made, will defense waste facilities be considered (i.e., WIPP) for a HLW repository. Bill Bennett, DOE, replied no, DOE will continue to follow the requirements under the NWA. Steve Frishman, Texas, commented that in the DOE's May 2, 1985, Baltimore meeting, Mr. Rusche mentioned that the HLW "process" was not as important as the "product," that is, getting the HLW repository built. Mr. Frishman criticized Mr. Rusche as not being affected by past state interactions and comments.

Bill Bennett, DOE, gave an overview of the integrated system, a repository update. DOE has received approximately 15,000 comments on EA's--23% from state/tribes, 15% from federal agencies, and 62% from the public. DOE is still receiving and considering comments. The target for the final EA's is November 1985. The EA comments are being handled by DOE as follows--30% by DOE HQ, 51% by Salt Project Office, 15% by BWIP Project Office, 7% by Nevada Project Office. However, the State of Nevada's "800 pages" of comments had not yet been received and factored into the percentages.

Mr. Bennett, who will be moving to the Uranium Enrichment office within DOE at the end of June, discussed how he felt the state/tribal/DOE relationship had greatly deteriorated during the last six months. Interaction is much more confrontational and less productive; he believes the states should try to be more cooperative.

WM Record File

WM Project

109

Docket No.

8506110194 850531

PDR WASTE

PDR

WM-1

PDR

LPDR

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A participant from Maine commented that he believes the reason for DOE/state confrontations is that DOE never listens to the state comments, thus states will continue to become more emphatic with their comments. He cited the Region-to-Area Screening document as a good example of DOE not addressing state comments.

The Department of Interior representative said he would like to see a detailed package on the security of the HLW sites if waste is commingled with defense waste. He asked if there will be any difference in the security level? Mr. Bennett said no; the security will be the same.

Dave Berick, Environmental Policy Institute, asked about the status of the Project Decision Schedule? Roger Gale, DOE, said a draft is due at the end of June 1985; the final is due in September 1985. DOE has received about 30 comments.

Keith Klein, DOE, discussed the Monitored Retrievable Storage (MRS) program. Lake Barrett was introduced as DOE's Transportation & Systems Office head. When asked if the MRS can accommodate both 1st & 2nd round repositories, Mr. Klein said he believed so, but it will depend on the rate of receipt of the waste. Suzanne Rhodes, South Carolina, asked if any other sites are being considered now for MRS besides Tennessee? Mr. Klein said no, Tennessee still seems the best and most likely state for an MRS site. There will be a detailed analysis submitted to Congress on the need for an MRS, which will include cost information. When a Mississippi participant asked where states had involvement in the MRS process, Mr. Klein said DOE had a peer review group review the MRS program with many outside organizations participating. DOE basically used their own judgment through MRS process and found regionally good sites in Tennessee. He does not believe state involvement is as important in the MRS program as in the HLW repository program since the MRS is "not permanent like a repository." The peer review group was not formally set up so there is no formal report available; however, individual comments from the group are publicly available.

A Mississippi representative commented that he had read about the potential MRS sites in the newspaper. A Washington representative commented that the states have a feeling of a DOE "cover-up" on the MRS program.

Gene Langston, DOE, discussed DOE's quality assurance program. In response to the question on whether DOE is following NRC's "ever-changing" QA procedures and whether DOE and NRC will work together closely, Mr. Langston said yes, just recently, NRC had visited the DOE field offices to review DOE's QA program. Maine commented that DOE data/information, especially contractor documents, are not always available. Roger Gale, DOE, said that all DOE technical HLW

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information is open to the states, unless proprietary. There may be a logistics problem for some states in reviewing the DOE data.

Mr. Frishman asked whether there are any design differences in the QA repository program compared to other DOE programs? Mr. Langston said yes, but this is to be expected due to the nature of the HLW program. Mr. Frishman asked if there was a QA process and was it documented for the EA portion written by DOE-HQ, specifically Chapter 7. Mr. Langston said DOE "trusted the data from sources such as USGS." A QA trail could be reconstructed, but there was no definite QA program in writing at that time. There is a good QA program evolving in DOE now.

Roger Gale, DOE, discussed the Mission Plan, in the absence of Tom Isaacs, DOE. DOE is not sure how updates to the Mission Plan will be handled, but there will be a public process each time. The draft Plan is due 5/31/85. Multiple copies will be distributed to the states.

Sheldon Meyers, EPA, spoke about the EPA HLW Standard. The final is due mid-summer 1985. Minnesota asked if there will be a signed agreement between EPA and NRC regarding NRC's adoption of EPA's assurance requirements. Mr. Meyers stated that there is a verbal agreement between NRC and EPA on this. He does not believe EPA would be able to get a written MOU through NRC's concurrence process.

Tom Cotton, Office of Technology Assessment, discussed OTA's recent report, "Managing the Nation's Commercial High-Level Radioactive Waste," 3/85. When asked if NRC's "management problems" were addressed in the report, Mr. Cotton said not specifically, but NRC's management "is always a wonder, like a multi-headed animal."

Doug Larson, Western Interstate Energy Board, discussed WIEB's Spent Fuel/High-Level Radioactive Waste Transportation Project, under contract to DOE. WIEB has prepared a draft report under this project; the next draft is due at the end of June.

On May 23, 1985, WMPC (Donna Mattson, Cathy Russell, and myself) briefed WMRP (John Linehan, Scott Grace, King Stablein, and Sylvie Olney) regarding both the Kansas City meeting and DOE's Quarterly Meeting in Baltimore, MD, on May 2, 1985.

*AS*

Nancy Still  
Program Control and Analysis Section  
Policy and Program Control Branch, WM

Enclosures: As stated

OFC	: WMPC	:	:	:	:	:	:
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DATE	: 85/05/31	:	:	:	:	:	:

*Encl. to memo  
to Mattson fm.  
Stall - 5/21/85*

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

SPRING 1985 INFORMATION MEETING

Embassy on the Park Sheraton  
Kansas City, Missouri  
May 14-15, 1985

AGENDA

Tuesday, May 14, 1985

- |             |   |                         |
|-------------|---|-------------------------|
| 9:00-9:45   | Overview and Introduction<br>- Milestones<br>- Budget and Congressional Updates | <i>Roger Gale</i>       |
| 9:45-10:45  | Integrated System<br>- MRS  | <i>Keith Klein</i>      |
| 10:45-11:00 | BREAK   |                         |
| 11:00-12:00 | Integrated System (continued)<br>- Repository Update                            | <i>Bill Bennett</i>     |
| 12:00-2:00  | LUNCH   |                         |
| 2:00-3:00   | Quality Assurance   | <i>Merritt Langston</i> |
| 3:00-3:15   | Break   |                         |
| 3:15-4:15   | Mission Plan Preview  | <i>Roger Gale</i>       |
| 4:15-5:00   | Additional Issues   |                         |

RECEPTION/CASH BAR 5:30-7:00

Wednesday, May 15, 1985

- |             |  |                       |
|-------------|--|-----------------------|
| 9:00-9:45   | Environmental Protection Agency Briefing | <i>Sheldon Meyers</i> |
| 9:45-10:30  | Office of Technology Assessment Briefing | <i>Tom Cotton</i>     |
| 10:30-10:45 | BREAK                                    |                       |
| 10:45-11:30 | Western Interstate Energy Board Briefing | <i>Doug Larson</i>    |
| 11:30-12:00 | Summary                                  |                       |

# OCRWM PROGRAM

## MISSION

- **ESTABLISH SYSTEM FOR ACCEPTING NUCLEAR SPENT FUEL AND HIGH-LEVEL WASTE FROM ITS GENERATORS BY 1998**
- **ARRANGE FOR ULTIMATE DISPOSAL IN REGIONAL SYSTEM OF GEOLOGIC REPOSITORIES**

# OCRWM PROGRAM

## MAJOR SYSTEM FUNCTIONS:

- **ACCEPT SPENT FUEL AND WASTE**
- **TRANSPORT FROM SOURCE TO REPOSITORIES OR INTERMEDIATE FACILITIES**
- **PREPARE, PACKAGE, AND STORE MATERIAL AS NEEDED**
- **PROVIDE FOR FINAL DISPOSAL**

# OCRWM PROGRAM

## SYSTEM COMPONENTS:

- **GENERATORS (PRIMARILY POWER REACTORS)**
- **MONITORED RETRIEVABLE STORAGE**
- **REPOSITORIES**
- **INTERCONNECTING TRANSPORTATION SYSTEM**

# OCRWM PROGRAM

## ORIGINAL STRATEGY:

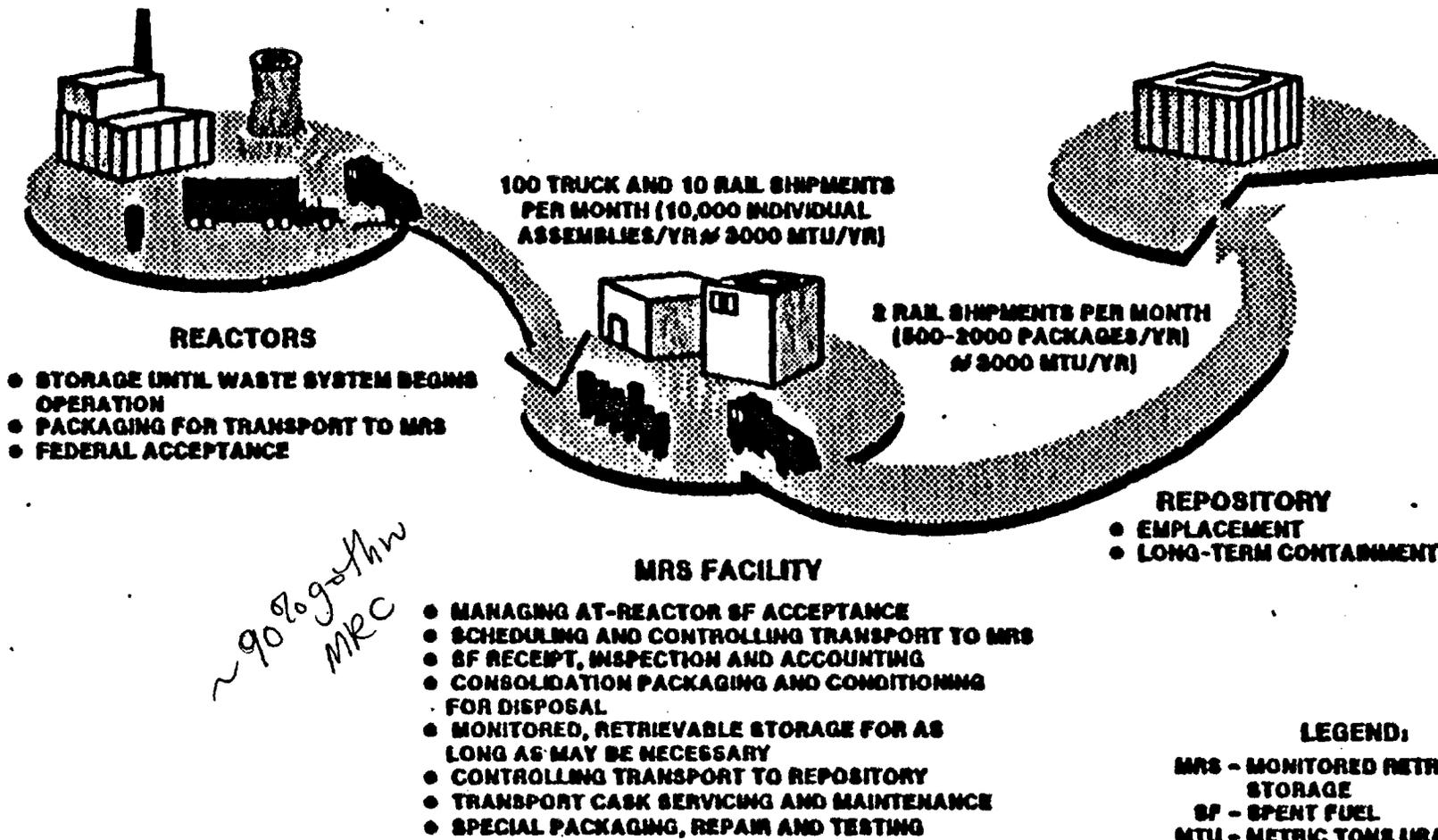
- ACCEPT FUEL BY JANUARY 31, 1998
- TRANSPORT DIRECTLY FROM REACTORS TO REPOSITORY
- USE NRC-CERTIFIED CASK
- BEGIN FIRST REPOSITORY OPERATION IN 1998
- BEGIN SECOND REPOSITORY OPERATION IN 2006
- STUDY MRS NEED AND FEASIBILITY AND PROVIDE REPORT IN JUNE 1985 (BACKUP FACILITY?)
- FINANCE ACTIVITIES OUT OF NUCLEAR WASTE FUND

# OCRWM PROGRAM

## CURRENT STRATEGY FOR MRS:

- RECEIVE SPENT FUEL
- PRODUCE CONSOLIDATED REPOSITORY-READY PACKAGES
- STORE FUEL
- MONITOR FUEL
- SHIP TO REPOSITORY

# DISTRIBUTION OF WASTE MANAGEMENT FUNCTIONS WITHIN AN "INTEGRATED" SYSTEM

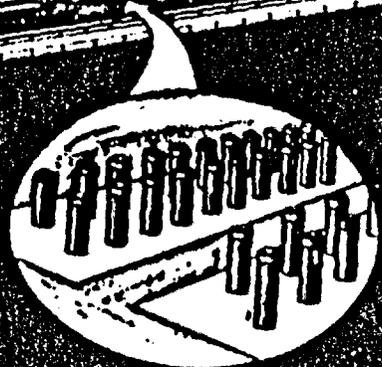
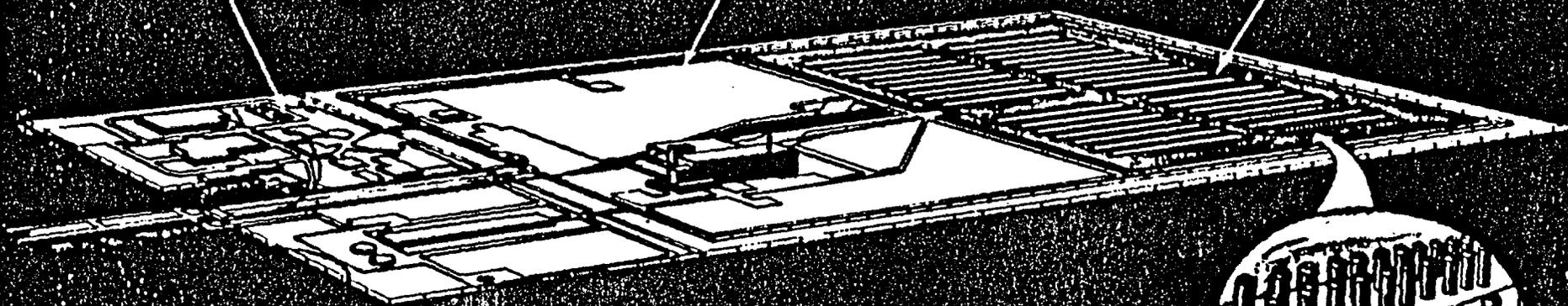


# Monitored Retrievable Storage Facility

Support Services  
and Cask  
Manufacturing Area

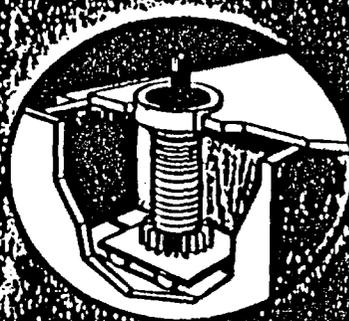
Receiving, Handling  
and Packaging Area

Storage Area

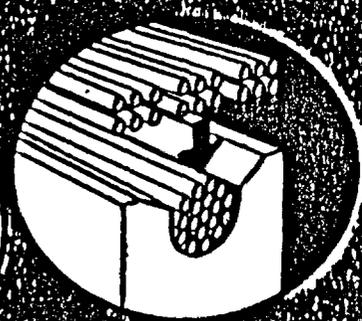


Artist's Concept

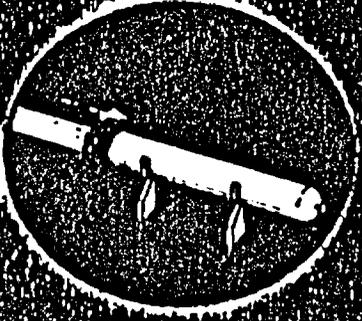
# Monitored Retrievable Storage Facility Operations



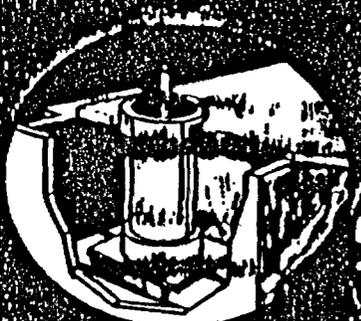
Shipping Cask  
Unloading



Spent Fuel  
Consolidation



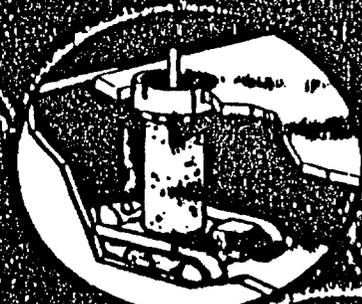
Canister  
Loading



Shipping Cask  
Loading



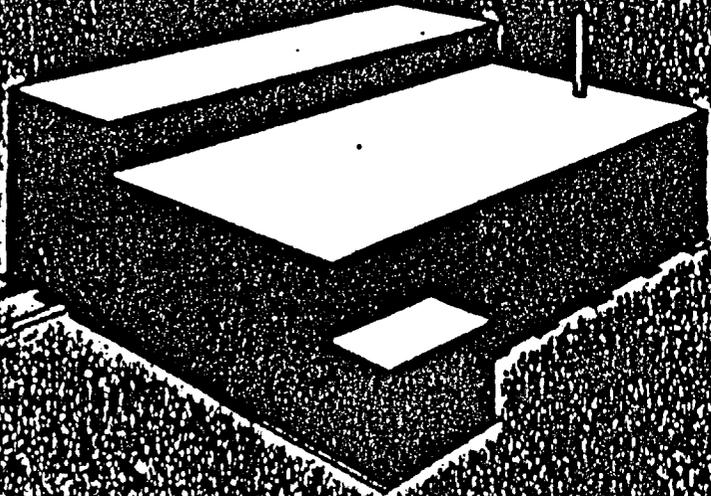
Shipment to  
Repository



Storage Cask  
Loading/Unloading

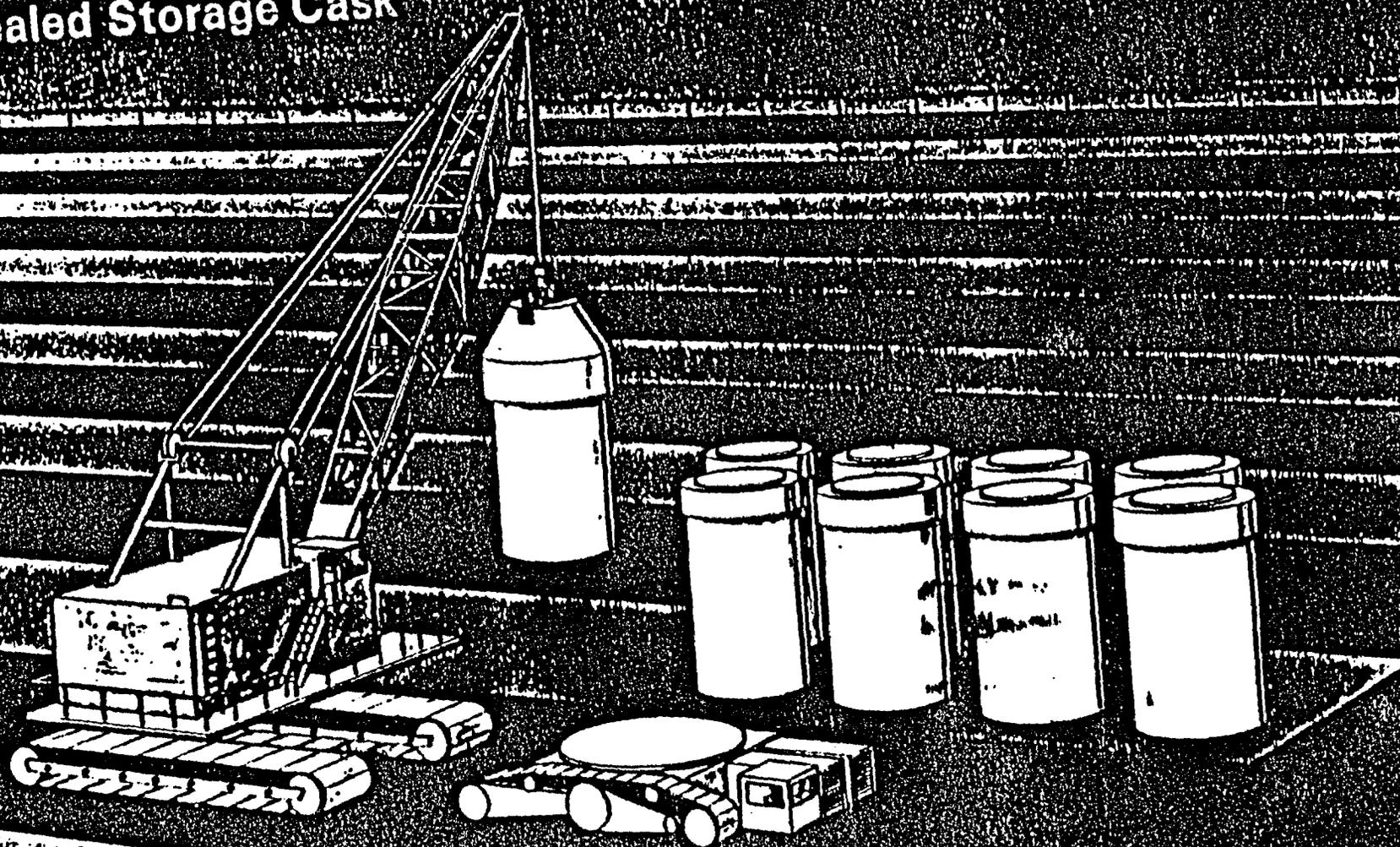


Storage



Artist's Concept

# Primary Storage Concept for Monitored Retrievable Storage - Sealed Storage Cask



Artist's Concept

# EXPECTED BENEFITS OF INTEGRATED MRS

- **REPOSITORY**

- **ALLOWS REPOSITORY DEVELOPMENT EFFORTS TO  
FOCUS ON GEOLOGIC ISSUES**
- **DECREASES REPOSITORY LICENSING, CONSTRUCTION,  
AND OPERATING EFFORTS**
- **REPOSITORY RECEIVES FEWER SHIPMENTS AND  
CLEAN, UNIFORM PACKAGES**

# **EXPECTED BENEFITS OF INTEGRATED MRS**

- **TRANSPORTATION SYSTEM**

- **PROVIDES A STAGING AREA**
- **DEDICATED TRAINS FOR CROSS-COUNTRY SHIPMENTS**
- **FEWER CASK MILES**
- **REDUCED, OVERALL TRANSPORTATION IMPACTS**
- **PROVIDES A LOGICAL SITE FOR CASK SERVICING  
AND MAINTENANCE**

# **EXPECTED BENEFITS OF INTEGRATED MRS**

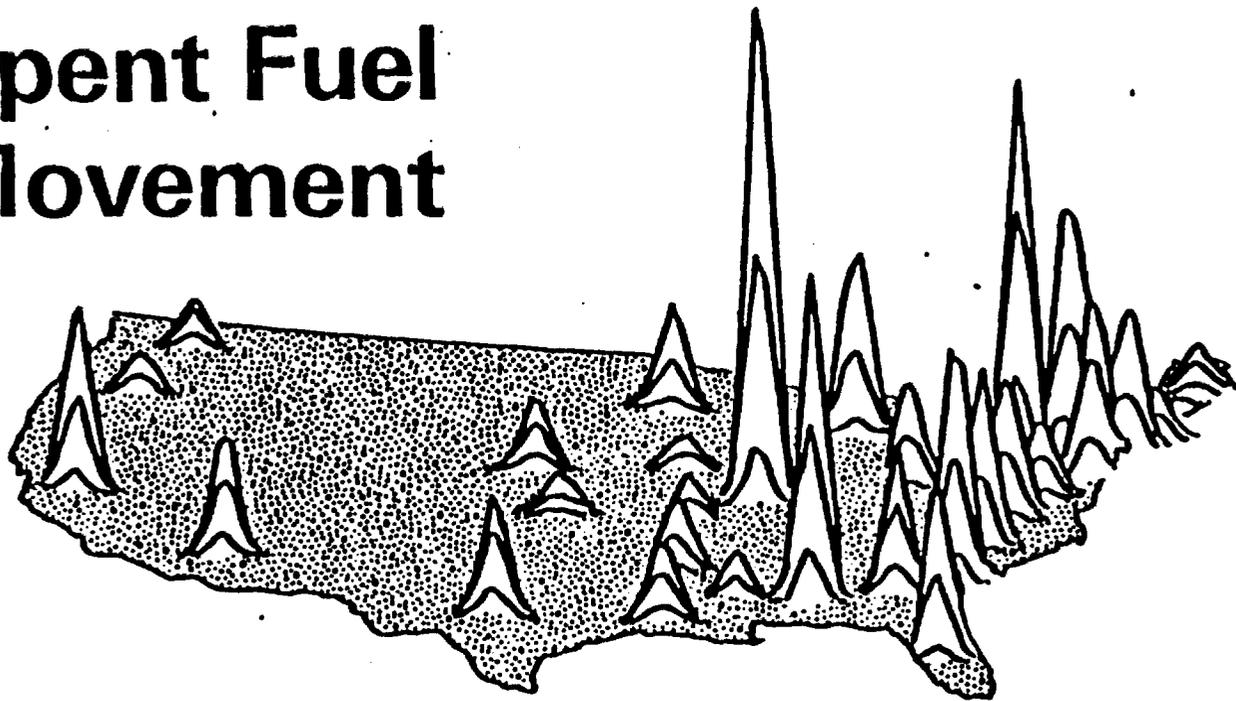
- **OVERALL SYSTEM STORAGE**

- **BUFFER BETWEEN ACCEPTANCE COMMITMENTS AND REPOSITORY AVAILABILITY**
- **REDUCES NEED FOR NEW AT-REACTOR CAPACITY ONCE FEDERAL WASTE SYSTEM IS OPERATIONAL**
- **PROVIDES AN OPTION FOR LONG-TERM STORAGE**
- **ALLOWS FOR AGING OR CONDITIONING OF FUEL**

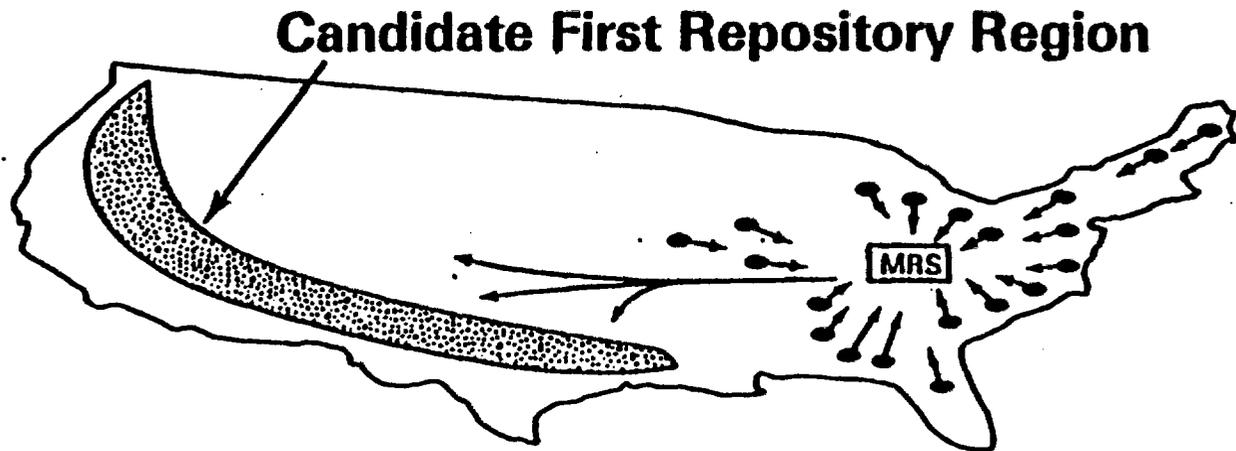
# **EXPECTED BENEFITS OF INTEGRATED MRS**

- **OVERALL SYSTEM RELIABILITY, FLEXIBILITY AND COST EFFECTIVENESS**
  - **SYSTEM "SURGE" CAPACITY**
  - **GREATER LOGISTICS CONTROL**
  - **ALLOWS DISPOSAL PROGRESS EVEN IF REPOSITORY IS DELAYED**
  - **CAN SIGNIFICANTLY REDUCE OVERALL SYSTEM COSTS**

# Spent Fuel Movement



**Weighted Distribution of First 70,000 MT  
of Spent Fuel**



**Movement of Spent Fuel**

# **MRS Facility Candidate Site Identification**

## **Objectives:**

- **Identify safe sites with minimal adverse environmental impact**
- **Enhance mission of integral MRS**
- **Timely, cost effective selection**

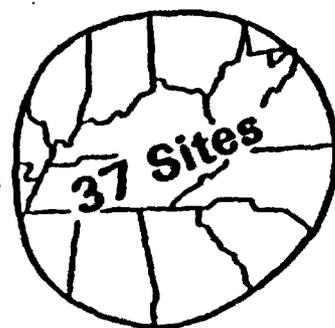
# MRS Facility Site Screening



**Many Potentially Acceptable Sites Across the Country**



**Preferred Region to Reduce Transport Miles**



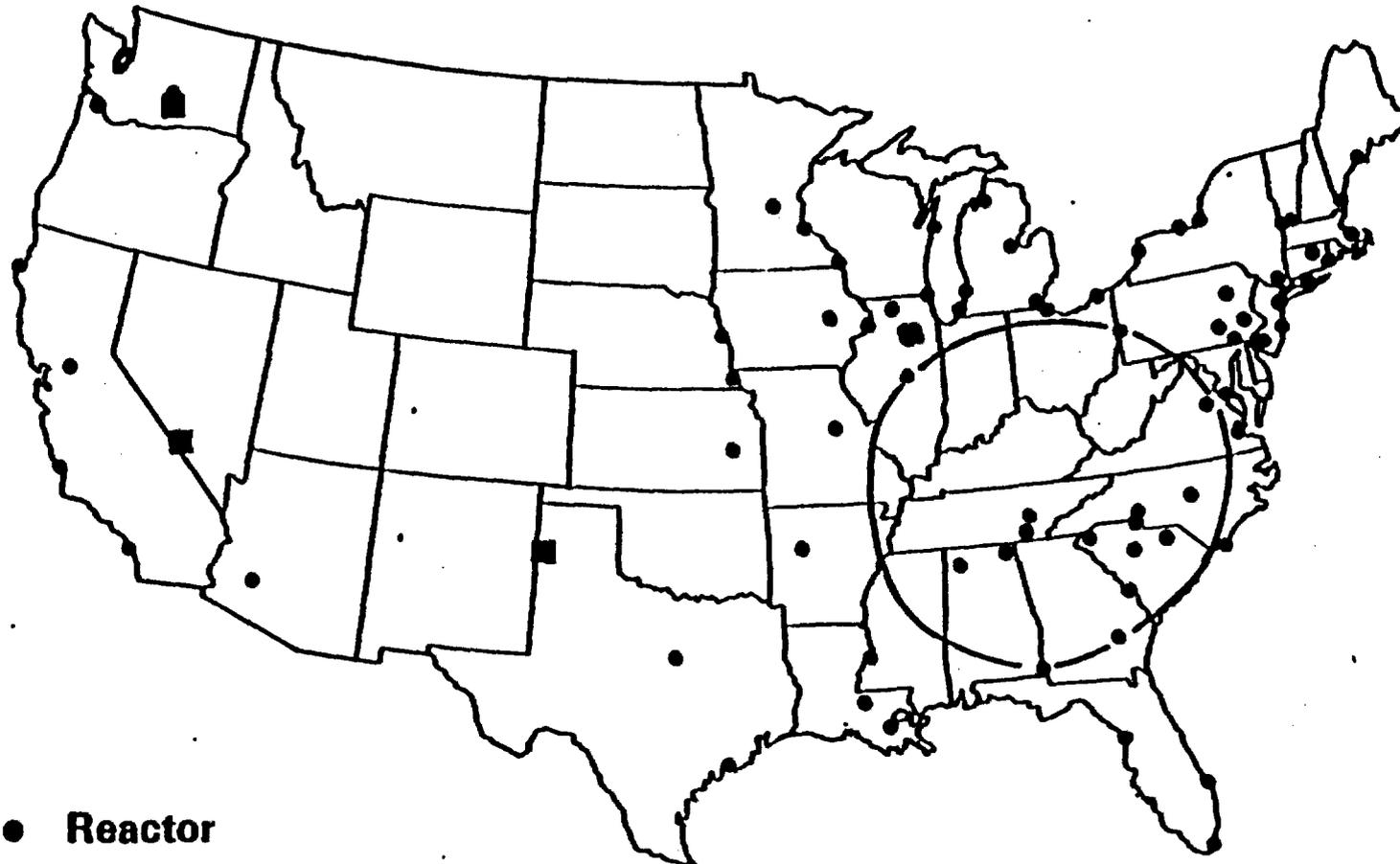
**DOE-Owned & NRC-Docketed Sites**



**1100 Available Acres Without Site Use Conflict**

# Preferred Region for Siting an MRS Facility

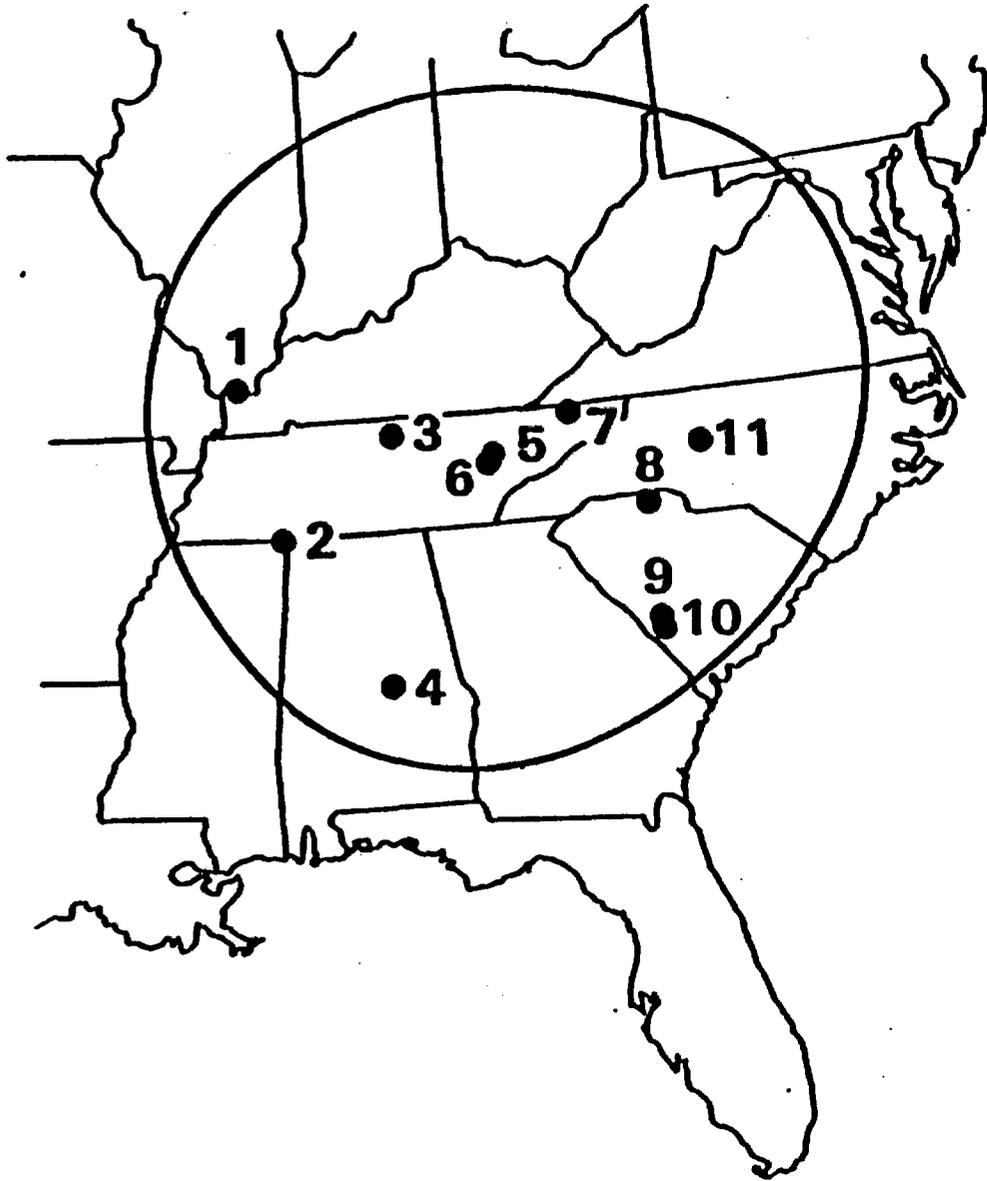
The preferred region is that area of the country where locating an MRS facility for receipt and packaging of spent fuel and shipment by rail to the repository would result in total shipment miles within 20% of the minimum achievable.



● Reactor

■ Site Under Consideration for First Repository

# 11 Potentially Suitable Sites for Evaluation



1. Paducah Site, KY
2. Yellow Creek Site, MS
3. Hartsville Site, TN
4. Barton Site, AL
5. Oak Ridge Site, TN
6. Clinch River Site, TN
7. Phipps Bend Site, TN
8. Cherokee Site, SC
9. Savannah River Site, SC
10. Barnwell Site, SC
11. Perkins Site, NC

# Analysis of Eleven Sites

**Site  
Descriptions**

- **Regulatory Compliance**
- **Environmental**
- **Geotechnical**
- **Socioeconomic**
- **Institutional**
- **Transportation**
- **Infrastructure**
- **Capital Cost**

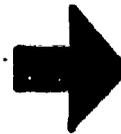
**Finding**

**MRS Can Be Constructed and Operated  
Safely at All 11 Sites**

# MRS Candidate Site Identification



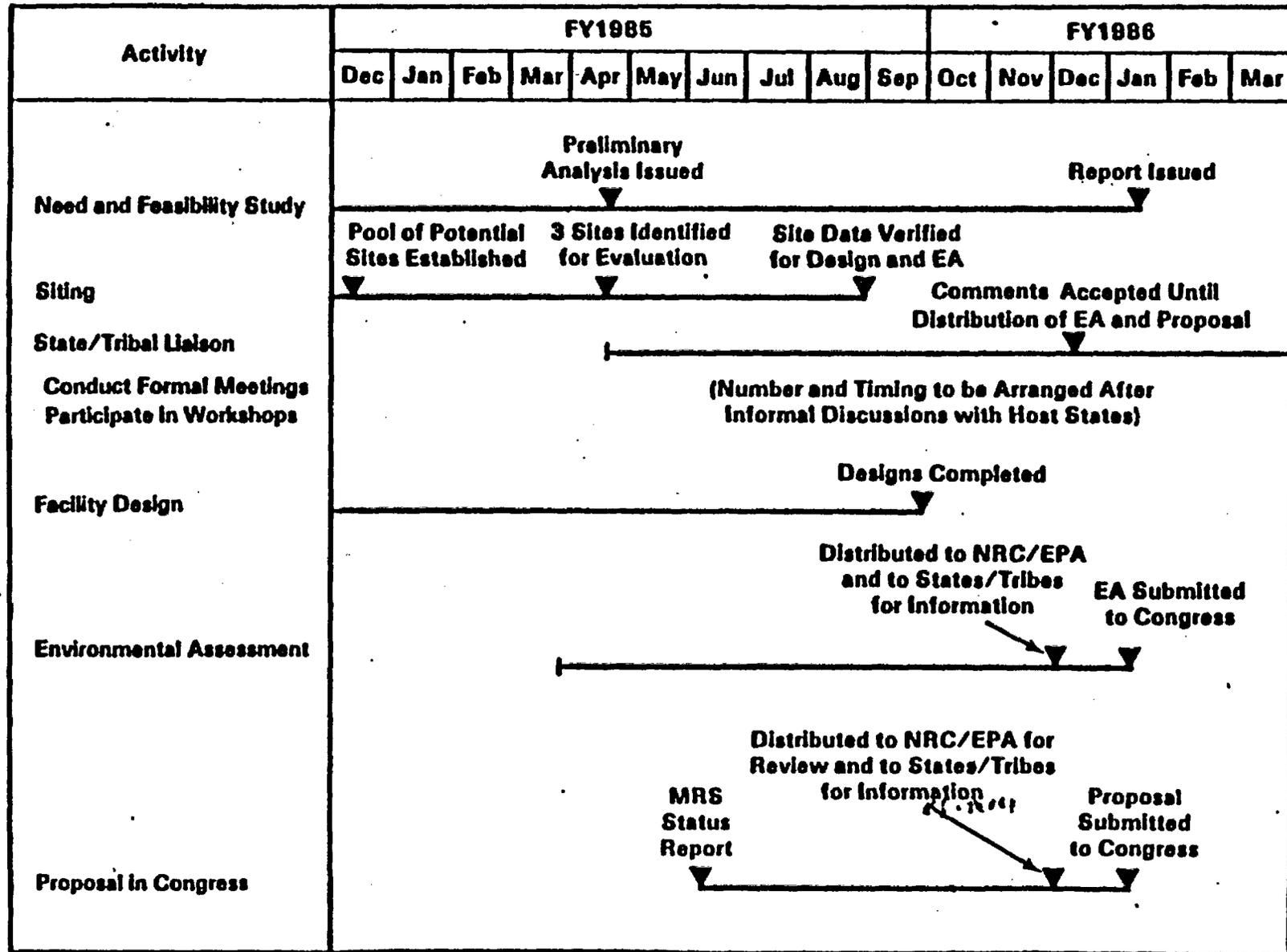
**Comparison &  
Judgment**



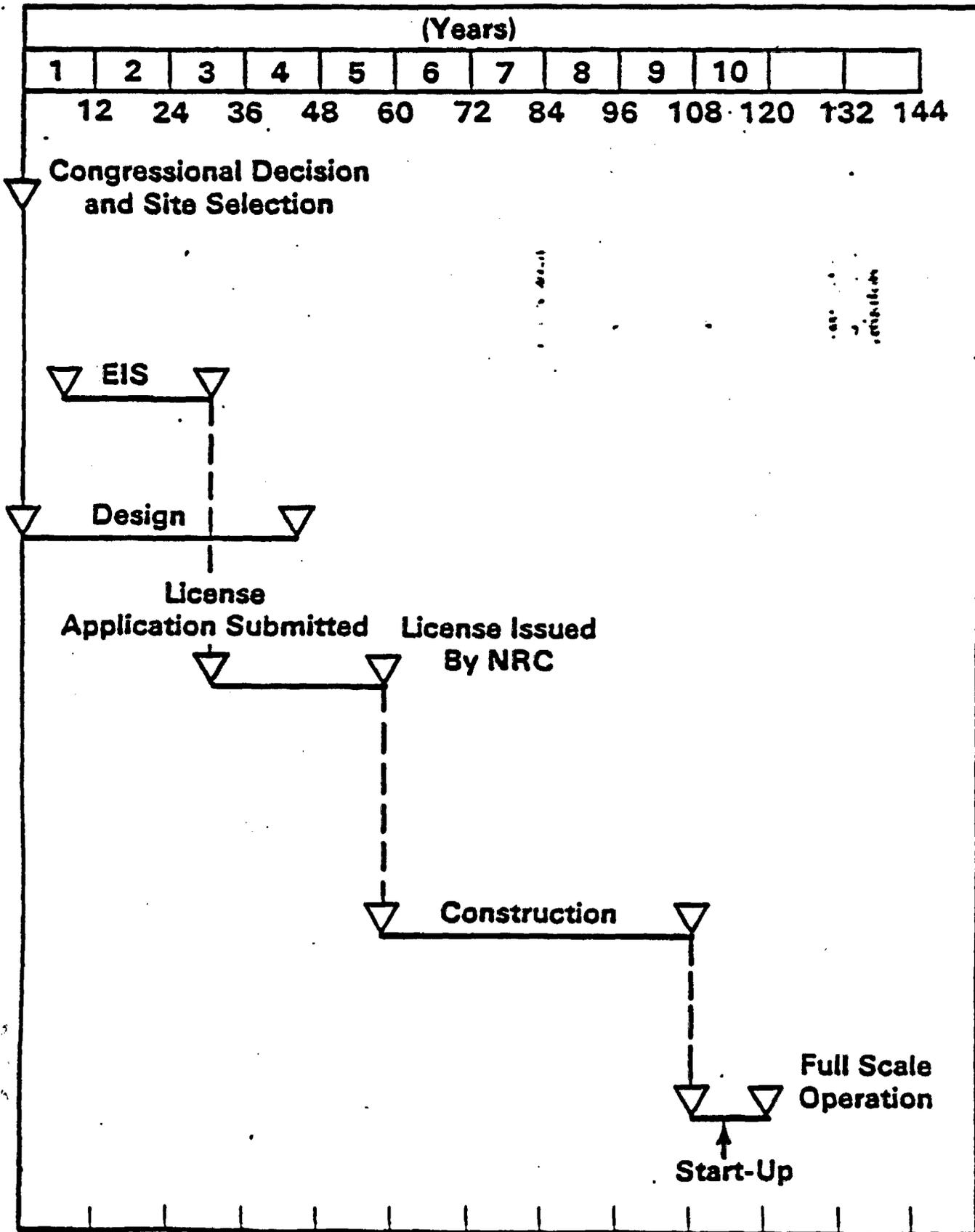
**3 Candidate MRS  
Sites Identified**

- **Clinch River Breeder Reactor Site**
- **DOE Oak Ridge Reservation**
- **TVA Hartsville Site**

# Summary Schedule for MRS Proposal Preparation



# MRS Deployment Schedule



# **NWPA Directs DOE to Prepare Proposal for MRS**

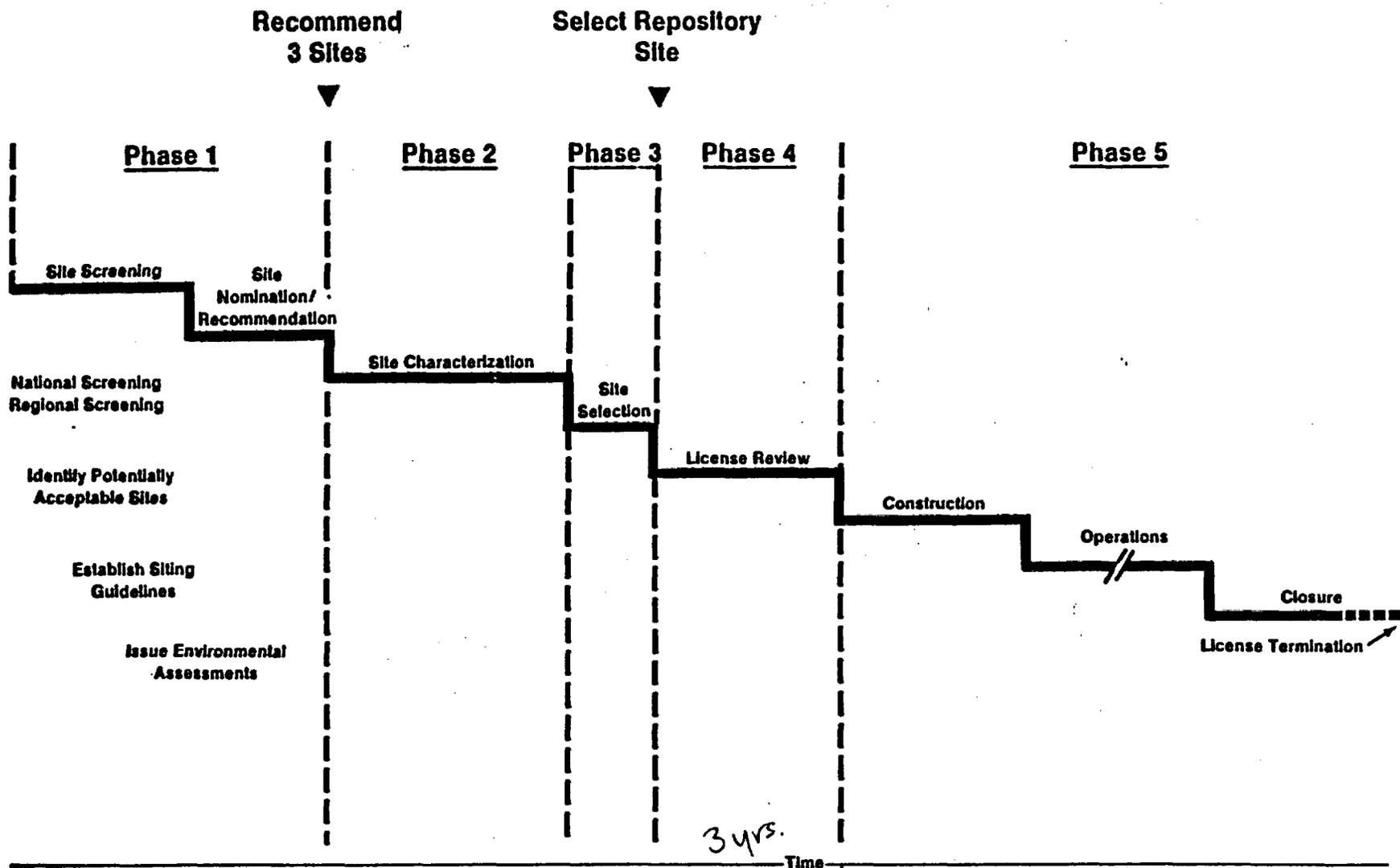
## **Reached Major Milestones in This Directive**

- **Preliminary analysis of need and feasibility**
- **Identified a preferred and 2 alternative sites**
- **Starting state and public interactions**
- **Objective: Fully informed players**
- **Proposal will be submitted in January 1986**

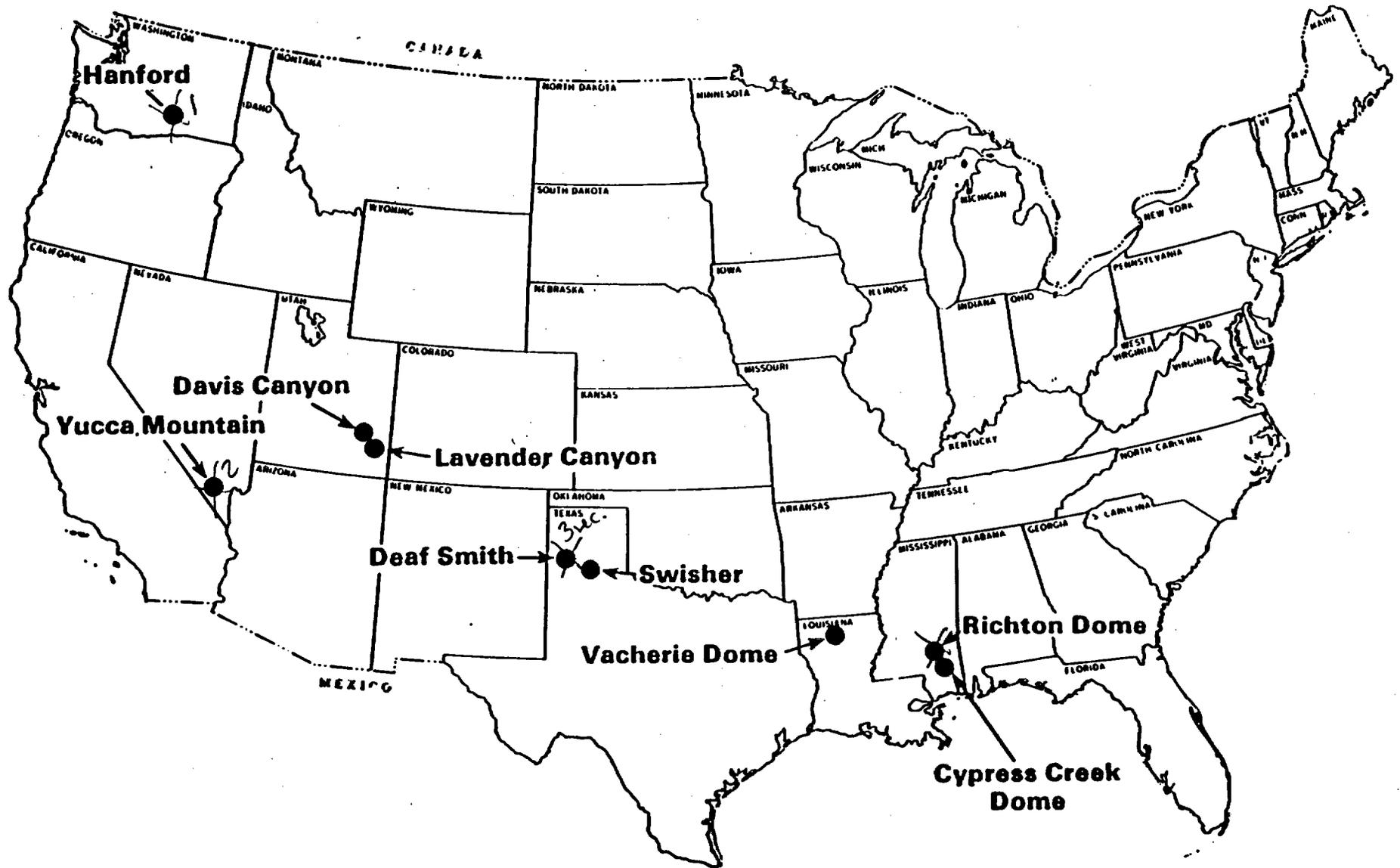
# ITEMS TO BE COVERED

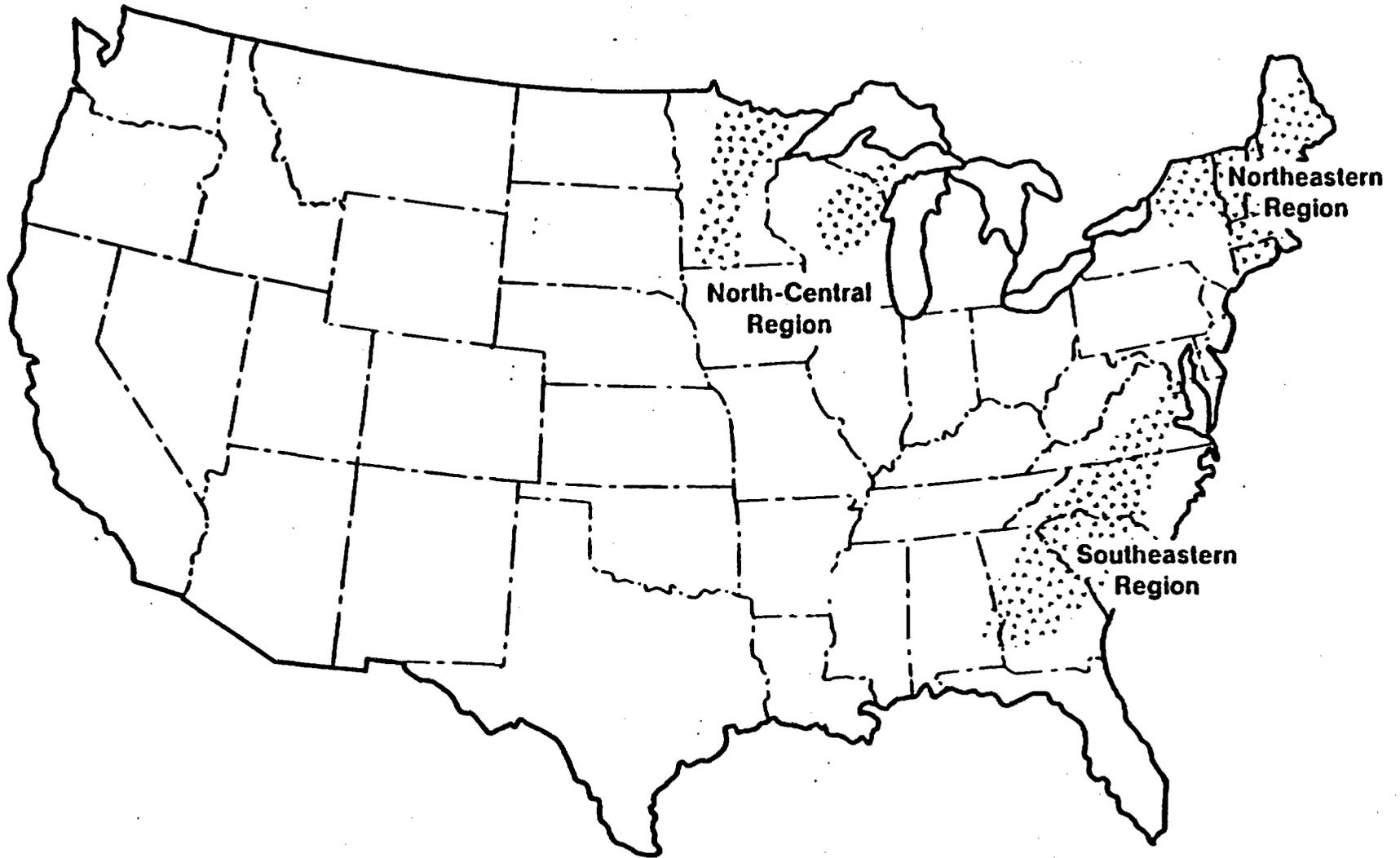
- PHASES OF GEOLOGIC REPOSITORY PROGRAM
- FIRST REPOSITORY STATUS
  - LONG-RANGE SCHEDULE
  - NEAR-TERM ACTIVITIES
- SECOND REPOSITORY STATUS
  - LONG-RANGE SCHEDULE
  - NEAR-TERM ACTIVITIES
- SPECIAL TOPICS
  - PRELIMINARY DETERMINATION
  - GRANTS
  - EAs

# MAJOR PHASES OF GEOLOGIC REPOSITORY PROGRAM



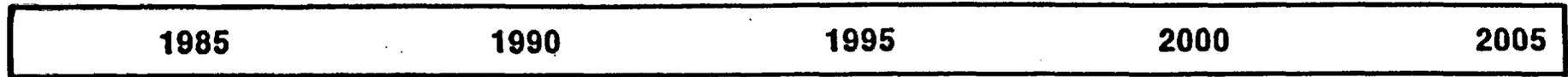
# POTENTIALLY ACCEPTABLE SITES FOR FIRST REPOSITORY



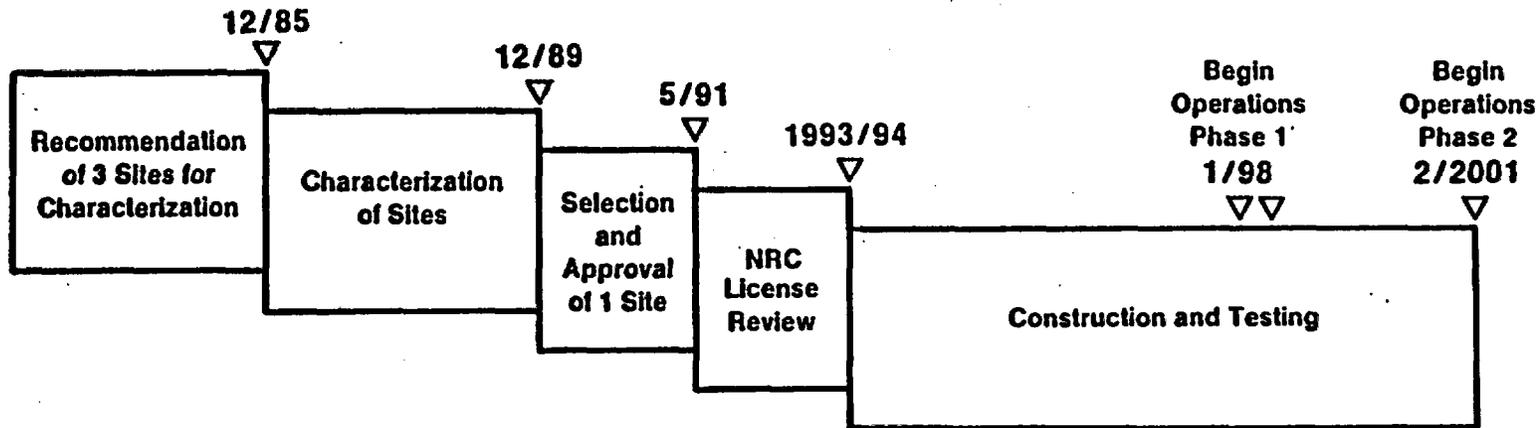


**REGIONS BEING CONSIDERED FOR THE SECOND REPOSITORY**

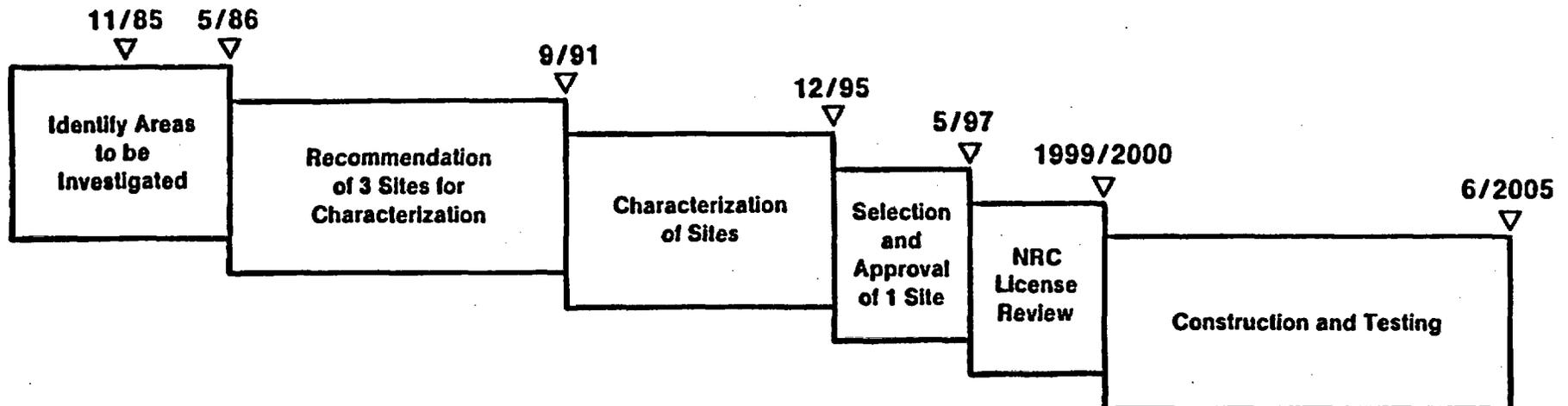
# Geologic Repository Reference Schedule



## FIRST REPOSITORY



## SECOND REPOSITORY



# **FIRST REPOSITORY NEAR-TERM ACTIVITIES**

- **PUBLIC COMMENT PERIOD ON DRAFT EAs CLOSES — 3/20/85**
- **CONSULT WITH STATES/AFFECTED TRIBES/FEDERAL AGENCIES  
— SPRING 85**
- **PUBLISH FINAL EAs — FALL 85**
- **RECOMMENDATION OF SITES FOR CHARACTERIZATION TO PRESIDENT  
— FALL 85**
- **PRESIDENT APPROVES 3 SITE FOR CHARACTERIZATION — WINTER 85**

# SECOND REPOSITORY NEAR-TERM ACTIVITIES

- SCREENING METHODOLOGY — APRIL 1985
- FINAL REGIONAL CHARACTERIZATION REPORTS — JULY 1985
- DRAFT AREA RECOMMENDATION REPORT — NOVEMBER 1985
- FINAL AREA RECOMMENDATION REPORT — MAY 1986

*Begin siting studies  
late '86*

*- identify  
10-20 rock  
bodies*

## REPOSITORY PLANS/ANTICIPATED PROGRESS AND PROBLEMS WITH SITING

J. William Bennett  
Deputy Associate Director  
Office of Geologic Repositories  
Office of Civilian Radioactive Waste Management  
U.S. Department of Energy  
Washington, DC 20585

### ABSTRACT

The geologic repository program within the Office of Civilian Radioactive Waste Management has made considerable progress during 1984 in implementing the site selection process mandated in the Nuclear Waste Policy Act of 1982. Major milestones attained during the year included publication of a draft Mission Plan, Siting Guidelines, draft Environmental Assessments for each of the nine potentially acceptable sites under consideration for the first geologic repository, draft Regional Geologic Characterization Reports and Draft Environmental Characterization Reports for each of the three regions covering 17 States under consideration for the second geologic repository, and a draft screening methodology document for screening the approximately 250 crystalline rock bodies in the region-phase studies to a more workable number in the area-phase studies for the second geologic repository.

In addition, the Department has made considerable progress in promoting public interaction and implementing the consultation and cooperation process with the affected States and Indian tribes. Major activities in these areas included multiple reviews of the Siting Guidelines, public meetings with the Nuclear Regulatory Commission (NRC) to resolve NRC concerns leading to NRC concurrence on the Siting Guidelines, periodic program information meetings with the first and/or second repository States and affected Indian tribes, negotiation of a draft consultation and cooperation agreement with the State of Washington, grants to the affected States and Indian tribes to participate in the review of the program, and publication of draft Environmental Assessments in advance of the nomination and recommendation of sites for detailed site characterization.

The progress made in 1984 demonstrates that the Department is well along in the first of five major program phases, which I described at WASTE MANAGEMENT '84 last year, leading to licensing of the Department to receive spent fuel in 1998 for emplacement in the geologic repository. The phases include: 1) recommendation of sites for characterization; 2) characterization of sites; 3) selection and approval of one site for development as a geologic repository; 4) construction authorization for that site; and 5) construction and performance confirmation testing for the geologic repository. The Department remains firmly committed to, and has entered into disposal contracts based on, receipt of spent fuel in 1998 for emplacement in a geologic repository for permanent isolation from the biosphere.

In this paper, I will describe the status and management strategy associated with each program phase, discuss major milestones associated with each program phase, and highlight those opportunities or obstacles which have the potential to accelerate or delay the achievement of program goals.

### INTRODUCTION

The Nuclear Waste Policy Act of 1982 (the Act) authorizes the Department of Energy to site, design, construct, operate, and close geologic repositories for the disposal of civilian spent fuel and high-level wastes. The Act lays out a detailed siting process and schedule; and, the Act mandates a comprehensive process for public interaction and consultation and cooperation (C&C) between the Department and the affected States and Indian tribes. Considerable progress has been made in each of these areas. Where balancing the priorities between the two areas has been necessary, the Department has consistently placed more importance on public interaction, particularly with the affected States and Indian tribes, while still recognizing the need to achieve the mandated goal of receiving and emplacing wastes in the geologic repository by 1998. To date, the balancing of priorities has contributed to delays in meeting the near-term schedule and has placed pressure on longer-term milestones due to schedule compression.

In this paper, I will describe the status and management strategy associated with each of five program phases leading to issuance of a license to receive and emplace wastes in the geologic repository. I will discuss major milestones associated with each program phase; and, I will highlight those opportunities or obstacles which have the potential to accelerate or delay the achievement of program goals (including schedule).

### Program Phases

The major program phases leading to licensing of the Department to receive wastes in 1998 for emplacement in a geologic repository are:

1. Recommendation of sites for characterization,
2. Characterization of sites,
3. Selection and approval of one site for development as a geologic repository,
4. Construction authorization for that site, and
5. Construction and performance confirmation testing for the geologic repository.

The Department considered a wide variety of scheduling possibilities, as detailed in the draft Mission Plan, that might lead to the completion of the tasks within each program phase and the achievement of the overall goal of safe and environmentally-acceptable disposal of wastes in a geologic repository by 1998. After analyzing these alternative schedules, the Department adopted a "reference schedule" for achieving this schedular objective for the first geologic repository. This reference schedule can be characterized as optimistic and success-oriented, and major assumptions used in developing the reference schedule will be presented in the following discussion.

#### Phase 1. Recommendation of Sites for Characterization

The Department promulgated general guidelines for the recommendation of sites for the nuclear waste repositories on December 6, 1984. These Siting Guidelines (10 CFR Part 960) are described in detail at this conference in a separate paper authored by Carol Hanlon, Department of Energy. In summary, the Siting Guidelines establish the technical criteria and the process, consistent with the Act and NRC requirements, which are the basis for repository siting. The Department published draft Environmental Assessments (EA's) for each of the nine potentially acceptable sites for the first geologic repository on December 20, 1984 for public comment period. The draft EA's provide a description of the sites, an evaluation of each site against the Siting Guidelines, and a comparison of the sites, guideline-by-guideline, against each other.

Based on these evaluations and the inter-comparison, the Department proposed in the draft EA's to nominate five sites as suitable for site characterization. These are the Davis Canyon site in Utah, the Deaf Smith County site in Texas, the Richton Dome site in Mississippi, the Hanford site in Washington, and the Yucca Mountain site in Nevada. The Department also proposed in the draft EA's to recommend to the President three sites for detailed site characterization. These are the Deaf Smith County site in Texas, the Hanford site in Washington, and the Yucca Mountain site in Nevada. The draft EA's are described in detail at this conference in a separate paper authored by Ellison Burton, Department of Energy.

The 90-day public comment period on the draft EA's expired on March 20, 1985. The Department is now in the midst of the massive job of reviewing and categorizing the comments received to date. Comments received after March 20 will be considered, to the extent possible, in preparing the final EA's. Subsequent milestones for Phase 1 include:

Issuance of final EA's, nomination, and recommendation of sites for characterization to the President	September, 1985
Presidential approval of recommended sites	November, 1985

Key assumptions used in developing this schedule include: 1) no extension of the public comment

period, 2) key comments are received on time, 3) the volume of comments received is not major, 4) major rewrites of the EA's are not needed to address the comments received, and 5) final EA's are prepared for only the five nominated sites. The Department should be in a better position to assess the feasibility of achieving this schedule after the critical review of the comments received has been completed and resultant revisions required to prepare the final EA's have been identified.

The Department is committed to a thorough evaluation and consideration of the comments received on the draft EA's; and, the Department will include an appendix in the final EA's which discusses the comments received, the resolution of the comments, and changes made in the final EA's in response to the comments. In addition, the Department will hold meetings with Federal agencies, affected States and Indian tribes during the finalization process to clarify the intent of their comments and to discuss the Department's resolution of the comments.

However, the Department fully recognizes that issuance of the final EA's, the nomination and recommendation, and Presidential approval are needed prior to starting certain critical-path activities in Phase 2 of the program.

#### Phase 2. Characterization of Sites

After Presidential approval of the recommended sites for characterization, the Department will issue Site Characterization Plans (SCP's) in accordance with the provisions of the Act and 10 CFR Part 60. The SCP's will describe the site, the conceptual design of the repository, and the waste package development program. They will also identify issues to be resolved during the testing and discuss the plans for testing in each of these areas. Site characterization will consist of surface-based testing and underground testing at the projected depth of the geologic repository in order to develop the information needed to more fully demonstrate the suitability of the site, design the repository, and support the license application for construction authorization. In addition, environmental and socioeconomic field studies will be performed in order to quantify the impacts of site characterization, provide a basis for estimating impacts arising from repository construction, operation, and closure, and prepare the Environmental Impact Statement (EIS) which will support the selection of one site for development as a geologic repository.

Site characterization activities are currently projected to cost nearly five hundred million dollars at each of the three sites through 1990. Studies performed in parallel, such as advancement of the repository design, development of the waste package, and performance assessment, are expected to cost another five hundred million dollars through 1990. Site characterization will include construction of two exploratory shafts, underground connections between the shafts, and testing rooms at the projected repository depth in order to perform in-situ tests under realistic conditions and scales of dimension and time. There will also be surface-based construction needed to support the

underground construction and testing, as well as to support any surface-based testing included in the SCP's.

Support activities and reports to be incorporated into the SCP's have been underway for some time; for example, agreement was reached with the NRC on an annotated outline for the SCP's on February 13, 1985. Issues to be addressed in the SCP's have been the subject of workshops with the NRC, DOE studies, and NRC technical position papers over the past several years.

Major milestones for Phase 2 include:

**Issuance of SCP's:**

Basalt	December, 1985
Tuff	December, 1985
Bedded Salt	October, 1986

**Start of site preparation:**

Basalt	Completed
Tuff	December, 1985
Bedded Salt	December, 1986

**Start of construction of first exploratory shaft:**

Basalt	April, 1986
Tuff	June, 1986
Bedded Salt	May, 1987

**Completion of first exploratory shaft:**

Basalt	October, 1987
Tuff	September, 1987
Bedded Salt	November, 1988

**Start of construction of second exploratory shaft:**

Basalt	February, 1987
Tuff	September, 1987
Bedded Salt	May, 1987

**Completion of underground connections between shafts:**

Basalt	October, 1988
Tuff	January, 1988
Bedded Salt	February, 1989

This schedule for site characterization milestones is based on certain key assumptions, among them: 1) the Department will proceed with site preparation and construction of exploratory shafts during NRC review of the SCP's, 2) NRC comments on the SCP's will be addressed in the semi-annual progress reports, 3) land acquisition and State or local permits will be accomplished in a timely manner, 4) the process is not delayed by lawsuits, and 5) the preliminary determination of site suitability will be made shortly after Presidential approval of the recommendation of three sites for site characterization.

This latter assumption should be explained in more detail. The Department is required in the Act, as part of the NEPA compliance process, to make a

preliminary determination as to the suitability of the three sites for development as a geologic repository. The Department interprets the Act to mean that the preliminary determination of site suitability can be made, based on the Siting Guidelines and the same information used in the EA's to nominate and recommend the sites, shortly after Presidential approval of the recommendation. The Department fully expects all three sites will survive site characterization and be found suitable for development as a geologic repository. However, it is the Department's position that if a site is found to be unsuitable during or after site characterization, the Department can nonetheless proceed with a recommendation to the President of one of the other characterized sites for development as a geologic repository. In other words, all three sites do not have to survive site characterization in order to have an adequate set of alternatives to consider in the NEPA process. The Department believes that the characterization of multiple sites, while providing alternatives, was based primarily on the need to have at least one site survive site characterization and keep the program moving forward within the schedule mandated in the Act.

The Department disagrees with the view that the selection of one site for development as a geologic repository can only be made from a field of three fully-characterized sites which have been found suitable for a geologic repository. In that case, a finding of unsuitability for a site would cause a delay in excess of five years during which time another site must be recommended (necessitating an EA to support the recommendation) and characterized (necessitating an SCP, design and construction of exploratory shafts and underground workings, and public interaction with an additional affected State).

The Department also disagrees with the view that more than three sites should be characterized in order to assure that three fully-characterized sites are available as alternatives during the selection of one site for development as a geologic repository. The inclusion of an additional site would add nearly one billion dollars per site to the cost of the repository program, yet would provide very little, if any, benefit to the repository program, public health and safety, or the environment.

**Phase 3. Selection and Approval of One Site for Development as a Geologic Repository**

During Phase 2, the Department will issue semi-annual progress reports on the site characterization as mandated by the Act and 10 CFR Part 60. These semi-annual progress reports will identify issues resolved, new issues identified, or previous issues which no longer require resolution. The issues will be tied, through an issues hierarchy, to the performance objectives in the EPA standard (40 CFR Part 191) and the NRC rules (10 CFR Part 60). Design of the repository, including the waste package and the underground facility, will advance to a level needed to support a license application for construction authorization. Environmental and socioeconomic field studies will establish a basis for estimating impacts of repository construction, operation, and closure. Performance assessment capabilities will be advanced to the position of

being able to confidently predict overall system and subsystem performance using numerical techniques and codes which have been adequately documented, benchmarked, and validated.

These activities and others performed during the period of site characterization will serve as the basis for an Environmental Impact Statement (EIS) and Site Selection Report (SSR) supporting the recommendation of one site to the President for development as a geologic repository. Major milestones for Phase 3 include:

Issuance of draft EIS for public comment	June, 1990
Issuance of final EIS	December, 1990
Site Selection Report	January, 1991
Presidential recommendation of site to Congress	March, 1991
Site designation becomes effective	May, 1991
Submittal of license application for construction authorization to NRC	May, 1991

Key assumptions used developing this schedule include: 1) the underground testing will be sufficiently complete to adequately demonstrate site suitability, support design of the repository, and support the license application for construction authorization, 2) the SSR will not be issued draft for public comment, 3) the President approves the recommended site within 60 days, 4) the site designation becomes effective within 60 days, and 5) the host State or any affected Indian tribe do not file a notice of disapproval with Congress.

With respect to the first assumption, the Department has adopted a position, consistent with 10 CFR Part 60, that underground testing can be broken into phases, with that needed for construction authorization substantially completed during site characterization and the NRC review of the license application for construction authorization. Additional underground testing and continuation of the underground testing started during site characterization will be performed as part of the performance confirmation program during the construction of the repository and the NRC review for the license to receive and emplace wastes in the repository.

The Department published its position on underground testing in March, 1984; and, the Department has just completed commenting on a draft technical position on underground testing published by the NRC. The Department and the NRC will continue to discuss the underground testing required during site characterization to support the license application for construction authorization and during performance confirmation to support the application for a license to receive and possess wastes for disposal in the geologic repository.

With respect to the notice of disapproval by the host State or any affected Indian tribe, the Department is fully committed to work with the public, local units of government, States, and affected Indian tribes to identify and resolve, to the extent practicable, their concerns. The Department is currently funding State and Indian tribal participation in the review of the program. The Department is also looking towards negotiating formal C&C agreements with the affected States and Indian tribes. A significant feature of these C&C agreements will be a formal issue-resolution mechanism. Public interaction is described in detail at this conference in a separate paper authored by Barry Gale, Department of Energy. The Department has every intention to work closely with the affected States and Indian tribes to provide an understanding of the repository program and the siting process in order to minimize the likelihood that they will file a notice of disapproval with Congress.

#### Phase 4. Construction Authorization

The Department will begin Phase 4 by submitting a license application for construction authorization to the NRC in May 1991. The Act allows the NRC a three-year review period. Further, it authorizes the NRC to extend its review by one year if needed. It should be pointed out, however, that the reference schedule would require the NRC to complete its review in less than three years if the 1998 date is to be met.

The Department believes that the review time may be shortened and unnecessary delays can be avoided if the NRC and the Department effectively use the 5 to 6 years of interaction between the Department and NRC to systematically identify and resolve potential licensing issues. Through the use of semi-annual progress reports on site characterization and frequent technical meetings between the two agencies, the NRC will be continuously informed of the Department's plans and progress regarding site characterization and repository design.

Additionally, the NRC has issued several generic technical positions and detailed site-specific technical positions which provide early guidance on the issues that need to be addressed during site characterization and the types of information required in the SCP's and the license application for construction authorization. The Department is currently evaluating the use of topical reports to solicit NRC review and comment on specific technical aspects of the program. The Department and the NRC are also coordinating activities leading to the establishment of a regulatory data base management system to facilitate storage and retrieval of key licensing and supporting documents. Continued and enhanced technical communication of these types should enable the Department to submit a high-quality license application immediately upon the site designation becoming effective and should facilitate an expedited licensing review by the NRC, as assumed in the reference schedule.

Whereas I have focused this discussion on receiving construction authorization from the NRC, the regulation of spent fuel and high-level waste disposal in geologic repositories involves numerous

federal agencies, among them the Department, the EPA, the NRC, and the Department of Transportation, and numerous State, Indian tribal and local requirements which must be addressed in the licensing process. This subject is discussed in more detail at this conference in a paper authored by Ralph Stein, Department of Energy. The Department is committed to conducting its activities in accordance with applicable Federal, State, Indian tribal, and local requirements.

**Phase 5. Construction and Performance Confirmation Testing for the Geologic Repository**

Upon construction authorization, the Department will begin construction of the surface and subsurface facilities. Performance confirmation testing will continue throughout this period. In addition, the Department will complete any necessary pre-operational testing in order to receive a license to accept waste and operate the facility.

The Department will construct the repository in two stages. Stage 1 consists of the construction of the surface and underground facilities that are required to allow the Department to accept small quantities of spent fuel beginning in 1998. Stage 2 consists of the construction of the remaining facilities needed to develop the repository to its full-scale capacity. Construction of these phases will be carried out in parallel. Construction of the Stage 2 facilities will continue, but be physically separated from, active waste emplacement operations.

It is estimated that the Stage 1 facilities will be able to emplace 50 to 400 metric tons of commercial spent fuel per year; however, no special consolidation or packaging will be possible at the limited-capability facilities. The Stage 2 facilities will be able to receive and dispose of 3000 metric tons of spent fuel and high-level waste per year, with full capability to consolidate and package spent fuel. It will also be capable of receiving and handling other waste forms, such as DHLW and solidified high-level waste from the West Valley, New York, facility.

The Department has adopted a two-stage repository because it provides a mechanism for the initial acceptance of waste by January 1998. It also offers the advantage of beginning with a slower rate of waste acceptance, thereby allowing transportation and operator experience levels to mature at a comfortable pace. This should enable the workers to cope more expertly with the full-scale acceptance workload of Stage 2.

**Reference Schedule - Second Repository**

Although not included in the previous discussion, I would be remiss if I did not acknowledge the significant progress made in the crystalline studies and describe the current status and strategy of studies leading to the selection of a site for the second repository. In 1984, the Department published draft Regional Geologic Characterization Reports (RGCR's) and draft Regional Environmental Characterization Reports (RECR's) for each of the three regions, covering 17 States, under consideration. In addition, a draft screening

methodology document for screening the approximately 250 crystalline rock bodies in the region-phase studies to a more workable number in the area-phase studies was published.

Currently, however, the crystalline rock program is dealing with approximately 250 crystalline rock bodies covering tens to hundreds of square miles in 17 different States in the eastern United States. After finalization of the RGCR's, the RECR's, and the screening methodology document, the Department will screen the crystalline rock bodies to identify a smaller number (15-20) of candidate areas undoubtedly in fewer States. The Department will issue draft Area Recommendation Reports (ARR's) for the States to review in late 1985.

Area characterization plans will be issued for the States to review; and, field investigations in the recommended areas will begin in fall 1986. Field investigations will be completed in the fall of 1989 and candidate sites for nomination will be identified in late 1990.

Thereafter, the process of siting and developing the second repository will be very similar to that of the first repository, i.e. EA's will be prepared to support the nomination and recommendation of sites for site characterization and SCP's will be prepared describing the detailed site characterization program. The second repository will not use the two-stage approach. Instead, the current strategy is to proceed with construction of the full-scale repository facilities without any intermediate steps. Subsequent major milestones for the second repository are:

- Issue final Environmental Assessments June 1991
- Nominate and recommend sites for site characterization July 1991
- Request Congressional authorization for construction of a second repository March 1993
- President recommends site for second repository to Congress December 1997
- Submit license application for construction authorization to NRC February 1998
- Receive construction authorization from NRC and begin construction May 2000
- Begin emplacement of radioactive waste March 2006

**Conclusion**

The Department is committed to beginning the operation of the first geologic repository in 1998. The Act clearly requires a best effort by the Department to meet the 1998 date. The Department acknowledges that the 1998 date is dependent upon meeting an aggressive schedule, is optimistically

stated, and requires the cooperation of the public, local units of government, affected States and Indian tribes, and other Federal agencies, particularly the NRC.

The Department will work to eliminate or minimize delays, particularly for those activities which are under its control. If delays are encountered, the Department will pursue, if appropriate, alternatives that allow future phases of the program to be

completed in less time than is assumed in the reference schedule. Substantial progress was made in both the first and second repository programs in 1984; however, the pace of the programs and the workload to be accomplished must pick up markedly in 1985 in order to provide assurance that the overall goal of a safe and environmentally-acceptable geologic repository on-line in 1998 can be met.



**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT**

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**OVERVIEW OF QUALITY ASSURANCE IN THE  
CIVILIAN RADIOACTIVE WASTE  
MANAGEMENT PROGRAM**

**Presented At  
Spring 1985 Meeting**

**In  
Kansas City, MO**

**By  
Merritt E. Langston  
Manager, Quality Assurance**

# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW

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- DEFINITION
- ORGANIZATION
- GUIDELINES
- ELEMENTS
- RESPONSIBILITIES
- REQUIREMENTS
- ACTIONS

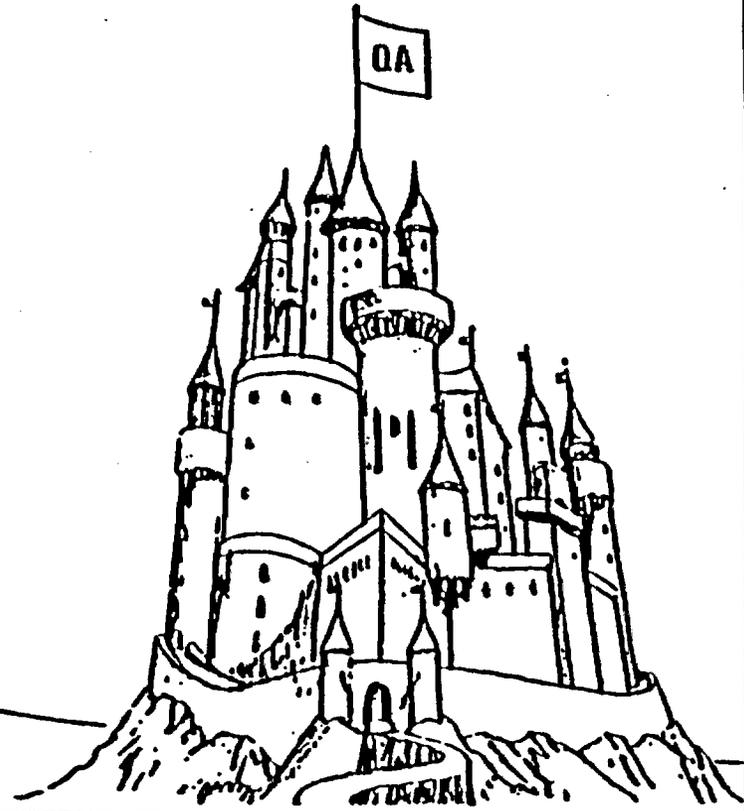
# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW

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## DEFINITION

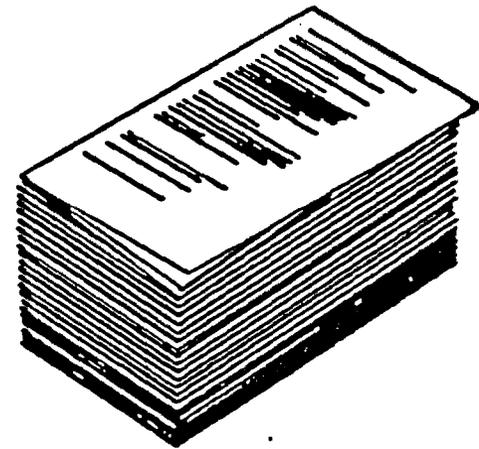
# DISCLAIMER 1

- QUALITY ASSURANCE IS NOT AN ORGANIZATION



# **DISCLAIMER 2**

**QUALITY ASSURANCE IS NOT  
DOCUMENTATION**



**QUALITY = FITNESS FOR INTENDED USE**

**QUALITY ASSURANCE**

**ALL THOSE PLANNED AND SYSTEMATIC ACTIONS  
NECESSARY TO PROVIDE ADEQUATE CONFIDENCE:**

- THAT A STRUCTURE, SYSTEM, COMPONENT, OR FACILITY  
WILL PERFORM SATISFACTORILY IN SERVICE;**
- AND**
- THAT DATA ARE VALID, DEFENSIBLE, AUDITABLE, AND  
RETRIEVABLE**

# **OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW**

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**QUALITY ASSURANCE  
IS  
A COMMITMENT TO PRINCIPLES  
AND  
A DEDICATION TO MANAGEMENT CONTROLS**

**QA PROGRAM X ACCEPTANCE**

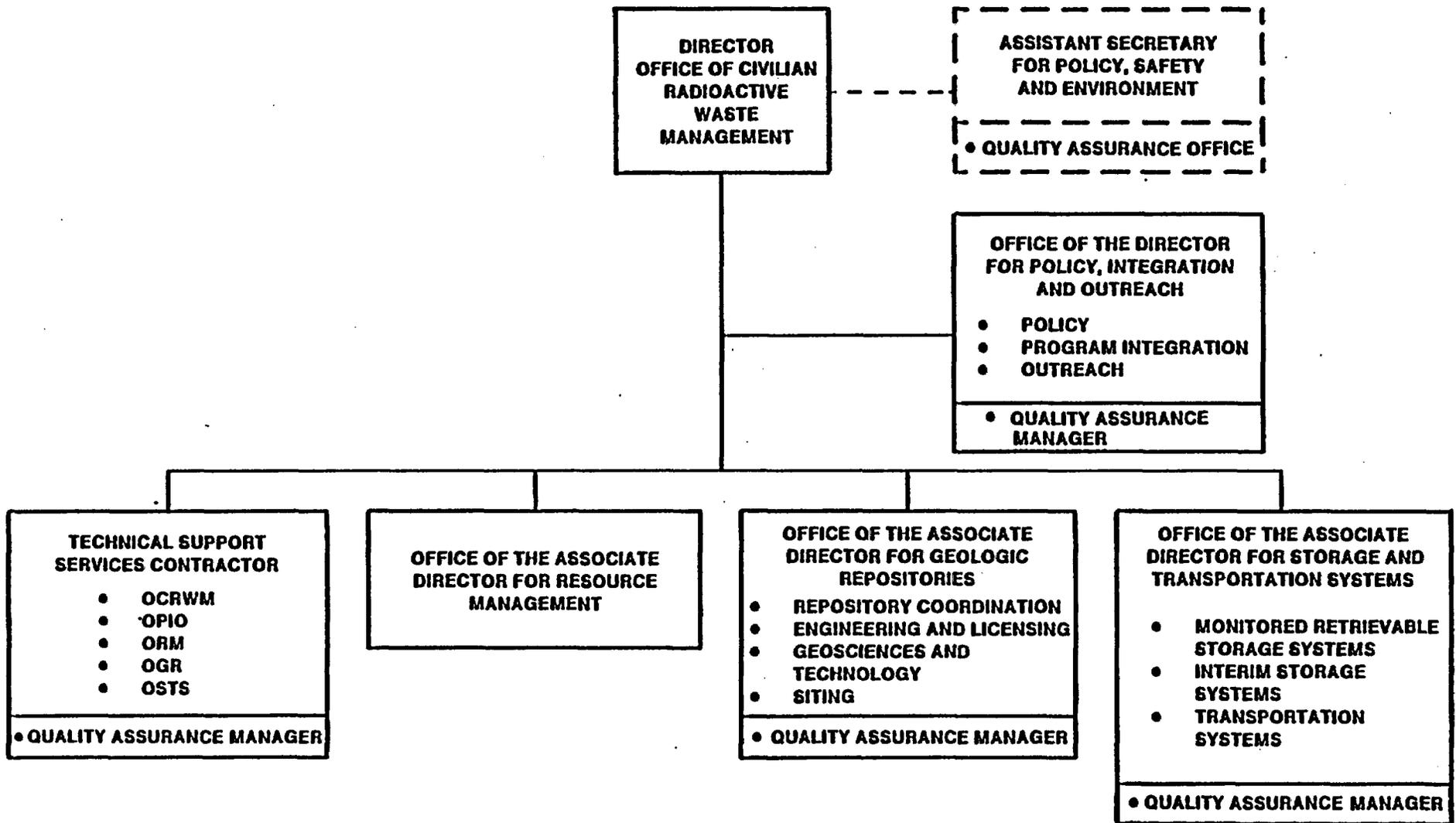
**= EFFECTIVENESS**

# **OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW**

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## **ORGANIZATION**

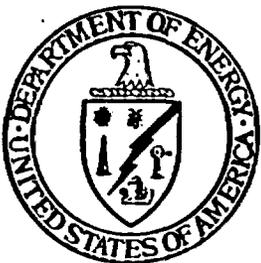
# OCRWM HEADQUARTERS QUALITY FUNCTIONAL ORGANIZATION



**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
QUALITY ASSURANCE OVERVIEW**

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**GUIDELINES**



## **OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW**

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### **OCRWM QUALITY ASSURANCE POLICY**

- **ACHIEVE AND ASSURE MANAGEMENT AND TECHNICAL EXCELLENCE IN ALL ASPECTS OF THE PROGRAM**
- **PROTECT PUBLIC HEALTH AND SAFETY AND THE ENVIRONMENT**
- **COMPLY WITH LEGISLATIVE AND REGULATORY REQUIREMENTS**
- **DEMONSTRATE ADEQUATE QUALITY IN PERSONNEL, ACTIVITIES, AND DATA**

# **OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW**

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## **PRINCIPLES**

- **QUALITY ASSURANCE IS A STRATEGIC MISSION GOAL**
- **QUALITY ASSURANCE IS AN INTEGRATED SYSTEM OF MANAGEMENT CONTROLS**
- **LINE ORGANIZATIONS ARE PRIMARILY RESPONSIBLE FOR QUALITY ACHIEVEMENT**
- **QUALITY IMPROVEMENT REQUIRES PRO-ACTIVE MANAGEMENT CONTROLS**
- **SIGNIFICANT QUALITY PROBLEMS ARE PREVENTED OR RESOLVED AND REPORTED TO ALL AFFECTED LEVELS OF MANAGEMENT**

# **SCOPE**

## **APPLIES TO ALL OCRWM PROGRAM ACTIVITIES**

- SITE CHARACTERIZATION**
- TECHNOLOGY DEVELOPMENT**
- WASTE PACKAGE DESIGN AND FABRICATION**
- REPOSITORY DESIGN, CONSTRUCTION, AND OPERATION**
- TRANSPORTATION**
- EMPLACEMENT AND RETRIEVAL**

# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW

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## ELEMENTS

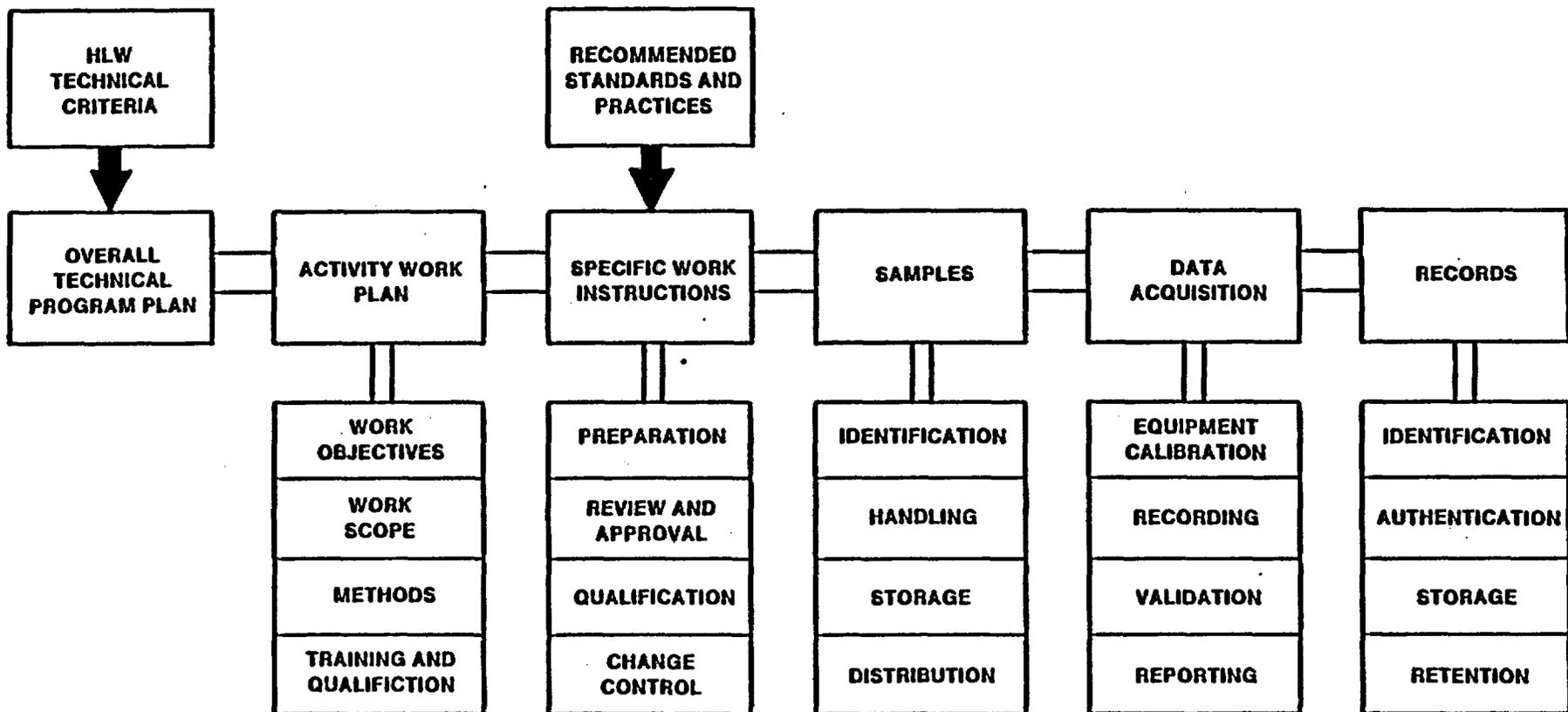
# OCRWM QUALITY MANAGEMENT CONTROLS

ELEMENTS				
PLANNING	ORGANIZING	DOCUMENTING	VERIFYING	COMMUNICATING
<ul style="list-style-type: none"> <li>• WORK/TASK OBJECTIVES</li> <li>• CATEGORIZATION</li> <li>• CONTROLS</li> </ul>	<ul style="list-style-type: none"> <li>• RESPONSIBILITIES</li> <li>• AUTHORITIES</li> <li>• TRAINING</li> <li>• QUALIFICATION</li> <li>• INTERFACES</li> </ul>	<ul style="list-style-type: none"> <li>• PROCEDURES AND INSTRUCTIONS</li> <li>• DOCUMENT CONTROL</li> <li>• RECORDS MANAGEMENT</li> </ul>	<ul style="list-style-type: none"> <li>• REVIEWS</li> <li>• ASSESSMENTS</li> <li>• AUDITS</li> <li>• ANALYSES</li> </ul>	<ul style="list-style-type: none"> <li>• PROBLEM IDENTIFICATION AND REPORTING</li> <li>• CORRECTIVE ACTION</li> <li>• INFORMATION DATA BASE</li> <li>• MANAGEMENT REPORTING</li> </ul>

# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW

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## QUALITY ASSURANCE ELEMENTS FOR GEOLOGIC INVESTIGATIONS



# **OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW**

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## **RESPONSIBILTIES**

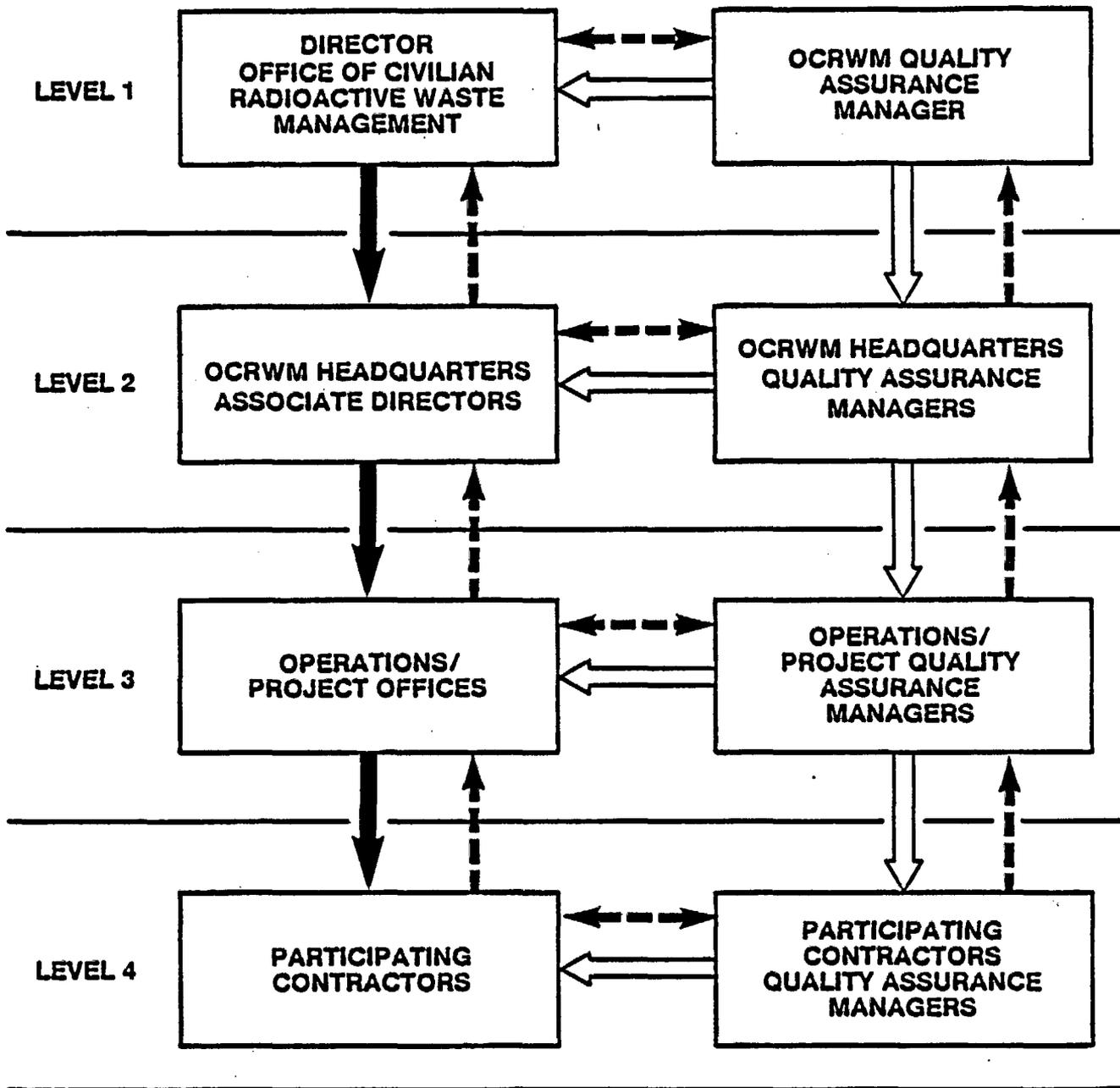
# **OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW**

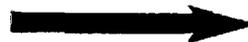
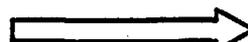
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## **TIERED MANAGEMENT RESPONSIBILITIES**

- **OCRWM HEADQUARTERS MANAGERS**
  - **QUALITY REQUIREMENTS BASELINE**
  - **QUALITY PROGRAM GUIDANCE**
  - **OVERVIEW AND AUDIT PROJECTS**
  
- **OPERATIONS/PROJECT MANAGERS**
  - **POLICY IMPLEMENTATION**
  - **CONTRACTOR SURVEILLANCE AND AUDITS**
  
- **NATIONAL LABORATORIES/CONTRACTORS**
  - **QUALITY PLANNING**
  - **PROCEDURAL COMPLIANCE**
  - **QUALITY INFORMATION REPORTING**

# OCRWM QUALITY MANAGEMENT DIRECTION AND OVERVIEW



-  MANAGEMENT DIRECTION
-  QUALITY OVERVIEW
-  QUALITY INFORMATION COMMUNICATION CHANNEL

# DOE/SRPO\* QUALITY ASSURANCE RESPONSIBILITIES

- **ASSURE EFFECTIVE IMPLEMENTATION OF QA ACTIVITIES  
BY OCRWM CONTRACTORS UNDER SRPO DIRECTION**

● <b>ELEMENTS</b>	<b>SRPO-QAP NUMBER</b>
— <b>POLICY</b>	
— <b>ORGANIZATION</b>	<b>1.0</b>
— <b>PROGRAM</b>	<b>2.0</b>
— <b>DESIGN CONTROL</b>	<b>3.0</b>
— <b>PROCUREMENT DOCUMENT CONTROL</b>	<b>4.0</b>
— <b>DOCUMENT CONTROL</b>	<b>5.0</b>
— <b>PROJECT NONCONFORMANCES</b>	<b>15.0</b>
— <b>RECORDS</b>	<b>17.0</b>
— <b>AUDITS</b>	<b>18.0</b>

\* **SALT REPOSITORY PROJECT OFFICE, COLUMBUS, OHIO**

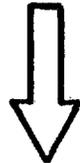
# **OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW**

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## **REQUIREMENTS**

# EVOLUTION OF QUALITY ASSURANCE IN NUCLEAR PROGRAMS

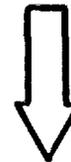
1950's	1960's	1970's	1980's
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**NUCLEAR  
MATERIALS  
PRODUCTION**



**REACTORS AND  
TEST FACILITIES**



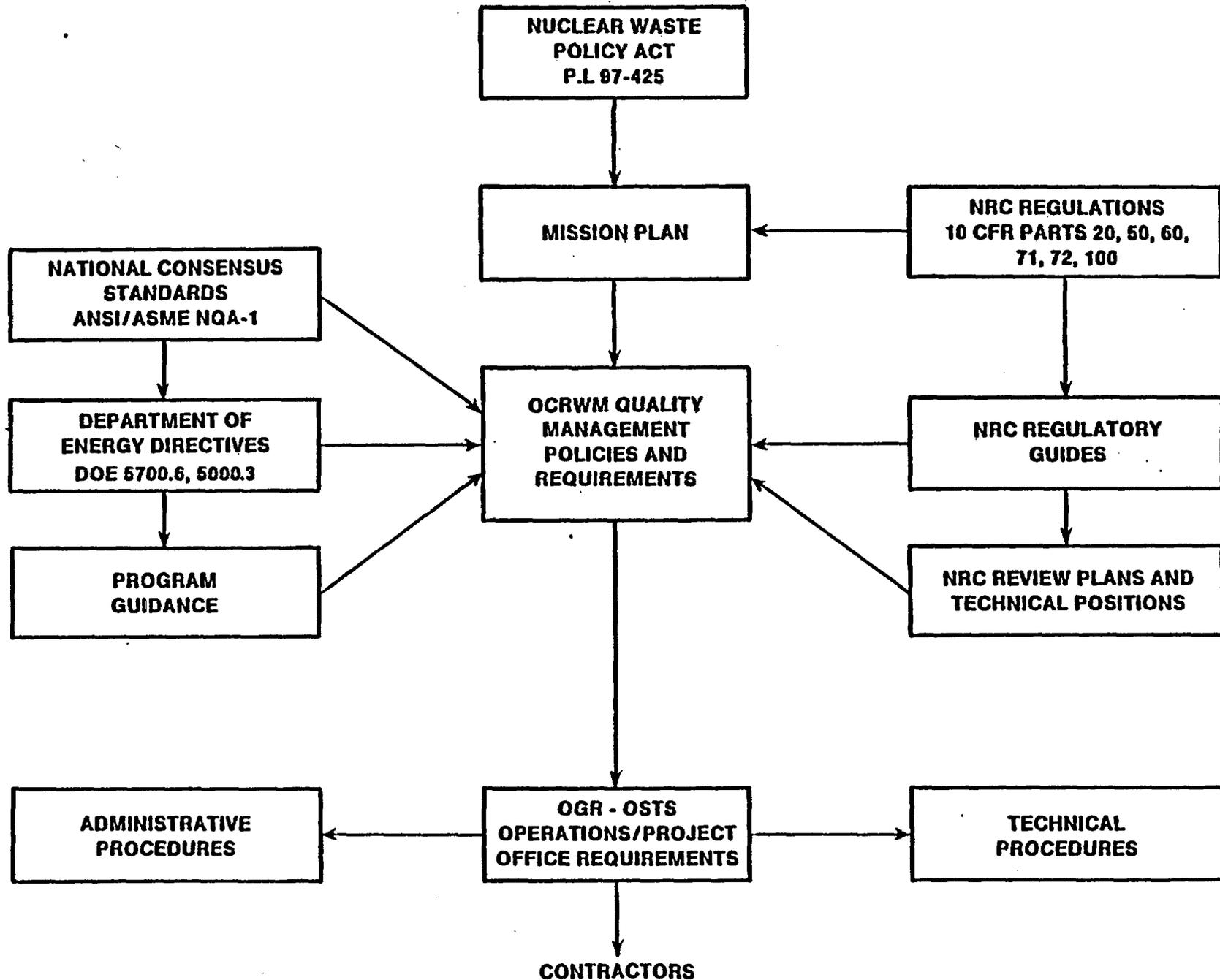
**REPOSITORIES AND  
REMEDIAL ACTIONS**

**MATERIALS AND  
PROCESS CONTROLS  
AND INSPECTION**

**DESIGN, PROCUREMENT,  
AND OPERATION  
CONTROLS**

**SITING AND  
DECONTAMINATION  
CONTROLS**

# OCRWM QUALITY REQUIREMENTS



# OCRWM QUALITY MANAGEMENT POLICIES AND REQUIREMENTS DOCUMENT

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  - 5.5 PROCEDURES AND INSTRUCTIONS
  - 5.6 INDOCTRINATION AND TRAINING
  - 5.7 TECHNICAL DOCUMENT REVIEW
  - 5.8 COMMUNICATION
  - 5.9 RECORDS MANAGEMENT
  - 5.10 OVERVIEW

# ANSI/ASME NQA-1

## QUALITY ASSURANCE PROGRAM

### REQUIREMENTS FOR NUCLEAR FACILITIES

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	7. CONTROL OF PURCHASED ITEMS AND SERVICES	7S-1	7A-1
	8. IDENTIFICATION AND CONTROL OF ITEMS	8S-1	
	9. CONTROL OF PROCESSES	9S-1	
	10. INSPECTION	10S-1	
	11. TEST CONTROL	11S-1	
	12. CONTROL OF MEASURING AND TEST EQUIPMENT	12S-1	
	13. HANDLING, STORAGE, AND SHIPPING	13S-1	
	14. INSPECTION, TEST, AND OPERATING STATUS		
	15. CONTROL OF NONCONFORMING ITEMS	15S-1	
	16. CORRECTIVE ACTION		
	17. QUALITY ASSURANCE RECORDS	17S-1	17A-1
	18. AUDITS	18S-1	18A-1

# OCRWM APPLICATION OF QUALITY ASSURANCE REQUIREMENTS

REQUIRE- MENT	ELEMENT	HQ OCRWM	HQ OGR/OSTS	CRWM PROJECTS
1	ORGANIZATION	X	X	X
2	QUALITY ASSURANCE PROGRAM	X	X	X
3	DESIGN CONTROL (& PEER REVIEW)	D	X	X
4	PROCUREMENT DOCUMENT CONTROL	D	X	X
5	INSTRUCTIONS, PROCEDURES, & DRAWINGS	D	X	X
6	DOCUMENT CONTROL (& PEER REVIEW)	D	X	X
7	CONTROL OF PURCHASED ITEMS & SERVICES	D	X	X
8	IDENTIFICATION AND CONTROL OF ITEMS	D	D	X
9	CONTROL OF PROCESSES	D	D	X
10	INSPECTION	D	D	X
11	TEST CONTROL	D	D	X
12	CONTROL OF MEASURING AND TEST EQUIPMENT	D	D	X
13	HANDLING, STORAGE, AND SHIPPING	D	D	X
14	INSPECTION, TEST, AND OPERATING STATUS	D	D	X
15	CONTROL OF NONCONFORMING ITEMS	D	D	X
16	CORRECTIVE ACTION	X	X	X
17	QUALITY ASSURANCE RECORDS	X	X	X
18	AUDITS	* X	X	X

**D = DELEGATED**  
**\* = MANAGEMENT ASSESSMENTS**

# **REGULATORY REQUIREMENTS**

- **PROGRAM MUST BE DOCUMENTED**
  - **DESCRIPTION OF QA PROGRAM (IN SCP & LICENSE APPLICATION)**
  - **QA ADMINISTRATIVE PROCEDURES**
  - **DETAILED TECHNICAL (IMPLEMENTING) PROCEDURES**
  
- **PROGRAM MUST BE IMPLEMENTED**
  - **ACTIVITIES PERFORMED & VERIFIED TO WRITTEN PROCEDURES**
  - **VERIFICATION FUNCTION INDEPENDENT OF PERFORMANCE FUNCTION**
  - **RECORD OF PERFORMANCE AND VERIFICATION TRACEABLE & RETRIEVABLE**

# HLW GEOLOGIC REPOSITORIES NRC REGULATIONS

10 CFR PART 60  
SUBPART B  
¶ 60.11

- PREAPPLICATION REVIEW - SITE CHARACTERIZATION REPORT
- QA PROGRAM DESCRIPTION FOR DATA COLLECTION

10 CFR PART 60  
SUBPART B  
¶ 60.21

- LICENSE APPLICATION - SAFETY ANALYSIS REPORT
- QA PROGRAM DESCRIPTION FOR REPOSITORY DESIGN-CONSTRUCTION-OPERATION

10 CFR PART 60  
SUBPART G

- DOE QA PROGRAM BASED ON APPLICABLE CRITERIA OF 10 CFR PART 50 APPENDIX B
- QA PROGRAM FOR PERFORMANCE CONFIRMATION

10 CFR PART 60  
SUBPART H

- TRAINING AND CERTIFICATION OF OPERATIONS AND SUPERVISORY PERSONNEL

# HLW GEOLOGIC REPOSITORIES NRC GUIDE AND REVIEW PLAN

**REGULATORY  
GUIDE  
4.17**

- **STANDARD FORMAT AND CONTENT FOR SITE CHARACTERIZATION REPORT**
- **QA PROGRAM DESCRIPTION FOR SITE EXPLORATION AND SITE CHARACTERIZATION (DATA COLLECTION)**

**REVIEW PLAN  
FOR SITE  
INVESTIGATIONS**

- **BRANCH TECHNICAL POSITION ON QA**
- **ACCEPTANCE CRITERIA BASED ON 10 CFR PART 50 APPENDIX B**

**10 CFR PART 50 - APPENDIX B**  
**QUALITY ASSURANCE CRITERIA FOR NUCLEAR POWER PLANTS**  
**AND FUEL REPROCESSING PLANTS**

**18 GENERAL CRITERIA**

- |   |   |
|---|---|
| <b>I. ORGANIZATION</b>  | <b>X. INSPECTION</b>                                      |
| <b>II. QUALITY ASSURANCE PROGRAM</b>  | <b>XI. TEST CONTROL</b>                                   |
| <b>III. DESIGN CONTROL</b>  | <b>XII. CONTROL OF MEASURING AND TEST EQUIPMENT</b>       |
| <b>IV. PROCUREMENT DOCUMENT CONTROL</b>                                     | <b>XIII. HANDLING, STORAGE, AND SHIPPING</b>              |
| <b>V. INSTRUCTIONS, PROCEDURES, AND DRAWINGS</b>                            | <b>XIV. NONCONFORMING MATERIALS, PARTS, OR COMPONENTS</b> |
| <b>VI. DOCUMENT CONTROL</b>   | <b>XV. CORRECTIVE ACTION</b>                              |
| <b>VII. CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES</b>           | <b>XVI. INSPECTION, TEST, AND OPERATING STATUS</b>        |
| <b>VIII. IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS</b> | <b>XVII. QUALITY ASSURANCE RECORDS</b>                    |
| <b>IX. CONTROL OF SPECIAL PROCESSES</b>                                     | <b>XVIII. AUDITS</b>                                      |

# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW

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## ACTIONS

# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW

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## ACTION PLAN

- **POLICY, DIRECTION, AND GUIDANCE**
  - PROVIDE INPUT FOR MISSION PLAN
  - DEVELOP QUALITY ASSURANCE MANAGEMENT POLICIES AND REQUIREMENTS DOCUMENT
  - PROVIDE GUIDANCE AND ASSISTANCE
  
- **STAFFING**
  - DESIGNATE FULL-TIME POSITIONS IN OCRWM HEADQUARTERS
  - DESIGNATE DEDICATED POSITIONS IN RL, NV, CH
  - TASK SUPPORT CONTRACTOR (WESTON)
  
- **QUALITY LEVELS - "Q LIST"**
  - DEVELOP RATIONALE FOR CLASSIFICATION OF ITEMS AND ACTIVITIES IMPORTANT TO SAFETY AND MISSION SUCCESS

# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT QUALITY ASSURANCE OVERVIEW

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## ACTION PLAN

- OVERVIEW
  - ESTABLISH OVERVIEW SYSTEM
  - DEVELOP QUALITY INFORMATION REPORTING SYSTEM
  - PERFORM QUALITY MANAGEMENT ASSESSMENT
  
- COMMUNICATION
  - NRC QUALITY ASSURANCE MEETINGS
  - PUBLIC INFORMATION MEETINGS

*RGale*

**U.S. Department of Energy  
Office of Civilian Radioactive Waste Management**

# **Spring 1985 Information Meeting**

**Mission Plan Preview**

**Kansas City, Missouri  
May 14-15, 1985**

# **Briefing**

# **MISSION PLAN**

## **LEGISLATIVE REQUIREMENT**

**THE NWPA REQUIRES THE SECRETARY OF ENERGY TO "PREPARE A COMPREHENSIVE REPORT... WHICH SHALL PROVIDE AN INFORMATIONAL BASIS SUFFICIENT TO PERMIT INFORMED DECISIONS TO BE MADE IN CARRYING OUT THE REPOSITORY PROGRAM AND THE R&D PROGRAM REQUIRED UNDER THE ACT"**

# MISSION PLAN

## CONTENT AS REQUIRED BY THE ACT

1. INFORMATION NEEDS FOR REPOSITORY FACILITIES
2. PLANS FOR OBTAINING THE UNAVAILABLE INFORMATION NEEDED TO SITE, CONSTRUCT, AND OPERATE A REPOSITORY
3. POTENTIAL FINANCIAL, POLITICAL, LEGAL, AND INSTITUTIONAL PROBLEMS
4. THE TEST AND EVALUATION FACILITY
5. SIGNIFICANT RESULTS AND IMPLICATIONS OF RESEARCH AND DEVELOPMENT PROGRAMS OF THE DIFFERENT GEOLOGIC MEDIA
6. GUIDELINES FOR RECOMMENDING SITES FOR REPOSITORIES
7. SITE CHARACTERIZATION DESCRIPTION AND ACTIVITIES
8. WASTE SOLIDIFICATION AND PACKAGING PROCESSES
9. REPOSITORY CAPACITIES AND CONSTRUCTION AND OPERATIONS SCHEDULES
10. COSTS OF CONSTRUCTING AND OPERATING COMMERCIAL RADIOACTIVE WASTE FACILITIES
11. SOCIOECONOMIC IMPACTS

# MISSION PLAN

## PURPOSE

- TODAY'S BEST ESTIMATE OF PLANS AND INTENTIONS
  - NOT DETAILED PROGRAM IMPLEMENTATION PLAN
  - NOT CONTRACT
- LIVING DOCUMENT

# MISSION PLAN

## REVIEW REQUIREMENTS

- **BY APRIL 1984, SUBMIT DRAFT TO STATES, AFFECTED INDIAN TRIBES, FEDERAL AGENCIES AND THE PUBLIC**
  - WORKING DRAFT SUBMITTED DEC. 1983
  - FORMAL DRAFT SUBMITTED MAY 1984
- **FEDERAL REGISTER NOTICE OF PUBLIC AVAILABILITY**
  - 49 FR 10996

# MISSION PLAN

## REVIEW REQUIREMENTS (CONTINUED)

- PUBLISH FEDERAL REGISTER NOTICE UPON RECEIPT OF COMMENTS
  - 49 FR 35038
  - SETS OF COMMENTS MADE AVAILABLE AT 24 DOE FACILITIES
  - SETS SENT TO ALL WHO PROVIDED COMMENTS

# MISSION PLAN

## COMMENTS RECEIVED

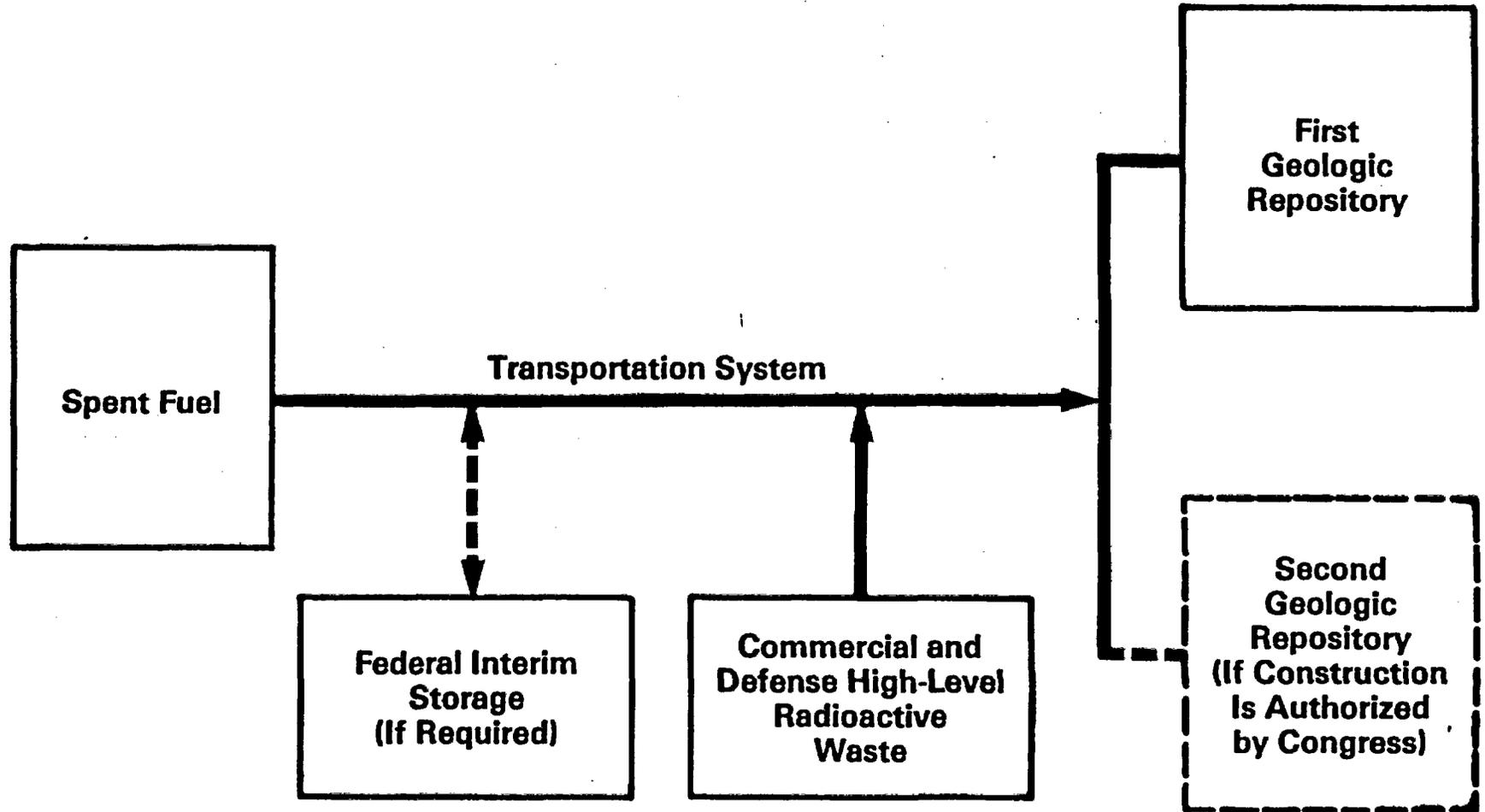
- 102 LETTERS, 2500 SEPARATE COMMENTS
  - 8 FEDERAL AGENCIES
  - 38 STATE AGENCIES
  - 30 UTILITY/INDUSTRY ORGANIZATIONS
  - 4 INDIAN TRIBES
  - 11 PUBLIC INTEREST GROUPS
  - 3 PUBLIC UTILITY COMMISSIONS
  - 8 PRIVATE CITIZENS

# **MISSION PLAN COMMENTS**

## **AREAS OF MAJOR CONCERN**

- 1. INSTITUTIONAL RELATIONS**
- 2. DEFENSE WASTE**
- 3. ACCEPTANCE IN 1998**
- 4. REPOSITORY SCHEDULE**
- 5. SITE CHARACTERIZATION**
- 6. SECOND EXPLORATORY SHAFT**
- 7. SECOND REPOSITORY**
- 8. MRS**
- 9. TRANSPORTATION**
- 10. MANAGEMENT/QA**

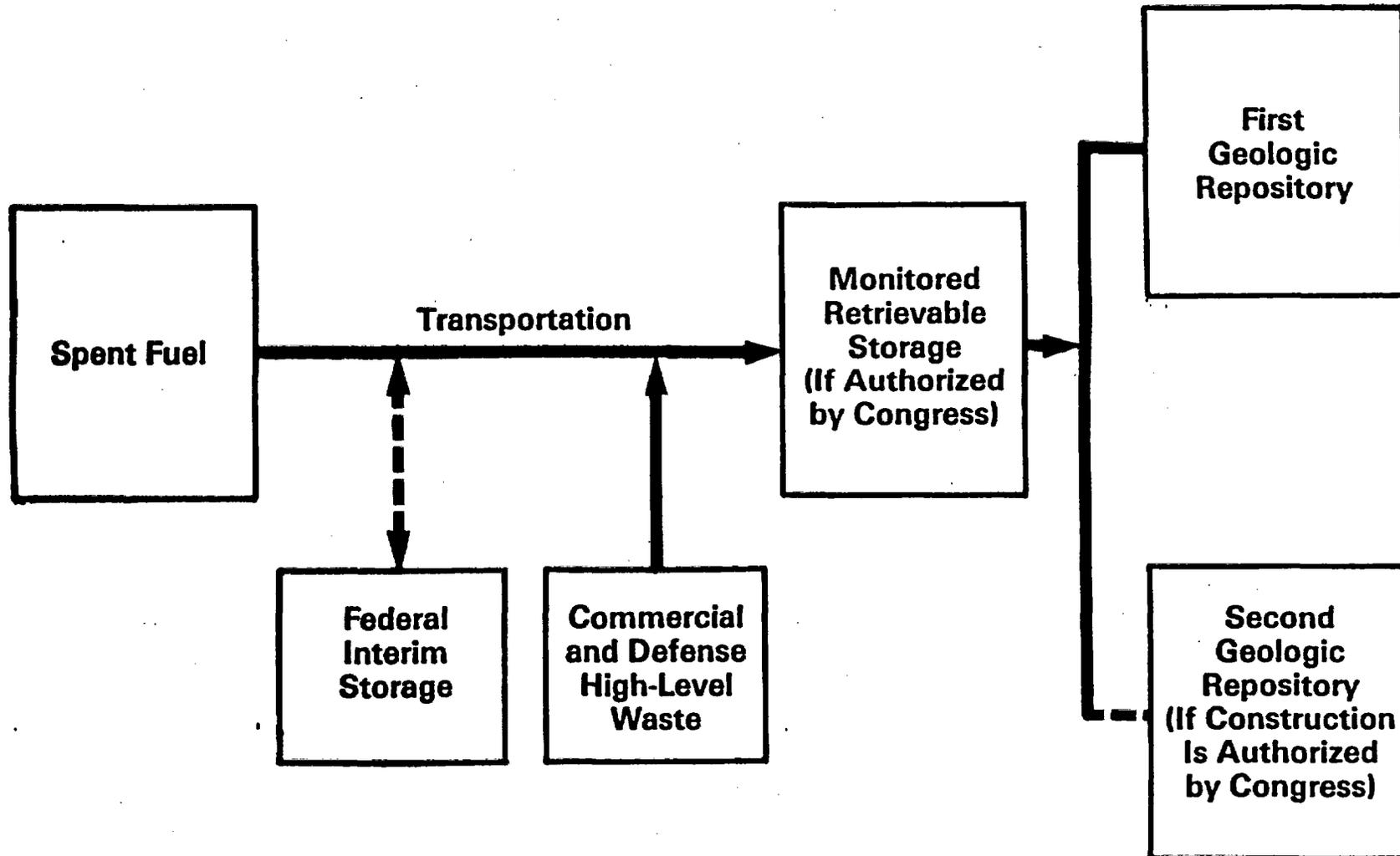
# Authorized System



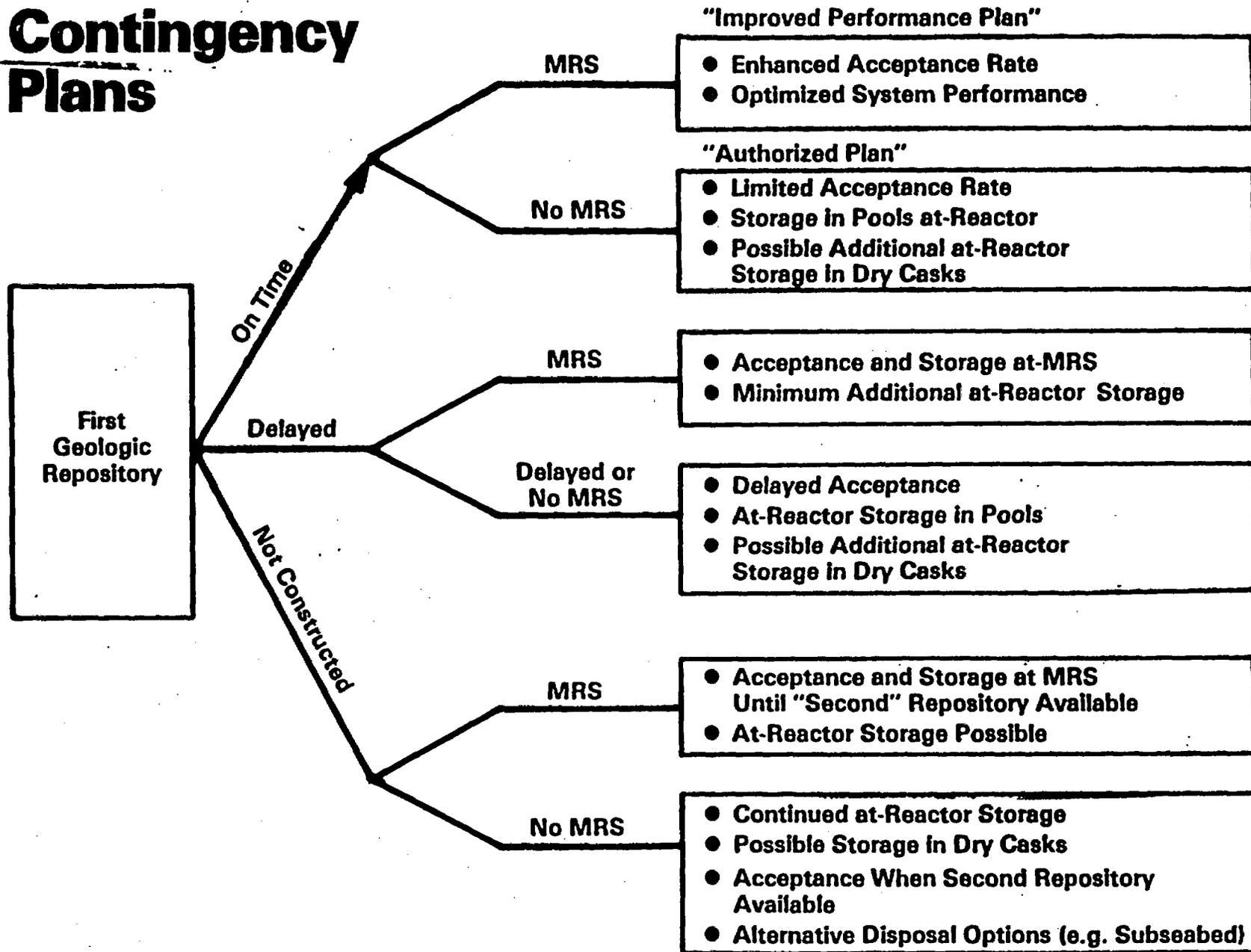
*IF MRS  
not authorized*

# Improved Performance System

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# Contingency Plans



THE DEPARTMENT OF ENERGY  
MISSION PLAN FOR THE CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM

Thomas H. Isaacs  
Director, Policy Division  
Office of Civilian Radioactive Waste Management  
U.S. Department of Energy

INTRODUCTION

The Nuclear Waste Policy Act of 1982, Pub. L. 97-425, was signed by the President on January 7, 1983. Section 301 of this Act requires the Secretary of Energy to prepare a comprehensive report known as the Mission Plan. The purpose of this report is to "provide an informational basis sufficient to permit informed decisions to be made in carrying out the repository program and the research, development, and demonstration programs required under the Act."

Section 301 of the Act further requires the Secretary to submit a draft Mission Plan to the States, the affected Indian Tribes, the Nuclear Regulatory Commission, and other Government agencies as the Secretary deems appropriate for their comments.

To obtain input early during the preparation of the formal draft from those affected by the program, the Department submitted a "working draft" of the first part of the Mission Plan to the States, affected Indian tribes, the Nuclear Regulatory Commission, and other Government agencies as well as citizen organizations, the nuclear utilities and industry, and the press for their review and comment on December 20, 1983. The working draft presented a brief overview and a discussion of program strategy, a description of program plans for the repository, monitored retrievable storage, transportation, interim storage and system integration activities, and an explanation of the program management planning and control functions being implemented.

As a consequence, the Department received over 60 sets of comments which provided pertinent and thoughtful reactions on nearly every major area discussed in the working draft of the plan.

After considering all comments received on the working draft, the Department completed the draft Mission Plan in April 1984. About 3000 copies were distributed for review and comment. The Department of Energy received sets of comments from over 100 organizations and individuals totalling nearly 2500 individual comments.

The Department is expanding and adding discussions of various topics in the Mission Plan as requested. In addition, the Department is addressing all areas of concern in the comments in a separate Comment Response Document to be published as a companion to the Mission Plan.

The following sections discuss the view of the Office of Civilian Radioactive Waste Management (OCRWM) on the purpose of the Mission Plan and our response to the major areas of concern as identified in the comments.

#### PURPOSE OF THE MISSION PLAN

The Mission Plan is today's best estimate of OCRWM's programmatic plans and intentions for carrying out the radioactive waste management program in compliance with the Nuclear Waste Policy Act. It is a planning document and not a contract for performance. It should be recognized that in a program that will span many decades, time and circumstances are bound to change the Plan. As significant changes impact the program, the Department intends to periodically modify the Mission Plan accordingly. To quote Ben Rusche, with the Mission Plan, "we are not striving for perfection, but for communication effectiveness. We don't look for unanimity, but for understanding."

#### AREAS OF MAJOR COMMENTS ON THE DRAFT MISSION PLAN

As in the case of the comments on the December 1983 working draft, the comments on the April 1984 formal draft of the Mission Plan reflect many strongly-held often divergent positions and viewpoints. However, the scope of the comments and their complexity were greater than those received after the review of the working draft. The ten areas of the draft Mission Plan, addressed most frequently in the comments or expressed in the strongest terms, are discussed below.

##### 1. Institutional Relations

Many people commented on the imbalance in the Mission Plan between the amount of information and discussion on technical areas such as repository site geology versus institutional issues such as the appropriate role of States and affected Indian tribes in review of program documents. The was criticized for being overly optimistic in its assessment of problems with States, inadequate airing of public views, insufficiently involving States and Indian tribes in decisionmaking, and providing inadequate educational activities and information especially on the Consultation and Cooperation (C&C) process. More information was requested on procedures or the "management plan" to resolve financial, political, legal and institutional conflicts.

In response, we are adding an entirely new chapter to Part I of the Mission Plan on Institutional Relations. This chapter will reiterate and expand on our policy to promote "full, open, and timely sharing of information" and describe the process for conducting these activities. Further, as discussed below, we will respond to all comments received on the Mission Plan in a Comment Response Document.

## 2. Plans for Defense Waste

Nearly all parties, States, environmental groups, utilities, etc, wanted more information on the plans to dispose of defense wastes.

The Department completed a comparative evaluation of disposing of defense waste in a separate defense-only repository, or putting it in the civilian repositories. This study concluded that there was no compelling need for a defense-waste-only repository and a cost savings results if defense waste were disposed of in a civilian repository. This report was forwarded to the President for his evaluation as required by the Act. On April 30, 1985, the President notified the Department that he found no basis to conclude that a defense only repository is required and he directed the Secretary to proceed to dispose of defense wastes in the civilian repositories in conformance with the Act. We expect to indicate the impact of accepting defense waste in the Waste Acceptance Schedule.

## 3. Waste Acceptance Beginning in 1998

The comments in this area were almost evenly divided between those seeking a strong DOE commitment to begin accepting waste by 1998, and those opposing such a commitment. In general the utilities favored the commitment citing the Department's obligation under the "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste." The States and the environmental groups emphasized the need for sound, defensible decision-making regardless of time constraints.

The Department recognizes both concerns and is planning to meet both obligations. The Mission Plan will discuss at length waste management systems scheduled to begin operation no later than 1998 to accept and dispose of commercially generated spent fuel and high-level radioactive waste in a manner that protects the health and safety of the public and maintains the quality of the environment. At the same time, however, the Department recognizes the need to do contingency planning in the event of program delays. These activities will continue and be expanded.

## 4. Repository Schedule

The overwhelming majority of comments about the repository schedule stated that it was too optimistic to be achievable. Reasons for lack of confidence in the schedule included: highly suspect sequencing of activities to meet 1998, near term dates missed by the end of the Mission Plan comment period, and short

public review periods for program documents. Commentors suggested that the reference schedule should be DOE's best estimate of what is achievable, not what would have to occur to meet the 1998 deadline.

DOE recognizes that the reference schedule portrayed in the Mission Plan is success-oriented and aggressive. As indicated earlier, the Mission Plan should be viewed as the vehicle to present today's best estimate of what is going to be done. If unforeseen technical problems develop or litigation delays the program, the schedule will be reestablished.

#### 5. Site Characterization and Recommendation

Many commentors requested that the Mission Plan describe the site recommendation decision methodology and how program participants will contribute to the decision process. Commentors were divided with respect to DOE's position on the Nuclear Waste Act's requirement for the preliminary determination that sites are suitable for development as repositories.

Since the draft Mission Plan was issued in April 1984, the Department issued the nine Draft Environmental Assessments of sites for disposal of high-level radioactive waste. These documents discuss in detail the process by which the recommended sites were selected. With regard to the preliminary determination that sites are suitable for development as repositories, the Department intends to make that determination shortly after the recommendation of three sites for the first repository.

#### 6. Need for Second Exploratory Shaft

Many comments were offered concerning the need for a second shaft at each characterized site. The NRC wanted additional information which justifies the large diameter of the second repository shaft. Many commentors, particularly State representatives, stated that the decision should be based on exploration or safety concerns and not on construction schedule savings.

The Department is planning to sink two exploratory shafts at each candidate site (i.e., tuff, basalt and salt). The second shaft will be sized to support the safe operation of the underground testing program and will provide flexibility in the scope and duration of in-situ testing.

#### 7. Second Repository

Many commentors suggested that the Mission Plan provide more detail and schedule analysis for the second repository. Some suggested that the first and second repository schedules should

be integrated and that the site nominations for the second repository should not occur before site selection for the first repository.

Revised schedules for both the first and second repositories will be included in the Mission Plan. The schedules will be adjusted to make maximum benefit in the second repository program of key information and results from the first. Current plans call for the Department to recommend the first site for repository development before the sites for the second repository are nominated for characterization.

#### 8. Monitored Retrievable Storage

DOE was requested to be more explicit about the criteria to determine whether Monitored Retrievable Storage (MRS) is needed. The utilities asked that the Monitored Retrievable Storage facility siting and licensing processes be established and initiated as soon as possible.

The potential role that the Monitored Retrievable Storage facilities could play in the integrated waste management system is evolving rapidly as a number of studies are nearing completion. In the draft Mission Plan, the MRS was described as a backup to the repository in the event of major delays. Recent results have shown that this may not be the only appropriate role. Other integrated system functions are being evaluated, such as packaging, handling and lag storage, that can or should take place away from a repository, possibly at the MRS. The Mission Plan will reflect the recent announcement of three potential sites for the proposed MRS facility.

#### 9. Transportation

Several commenters, primarily State representatives, criticized the general treatment of transportation complexities and importance as inadequate. Some portrayed the resolution of transportation issues as the most significant obstacle to siting and operating a repository. Among the issues most frequently raised were: prenotification to States and communities of waste shipments; emergency response capabilities; safety and security of transportation casks; and resolution of legal and regulatory conflicts.

As indicated above, the purpose of the Mission Plan is to provide an overview of program goals and an outline of current program policies plans. The final Mission Plan will incorporate a more detailed account of transportation issues than was contained in the draft Mission Plan. However, an in-depth discussion of the above issues is reserved for two supplementary documents: the Transportation Business Plan and the Transportation Institutional Plan scheduled for release in draft form later this year.

## 10. Need for Strong Management and Quality

Many reviewers advised that strong, centralized management is needed for program elements such as policy formulation, program planning, program implementation, funds control, legal affairs and coordination with other interested parties. Most of the concerns centered around the decision to execute the program through a network of decentralized operations offices. Many commenters, especially the NRC, felt the description of DOE's quality assurance program contained in the Mission Plan was inadequate.

The Department agrees that strong centralized management is necessary and is rewriting the Program Management Chapter to provide a more complete description of the system being implemented by the Office of Civilian Radioactive Waste Management.

The final Mission Plan will attempt to clarify that while execution of the program by DOE operations offices and contractors is decentralized, overall policy formulation, program planning, management control is centralized at Headquarters in Washington, D.C. A new section on Quality Assurance is being added to the Program Management Chapter to provide a more detailed discussion of the Quality Assurance activities.

### DEPARTMENT RESPONSES TO COMMENTS

In order to be responsive to everyone's concerns regarding the Mission Plan, and not just those of Federal Government agencies, and to assure that all comments have been thoroughly considered OCRWM has adopted the policy that responses will be prepared to address all comments and major areas of concern. These responses will be documented in a separate Comment Response Document to be published as a companion to the Mission Plan. Further, OCRWM is revising the Mission Plan to incorporate comments as appropriate and is expanding the discussion on several topics and issues in the mission plan as requested.

Review of the final Mission by other offices in the Department began in mid April. After resolution of their comments, the Mission Plan will be sent to the Secretary for transmittal to Congress, now expected at the end of May. At the same time copies will be sent to the States and Indian tribes, other Federal agencies, utilities, other program participants and interested parties.

### FUTURE REVISIONS OF THE MISSION PLAN

In conclusion, it should be emphasized that the Mission Plan defines OCRWM's best estimate at the present time of the objectives, strategy, activities, management approach and information needs to implement the civilian radioactive waste management program. It is not intended to provide detailed system description or

project plans nor is it a contract stating precisely how the program will be conducted. The Mission Plan should be viewed as a statement of current expectations of how the program will be carried out and of OCRWM's commitment to meet the mandates of the Nuclear Waste Policy Act. Because of the extended time period involved, and the large amount of work to be done to precisely define the program, the Mission Plan is subject to change.

OCRWM's policy, therefore, is to review annually the need to update the Mission Plan and to revise it on an as-needed basis. The Department intends to follow the same procedures specified in the Act and submit major, future revisions to the States, affected Indian tribes, the Commission and other Government agencies, and the public as appropriate for their comments.

# OCRWM

**United States Department of Energy  
Office of Civilian Radioactive Waste Management  
Washington, D.C. 20585**

**MAY 1985**

## **IMPLEMENTATION OF THE NUCLEAR WASTE POLICY ACT OF 1982**

### **INTRODUCTION**

The passage of the Nuclear Waste Policy Act of 1982 (NWPA) was a major milestone in the Nation's management of nuclear waste. This Act, which was signed into law by the President January 7, 1983, established a national policy for the safe storage and disposal of spent nuclear fuel and high-level radioactive waste. In brief, the Act requires the Department of Energy to provide for the development of deep, geologic repositories for the disposal of spent fuel and high-level waste; to submit a proposal to Congress on the need for and feasibility of one or more monitored retrievable storage facilities and to establish a program of research, development and demonstration regarding the disposal of spent nuclear fuel and high-level waste.

The NWPA established a schedule and step-by-step process by which the President, the Congress, the States, affected Indian tribes, the U.S. Department of Energy (DOE) and other Federal agencies must collaborate in the siting, design, construction and operation of geologic repositories for disposal of high-level waste generated by civilian nuclear reactors. This law has provided a mandate and, more important, a set of rules -- including unprecedented interaction among the Federal Government, the States and the public -- for proceeding with the identification and selection of sites for a repository as well as for Federal interim storage facilities in the event they are needed.

### **BACKGROUND**

The safe disposal of spent nuclear fuel and high-level radioactive waste has been a matter of national concern ever since the first U.S. civilian nuclear reactor began generating electricity in 1957. Since then, electric utilities have accumulated over 10,000 metric tons of spent nuclear fuel. There are now 88 licensed, commercial reactors in the U.S. Based on current projections of nuclear generating capacity, by the turn of the century, there will be an estimated 43,000 metric tons of spent nuclear fuel.

The spent nuclear fuel rods currently are being stored in deep pools of water at the reactors. The water cools the fuel rods and serves as an effective shield to protect workers at the reactors sites from the radiation. The level of radiation begins declining immediately; and within 10 years, it decays some 90 percent. Nevertheless, some fission products remain highly radioactive for many years, and, therefore, require long-term and permanent isolation from the public and the environment. Storage of the spent nuclear fuel at the reactors is a temporary measure.

To implement the NWPA and to carry out the associated programs and projects, the NWPA established within DOE, the Office of Civilian Radioactive Waste Management with the Director of the Office directly responsible to the Secretary. In the spring of 1984, Ben C. Rusche was nominated by the President and confirmed by the United States Senate as Director of the Office.

## STATUS

### o Mission Plan

DOE has prepared a Mission Plan describing the information needs of the program being conducted by DOE to fulfill the requirements of the NWPA. As required by the NWPA, DOE submitted a draft Mission Plan to the States, the affected Indian tribes, the NRC and other Federal agencies for their comments and made it available for public inspection. More than 3,000 comments were received and evaluated.

The Mission Plan, which will be issued in May 1985 presents an estimate of what DOE sees needs to be done now to be in a position to begin accepting waste for disposal in 1998. It describes objectives, strategies, programs and projects as well as key features of the waste disposal system.

### o Repository Siting Guidelines

General Guidelines for the Recommendation of Sites for the Nuclear Waste Repositories have been developed by DOE. These Guidelines establish the performance requirements for a geologic repository system, define the technical and environmental qualifications that candidate sites must meet, and specify how DOE will carry out its site selection process. They were developed through consultation with other Federal agencies and with Governors; as a result of testimony given at public hearings; and after reviewing written comments submitted by interested parties.

DOE held five public hearings around the country, received more than 3,000 comments from States and the public, held 29 individual or collective meetings with States, and consulted extensively with other Federal agencies. The Nuclear Regulatory Commission (NRC) conducted an extensive review of the Guidelines, held a public hearing and received additional comments from States and other interested parties. As a result of this review

and numerous discussions between NRC and DOE, the NRC concurred in the Guidelines in a unanimous vote of 5 to 0. The Guidelines were published December 6, 1984, and became effective in January 1985.

### o Repositories

When the NWPA became law in January 1983, DOE had under study, nine sites for consideration for the first repository. In February 1983, and as required by the NWPA, DOE formally identified the nine sites as being potentially acceptable sites for the first repository. At that time, the Governors and legislatures of these States, as well as affected Indian tribes, were notified. The nine potentially acceptable sites are in six States: one site in Nevada in a geologic medium called tuff, which is compacted volcanic ash; one site in Washington in basalt, which is a very fine-grained rock that is formed by the solidification of lava; two sites in Texas in bedded salt; two sites in Utah in bedded salt; one site in Louisiana in a salt dome; and two sites in Mississippi in salt domes.

There are currently three Indian tribes which have been determined by the Secretary of the Interior to be affected Indian tribes--the Yakimas, the Umatillas and the Nez Perce. These three Indian tribes are near the potential site located in Washington State. The NWPA defines "affected Indian tribe" as any Indian tribe within whose reservation boundaries a site is proposed to be located or whose federally-defined possessory or usage rights to other lands outside the reservation's boundaries arising out of treaties may be substantially and adversely affected by locating such a facility.

Based on the repository siting Guidelines, draft environmental assessments (EA's) were prepared on each of the nine potentially acceptable sites and issued December 20, 1984, for 90 days public comment and review. The draft EA's propose five of the nine potentially acceptable sites as suitable for site characterization for the first repository and propose three of those sites as preferred for recommendation to the President for site characterization. The sites proposed are: (alphabetically by State)

#### Proposed for Nomination

Mississippi - Richton Dome  
Nevada - Yucca Mountain  
Texas - Deaf Smith  
Utah - Davis Canyon  
Washington - Hanford

#### Proposed for Recommendation

Nevada - Yucca Mountain  
Texas - Deaf Smith  
Washington - Hanford

During the 90-day comment period, DOE held some 50 briefings in the affected States to facilitate the review of the documents and conducted 19 public hearings to receive testimony on the documents.

After consideration of all comments and additional consultation with affected States and Indian tribes, DOE will prepare final EA's. The Secretary of Energy will then formally nominate at least five sites as suitable for site characterization and each nomination will be accompanied by a final environmental assessment. The Secretary will then recommend three of the nominated sites to the President for site characterization as candidate sites for the first repository. At the time of this recommendation, the Secretary will make a preliminary determination of the suitability of the three candidate sites for development of a repository. Site characterization will occur only at the sites recommended to and approved by the President. This recommendation is expected to occur in fall 1985.

After the three sites have been approved by the President, site characterization is expected to begin in FY 1986. This will involve an intensive site evaluation program including in situ testing at the bottom of deep exploratory shafts. Shaft construction at the three sites will take approximately two years with in situ tests planned for FY 1988 through FY 1990. Currently, DOE plans to construct two shafts at each site. These shafts will be to the depth of a proposed repository -- about 1,000 to 4,000 feet deep.

After site characterization is completed, DOE must make a final determination of the suitability of a site for development as the first repository. DOE will recommend one site to the President for construction of the first repository. The President will then recommend one site to Congress.

When the President recommends the site to Congress, which is estimated to be in early 1991, the host State Governor or legislature or affected Indian tribe may issue a notice of disapproval --veto--within 60 days of the President's recommendation. The veto can be overridden only by a resolution of both Houses of the U.S. Congress. If the veto is not overridden, the President must submit to Congress within 12 months another repository site recommendation. If no veto is submitted, or if the veto is overridden, then as prescribed by the NWPA, the site designation is effective and DOE will submit to NRC a Construction Authorization Application. The NRC has three years to review the application.

While the NWPA does not authorize the actual construction of a second repository, it does require DOE to carry out the siting and development activities essential to preparation for such a facility.

The process for selecting the second repository involves a similar screening process as for the first repository. The decision points and schedule for siting the second repository lag the first repository by five-to-seven years.

For the second repository, DOE may consider: (1) sites identified as potentially acceptable but not nominated for the first repository; (2) sites characterized but not chosen for the first

repository site; and, (3) sites found potentially acceptable from rock formations not previously studied in the first repository selection process.

As part of DOE's efforts toward siting a second repository, DOE has been conducting studies of existing literature on crystalline rock in 17 States to determine if these States contain potentially acceptable sites for a second repository. These States are in the North Central Region (Michigan, Minnesota, Wisconsin), the Northeastern Region (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont) and the Southeastern Region (Georgia, Maryland, North Carolina, South Carolina, Virginia).

In April 1985, DOE issued a document entitled, Region-to-Area Screening Methodology for the Crystalline Repository Project. This screening methodology was previously issued in draft and has been developed following discussions and workshops with the 17 States mentioned above and in which rock bodies have been surveyed. The screening methodology will be used to narrow geologic focus from large regions to smaller areas in studies to identify potential crystalline sites. Using the screening methodology, later this year, DOE will identify approximately 15-20 areas in four-to-six of those States in which area phase field work will be conducted. To date, no field testing has been conducted.

Throughout the site selection process, DOE must adhere to relevant environmental standards set by the Environmental Protection Agency and regulatory requirements set by the NRC.

#### o Monitored Retrievable Storage

The NWPA directs DOE to complete and submit to Congress a detailed study of the need for and feasibility of one or more monitored retrievable storage (MRS) facilities as an option for long-term storage. Congress has not authorized construction of an MRS facility, but has directed the DOE to evaluate an MRS and prepare a proposal. However, DOE emphasizes that the NWPA is very specific in its requirement for the study stating that "... disposal of high-level radioactive waste and spent nuclear fuel in a repository developed under this Act should proceed regardless of any construction of a monitored retrievable storage facility ...."

DOE prepared and submitted in June 1983, a report to Congress which concluded that the MRS proposal can be prepared using currently mature engineering and design practices without additional research and development.

The NWPA requires DOE to complete a detailed proposal for construction of one or more MRS facilities. The proposal is to be site specific and include at least three alternative sites with at least five designs based on alternative site/concept combinations. The NWPA provides that before such a facility can

be built, Congress must by law specifically authorize construction of an MRS facility. DOE plans to provide a status report to Congress by June 1, 1985, and to submit the full proposal to Congress in January 1986.

In developing the proposal, DOE has been evaluating sites within the central eastern region that could be considered as candidate sites for the proposal to Congress. Sites evaluated include sites previously planned and those which "qualified" for nuclear activities -- such as, sites owned by DOE or previously docketed by NRC. Existing environmental documentation and data for these sites is of high quality and relevant to construction of a nuclear facility.

On April 25, DOE identified three candidate sites expected to be included in the proposal to Congress and documentation explaining the method and basis for the selection. All three candidate sites are in Tennessee and the preferred one is the former Clinch River Breeder Reactor site in Oak Ridge. The other two alternative candidate sites are the DOE Oak Ridge Federal reservation in Roane County, Tennessee, and the Tennessee Valley Authority's cancelled Hartsville (Tennessee) nuclear powerplant site, some 40 miles northeast of Nashville.

DOE fully intends to keep all segments of the public informed of decisions and supporting analyses leading up to the proposal to Congress in January 1986. This includes working closely with potentially affected States and localities once they are identified and assuring that they have ample opportunity to express their views to Congress.

Recent analysis by DOE has led to the conclusion that an MRS facility should be an integral part of the total waste management system. Such an MRS facility could perform spent fuel preparation and packaging functions at a central location before shipment to a repository for permanent disposal. Performance of these functions at an MRS facility centrally located to the majority of the generators of spent fuel could contribute significantly to overall systems efficiency and timeliness while reducing the total shipment miles. Generally, the east-central or southeastern part of the country is central to the nuclear generators and, therefore, the area in which possible candidate sites are being considered.

To temporarily store the consolidated and packaged spent fuel at an MRS prior to shipping to a repository, the sealed storage cask and open field drywell concepts are being designed. The cask concept has been identified by DOE as the preferred concept to be developed in detail. This decision was made as a result of a comprehensive process to ensure that DOE design the concepts most suitable for the potential MRS. These storage units could be enclosed or modified to address local environmental concerns.

In the development of the MRS proposal, prime consideration will be given to safety and flexibility of the design concepts. The

proposal itself is to include a program for the siting, development, construction and operation of facilities to be licensed by NRC; a funding plan so that the costs shall be borne by waste generators and owners; and a plan for integrating MRS with other storage and disposal methods. The proposal and plans for possible deployment of an MRS, if authorized by Congress, would provide greater assurance of Government acceptance of spent fuel and high-level waste beginning no later than January 31, 1998.

#### o Interim Storage

The NWPA clearly states that utilities have the primary responsibility for the interim storage of spent fuel. For utilities which are unable to provide adequate at-reactor storage capacity for their spent fuel, DOE is authorized to provide interim storage for up to 1900 metric tons of spent fuel. The NRC will determine eligibility of utilities for Federal interim storage; and DOE has developed a standard contract and fee schedule for Federal interim storage. Current spent fuel inventory and storage projections indicate little, if any, immediate demand for Federal interim storage.

#### o Research and Development

As required by the NWPA, DOE is conducting a cooperative demonstration program to demonstrate at-reactor storage technologies. DOE is currently conducting a cooperative demonstration with the Tennessee Valley Authority (TVA) to demonstrate fuel rod consolidation. Rod consolidation involves the dismantling of the fuel assembly and rearranging the spent fuel rods into a more compact array. This procedure represents a cost-effective method for significantly increasing the capacity of some utility storage pools. A cooperative agreement is currently being negotiated with Northeast Utilities Company of Hartford, Connecticut, to demonstrate rod consolidation.

Dry storage systems also provide an alternative for additional spent fuel storage at nuclear power plants. Potential systems for dry storage include casks, drywells, silos or vaults. DOE has over 20 years experience with dry storage technologies. Drywell, silo and vault storage have been demonstrated at DOE facilities in Nevada. DOE entered into a cooperative agreement with TVA in 1982 to demonstrate licensed storage in two prototype storage casks.

In February 1984, DOE signed a contract with Nuclear Fuel Services, Inc., Rockville, Maryland to demonstrate, under a cost-sharing arrangement, cask transportation and dry storage. And in March 1984, DOE entered into cooperative agreements with the Virginia Power (formerly Virginia Electric and Power), Richmond, Virginia, and the Carolina Power and Light Company (CP&L), Raleigh, North Carolina, to participate in a demonstration of dry storage of spent fuel in specially designed metal casks and concrete storage modules.

### o Defense High-Level Waste

The NWPA requires the President to evaluate not later than two years after enactment the use of disposal capacity at the civilian repositories for disposal of high-level waste resulting from defense activities. The NWPA further states that after taking into account factors relating to cost efficiency, health and safety, regulation, transportation, public acceptability and national security, unless the President finds that the development of a separate repository is required, the Secretary of Energy shall proceed with arrangements for using the "civilian" repositories for both.

A draft evaluation was prepared by DOE and made available for public comment. Due to the clear cost advantage to be gained by disposing of defense wastes in a combined commercial and defense repository, DOE recommended this option to the President. On April 30, 1985, the President concurred in this recommendation in a memorandum to the Secretary of Energy. The NWPA clearly states that costs resulting from permanent disposal of defense high-level waste shall be paid by the Federal Government into the Nuclear Waste Fund.

Defense high-level waste is generated and currently stored at three DOE sites: the Savannah River Plant, the Idaho National Engineering Laboratory and the Hanford Reservation. The amount of defense high-level waste anticipated for disposal is the equivalent to approximately 10,000 metric tons.

### o Transportation of Spent Fuel and High-Level Waste

The capability to transport nuclear spent fuel and radioactive waste safely and economically is critical to implementation of the NWPA. This capability is contingent upon the availability of appropriate types and quantities of equipment and a stable regulatory and institutional environment. The NWPA places responsibility for the transportation on DOE, but also states that nothing in the NWPA shall be construed to affect Federal, State or local laws pertaining to the transportation of spent nuclear fuel or high-level waste. In addition, the NWPA directs that private industry be utilized to the fullest extent possible in performing the transportation functions.

To ensure timely compliance with these directives, DOE has initiated procedures to: (1) provide for the technical development of the transportation system including development of shipping casks appropriate for NWPA requirements; and, (2) establish the required insitutional relationships with States, tribal and local governments and with the public.

Technical development of the transportation system is planned in four phases: (1) system definition; (2) engineering development and certification of the casks; (3) cask fleet procurement and carrier negotiations; and, (4) transportation operations. DOE plans to publish during 1985 a Transportation Business Plan,

which will delineate activities within each of these phases. A preliminary draft was issued in January 1985. Since that time, several meetings have been held with interested parties to discuss transportation issues and for the purpose of obtaining private sector participation in the formulation of DOE's transportation business strategies.

DOE also plans to issue an Institutional Plan during 1985. This plan will serve as a guide in establishing communications with and encouraging participation by those institutions affected by the implementation of the transportation aspects of the NWPA.

#### o International Cooperation

In March 1983, in April 1984, and in April 1985, DOE and NRC published in the Federal Register a Joint Notice announcing the policy of the United States to cooperate with and provide technical assistance to non-nuclear weapon states in the field of spent fuel storage and disposal. Egypt, Brazil, the Republic of Korea, Taiwan, Mexico, Japan and the Netherlands are among those countries which have expressed interest in this offer. In addition, informal expressions of interest have been made by other countries.

#### NUCLEAR WASTE FUND

The NWPA established the Nuclear Waste Fund to finance the waste disposal program. The main source of revenue for the Fund is a one mill (one-tenth of a cent) per kilowatt hour fee charged to nuclear utilities for all electricity generated by civilian nuclear reactors beginning April 7, 1983.

Revenues collected by DOE through February 1, 1985 total approximately \$553.6 million. In addition to spent fuel generated since April 7, 1983, high-level radioactive waste and spent nuclear fuel generated prior to April 7, 1983, is subject to a fee equivalent to an average charge of one mill per kilowatt hour. Utilities have three options for paying this fee and must decide by June 1985 on the option they select. The estimated revenues from this "in-core" spent fuel is \$2.3 billion and, if utilities choose a deferred payment option, this amount will increase as interest is applied. Based on several surveys, some utilities have indicated they may pay the one-time fee by June of 1985. This may amount to collections of approximately \$770 million.

The NWPA provides for annual review and adjustment of the fee for nuclear-generated electricity to determine if the fee is sufficient to meet full-cost recovery, as mandated. The estimated total system life-cycle cost of the program is approximately \$25-\$35 billion in 1984 dollars. Based on current nuclear power generation projections, revenue flows will approximate \$300 million to \$400 million per year. It is DOE's objective to maintain the program at the one mill per kilowatt hour revenue level. DOE issued its third annual fee adequacy report in Feb-

ruary 1985 which concluded that no adjustment to the one mill per kilowatt hour fee is required at this time.

### DISPOSAL CONTRACT

Following enactment of the NWPA, DOE developed a standard contract for use as the formal agreement between DOE and utilities to dispose of spent fuel or high-level waste beginning in 1998. The contract sets forth terms and conditions as well as financial procedures and a fee structure. As part of the contract, DOE is developing a waste acceptance schedule.

By June 30, 1983, and as specified in the NWPA, 70 contracts were signed with 56 different organizations, including 46 lead nuclear utilities covering 80 licensed nuclear plants, eight owners of industrial test reactors, and two nuclear fuel vendors. For those who become owners or generators of spent fuel or high-level waste subsequent to June 30, 1983, disposal contracts must also be signed. Furthermore, the NWPA provides that NRC may require that a disposal contract be signed with DOE as a precondition to NRC's issuance or renewal of an operating license. Between June 30, 1983, and April 1, 1985, additional operating licenses were issued and additional disposal contracts have been signed.

### PUBLIC INFORMATION AND INPUT

The NWPA places a heavy emphasis on DOE's interaction and sharing of information with affected and interested parties. Technical reports, draft documents, plans, fact sheets, brochures, press releases, etc., are issued or distributed to State contacts, public libraries, published in the Federal Register and made available otherwise for information, review and comment.

Public hearings and public meetings and exchanges are held to discuss plans and documents and DOE officials strive to make themselves available for a number of public events where they can discuss issues, solicit public input and answer questions.

May 1985

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For additional information concerning DOE's activities regarding implementation of the Nuclear Waste Policy Act of 1982, you may call Ms. Ginger King on 202/252-2835 or write to:

U.S. Department of Energy  
Office of Civilian Radioactive Waste Management (RW-40)  
1000 Independence Avenue, S.W.  
Washington, D.C. 20585

## "EPA's High-Level Waste Standards"

Sheldon Meyers

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U.S. Environmental Protection Agency

Washington, D.C. 20460

The Environmental Protection Agency (EPA) is completing development of generally applicable environmental standards for the disposal of high-level radioactive wastes (40 CFR 191). These standards will set limits on the projected releases of radionuclides to the environment for a 10,000-year period after disposal, as well as limiting the contamination of significant sources of ground water in the vicinity of a geologic repository. Such numerical limits provide a basis for judging the relative effectiveness of different types of waste packages (for example, waste forms appear better than waste canisters at limiting long-term releases of radionuclides). In addition, the standards incorporate qualitative "assurance requirements" as an essential complement to these numerical limits. One of these qualitative provisions calls for the use of multiple barriers in a high-level waste disposal system--including both engineered and natural components--regardless of whether overall system analyses suggest that engineered barriers are needed. Such reliance on a "defense-in-depth" approach is vital because of the inherent uncertainties in our expectations of disposal system performance over thousands of years. The implications of these EPA standards for long-term waste package performance are discussed.

**EPA'S HIGH-LEVEL WASTE STANDARDS**

**REMARKS BY**

**SHELDON MEYERS**

**ACTING DIRECTOR**

**OFFICE OF RADIATION PROGRAMS**

**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**at the**

**SPRING 1985 MEETING  
OF THE**

**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT**

**Kansas City, Missouri**

**May 15, 1985**

Ladies and gentlemen: It is a pleasure to be here with you today to discuss EPA's environmental standards for the disposal of high-level radioactive wastes along with part of our findings regarding waste package performance.

Since the expansion of the United States' high-level waste program in 1976, EPA has been charged to develop generally applicable standards for the management and disposal of high-level radioactive wastes. Our basic authorities come from the Atomic Energy Act and the duties assigned to EPA at the time of its creation in 1970. The Nuclear Waste Policy Act of 1982 reaffirmed EPA's responsibility in this area. We think we have a significant role in the new and carefully constructed multi-agency approach that the Congress has devised to solve the problem of high-level nuclear waste disposal.

EPA's role in this process is a limited, but at the same time, a very important one. NRC will have the responsibility for the implementation and site-specific application of the generally applicable standards we prescribe. EPA has no direct role in the selection of actual sites for high-level waste repositories. The Nuclear Waste Policy Act assigns that responsibility to the DOE, with oversight by NRC, and it must be done in consultation with affected States and Indian tribes.

Today, I want to review the EPA's proposed environmental standards, and then I will discuss briefly the issue of waste canister performance.

At the outset let me emphasize that I have confidence now -- and for many years have had confidence -- that high-level wastes can and will be disposed of safely, and with the kind of exceptional care that will provide protection for present and future generations.

The Department of Energy has identified a number of potential sites in the western and southern United States that give promise of providing very good long-term isolation. NRC's final rule (10 CFR Part 60) calls for a system of engineered controls that will complement this protection, and its rule is one which we feel is entirely compatible with the Department of Energy's approach. At EPA, we expect to be able to promulgate standards later this year that will limit potential risks to very low levels -- levels that a broad consensus can support as sufficient to protect the public health and safety.

EPA first proposed these environmental standards for management and disposal of high-level and transuranic wastes -- formally identified as 40 CFR Part 191 -- for public review and comment more than two years ago, on December 29, 1982. They have been under active development since. Today, I would like to review with you the proposal in its present form, fast approaching a final rule.

First, the coverage: Our proposed standards apply to spent reactor fuel, the highly radioactive wastes derived from reprocessing spent fuel, and those transuranic wastes containing 100 or more nanocuries per gram and with half-lives of more than 20 years.

The proposed standards do not apply to wastes which have already been disposed of. This exception would affect only relatively small quantities of transuranic wastes since, as you know, no high-level wastes have been disposed of in the United States. Also, our standards do not apply to ocean disposal of high-level waste which is prohibited by the Marine Protection, Research, and Sanctuaries Act of 1972.

Our standards do apply to both the management and disposal of the wastes. We have divided the rule into two subparts: Subpart A applies to management -- including storage, preparation of the wastes, and placing them in a disposal site. This part deals with both temporary storage facilities and monitored retrievable storage. Subpart B takes over once the repository has been sealed.

In 1977, EPA promulgated its Uranium Fuel Cycle Standards (40 CFR Part 190), which covered commercial power-related operations from uranium milling through reprocessing. Subpart A of our new rule is a continuation of Part 190, and applies to waste management operations not covered in Part 190. These operations involve storage of the materials, solidification or other preparation for disposal, and placing the wastes in disposal sites. Subpart A also applies to spent fuel management, regardless of whether the fuel is considered to be waste or is destined for reprocessing.

Our studies tell us that the largest expected radiation exposures to the public from management and storage activities covered by these standards would be no more than a few millirem per year, which is somewhat smaller than

the requirements set out in Part 190. We have, therefore, decided to extend the dose limits contained in Part 190 to all the commercial, NRC-licensed operations addressed in Subpart A. Thus, the limit on annual dose equivalent to any member of the public due to commercial operations covered by Part 190 and Subpart A of Part 191 combined is 25 millirem to the whole body, 75 millirem to the thyroid, and 25 millirem to any other organ.

In Subpart B, we use a different approach because here we are devising environmental standards for the period after the repository is sealed. This involves very different considerations.

First, the requirements we establish in Subpart B can only be implemented by the NRC and DOE in the design phase -- by setting design principles or by analytically projecting disposal system performance. The more familiar concepts of implementation involving monitoring of emissions or ambient levels of pollutants are not applicable here because we cannot rely on such surveillance for the long time periods involved. Our rule, for instance, speaks of isolation for 10,000 years. (I said before, and I repeat now that this gives new dimensions to the idea of a long-term commitment.)

Second, the standards address unintentional releases, such as those resulting from human intrusion or geologic faulting. Provisions must be applicable to a variety of disposal strategies because the Agency does not have the authority to specify details or to direct DOE or NRC concerning any one of a number of disposal methods or designs. Regulations by NRC or DOE, as appropriate, will control the specific designs.

For long-term containment requirements, we assumed that it is possible to predict some aspects of the future well enough to use the predictions for comparing and selecting disposal methods. Thus, we evaluated ways that waste might be released from a mined geologic repository, developed analytical models to predict potential releases and their distribution throughout the ecosystem over a 10,000-year period, and we estimated the possible risks that could result from these releases if they occurred in an environment similar to the one we know today.

In selecting the release limits for the standards, we had to project the performance of disposal systems which, of course, have not yet been demonstrated. There are, as you can plainly see, significant uncertainties inherent in such projections. To avoid underestimating these risks, we often made pessimistic assumptions about how well a repository would work. For example, we assumed that human intrusion into a repository would take place as if no site markers or records discouraged it beginning 100 years after disposal. Our estimates are, in fact, probably upper bounds of the risks. When the Department of Energy selects and demonstrates actual control methods at a real repository site, we expect that releases will be well below the amounts allowed by the proposed standards.

To select the specific release limits for the various radionuclides in a disposal system, we first estimated the number of fatal cancers that might be caused by releases from a variety of potential repository systems. Our assessments showed that many designs and sites could keep the risk level below 1000 additional cancer deaths over the first 10,000 years after

disposal. This would be comparable to the number of health effects likely to occur from the uranium ore still in the ground -- in other words, not a significant risk to public health.

There is another reason why Subpart B differs so much from Subpart A: The standards in Subpart B must accommodate large uncertainties -- uncertainties in our current knowledge about disposal techniques, and inherent uncertainties about the future. The future is, by definition, unknown. So, protecting the environment, we think, involves encouraging use of disposal systems that are tolerant of potential mistakes in engineering design or site-selection.

We faced these issues by developing assurance requirements which try to address and compensate for the uncertainties that necessarily accompany plans to isolate these dangerous wastes from the environment for so very long a time. No matter how promising analytical projections of a given disposal system's performance appear, we insist that high-level and transuranic wastes should be disposed of in a cautious manner that reduces the likelihood of unanticipated releases.

In shorthand, the seven assurance requirements we are now considering are these:

- (1) Disposal systems shall not depend on active institutional controls for more than 100 years after disposal;

- (2) Long-term disposal system performance should be monitored for a reasonable time as a supplement to other types of protection;
- (3) Disposal systems shall be marked and their locations recorded in all appropriate government records;
- (4) Disposal systems shall be designed with several different types of barriers, both natural and engineered;
- (5) Sites should not be located where scarce or easily accessible resources are located;
- (6) Site selection should consider the relative isolation offered by potential alternatives; and,
- (7) Wastes shall be recoverable for a reasonable time after disposal.

The containment and assurance requirements we feel are complementary: the containment requirements set limits on potential releases of radioactive materials; the assurance requirements provide the framework necessary to develop the kind of confidence we need to meet the containment requirements, even in the face of uncertainties inherent in a process of such enormous duration.

You will note that the fourth assurance requirement would require the use of multiple barriers of varied types. The barriers which could fulfill this requirement must be a combination of both engineered and natural. This is because even though an overall system analysis suggests that one may rely solely on the geologic media to contain the wastes, we are convinced that reliance on a "defense-in-depth" approach is vital because of the inherent

uncertainties in our assumptions affecting the projection of disposal system performance over thousands of years.

In this regard, we fully support the Nuclear Regulatory Commission's approach of specifying minimum requirements for waste package lifetime and long-term release rates in 10 CFR Part 60, the rule that sets forth the technical criteria NRC will use to regulate geologic repositories. Our own performance assessments indicate that the Part 60 requirement for a waste form release rate no greater than one part in 100,000 per year, is quite important for reducing potential long-term risks -- particularly in view of the uncertainties in hydrology and geochemistry that are associated with many of the sites under consideration. This release rate requirement should provide confidence in meeting EPA's disposal standards even if we have to make pessimistic assumptions about the performance of the natural barriers. Somewhat less critical, but still useful, is the Part 60 requirement for a 300- to 1,000-year waste package lifetime during which essentially no releases should occur.

Although Part 60 allows the Commission latitude to modify these engineered barrier requirements on a case-by-case basis, we advocate a very cautious approach in considering such exceptions. The intent of our assurance requirement about multiple barriers is to guard against the inherent uncertainties in predictions of disposal system performance over thousands to tens of thousands of years. Accordingly, arguments that this or that engineered barrier is not needed for overall disposal system safety should be considered very skeptically. At the heart of most such arguments will

lie the analytical predictions of systems models, and it is precisely the potential for these models to be wrong that is the basis of our assurance requirement.

As I mentioned earlier, EPA does not have enforcement authority in this area. The standards for waste management operations -- Subpart A -- will, therefore, be implemented by the Nuclear Regulatory Commission for commercial nuclear power activities, and by the Department of Energy for national defense facilities.

The standards for disposal -- Subpart B -- will be implemented by the Nuclear Regulatory Commission for all high-level wastes, whether the wastes come from commercial or military activities. The Nuclear Regulatory Commission will do this by developing its own regulations -- such as 10 CFR Part 60 -- and by deciding whether and when to issue the necessary licenses. Under current law, disposal of transuranic wastes from military activities is not regulated by the Nuclear Regulatory Commission; therefore, the Department of Energy will carry out our requirements for disposal of this category of wastes.

Finally, I should tell you that we anticipate promulgating our high-level waste disposal standards in final form sometime this summer. That concludes my prepared remarks. Thank you for your kind attention.



## Managing the Nation's Commercial High-Level Radioactive Waste

The Nuclear Waste Policy Act of 1982 (NWP) establishes in law a comprehensive Federal policy for commercial high-level radioactive waste management. NWP provides sufficient authority for developing and operating a waste management system based on disposal in mined geologic repositories (see figure). The Act requires the Department of Energy (DOE) to site and license two such repositories, and to begin disposing of commercial waste in the first repository by January 31, 1998.

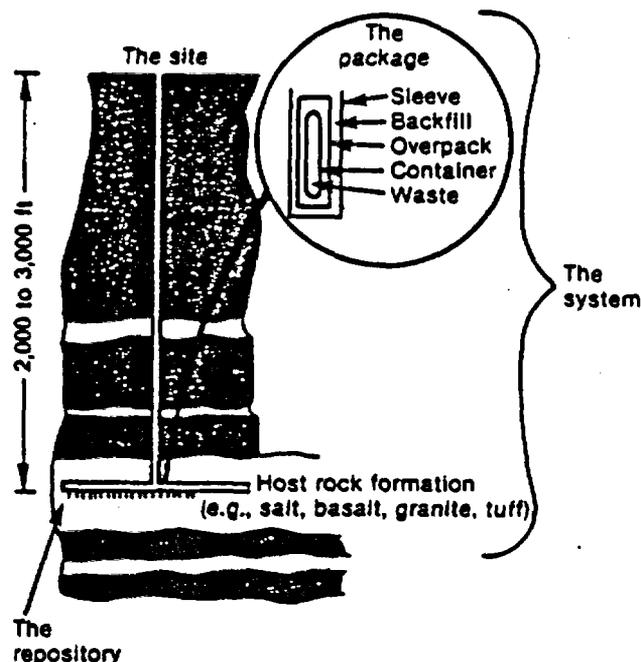
The 99th Congress will receive from DOE three key documents, required by NWP, detailing how this commitment would be met:

1. a Mission Plan, containing both a waste management plan with a schedule for transferring waste to Federal facilities and an implementation program for choosing sites and developing technologies to carry out that plan;
2. a monitored retrievable storage (MRS) proposal, with designs for long-term Federal storage facilities, evaluations of whether they are needed and feasible, and analysis of how they would be integrated with the repository program if authorized by Congress; and
3. a study of alternative institutional mechanisms for financing and managing the radioactive waste program, including the option of establishing an independent waste management organization outside of DOE.

The crucial next step for stabilizing the U.S. radioactive waste management program, and for building confidence that radioactive waste can and ultimately will be disposed of safely, is to develop a credible Mission Plan that is widely viewed as achievable and responsive to the concerns of the major affected parties. If the Mission Plan leaves some affected parties strongly dissatisfied with the way major questions left open by NWP are resolved, there will be a continued risk of future policy shifts like those that characterized the program before passage of NWP, and the credibility of long-term Federal commitments will suffer.

NWP requires the Mission Plan to provide "an informational basis sufficient to permit informed decisions to be made." To do this, it must identify the key programmatic decisions in developing the system, ana-

Figure—Mined Geologic Disposal Concept



Mined geologic disposal will use a system comprised of engineered barriers (the waste package and the mined repository) and naturally occurring barriers (the host rock formation and the chemical and physical properties of the repository site itself) to provide long-term isolation of waste from the biosphere. Three decades of extensive study have revealed no insurmountable technical obstacles to the development of mined geologic repositories, provided suitable sites are found.

SOURCE: Department of Energy.

lyze and compare the principal options, and thereby support DOE's choice among these options. The Draft Mission Plan published by DOE in April 1984 does not compare DOE's preferred course of action with feasible alternatives. OTA believes that the preparation of a final Mission Plan that does make such a comparison offers DOE a major opportunity to enhance the credibility and acceptability of the waste management program.

As part of its analysis of NWP, OTA identified the elements of a Mission Plan that can meet the requirements of the Act using only the authority it pro-

(over)

**Synopsis of  
Spent Fuel/High-Level Radioactive Waste Transportation Project  
of the  
Western Interstate Energy Board**

**Background:** The Western Interstate Energy Board, an association of sixteen western states, has been involved in a year-long cooperative project with the Department of Energy to develop an information base on the transportation of spent nuclear fuel and high-level radioactive waste (HLW) so that western states can be constructive and informed participants in the repository program under the Nuclear Waste Policy Act (NWPA). The project, which has been conducted under contract with the Department of Energy, also involves making recommendations regarding transportation of spent fuel and HLW.

**Status:** A draft report has been prepared and is under review by the Board's HLW Committee and other parties. The draft report consists of two parts: recommendations and a spent fuel/HLW transportation primer. Based on the significant number of useful comments, a second draft of the recommendations is expected to be ready for review by the HLW Committee by the end of the month. The final report is projected to be completed by the end of June.

**Outline of Areas of Recommendations:** The primary recommendation is that the Department of Energy develop a Comprehensive Transportation Plan to guide all transportation decisions under the NWPA. DOE (and other federal agencies) are conducting substantial work affecting various aspects of transportation under the Act. There is a need to organize and enhance such work through the development of a Comprehensive Transportation Plan.

To foster a continuing cooperative process between the states and DOE and to provide DOE with a constructive indication of the areas of interest to western states, the draft recommendations suggest the following topics be covered in the Plan.

1. Selection of transportation modes and analysis of preferred modes and potential routes.
2. Defense high-level waste shipments
3. Routing for waste shipments and infrastructure
4. Casks
5. Liability
6. Inspection and enforcement and incident reporting
7. Emergency preparedness and response
8. Operational concerns, e.g. driver training, placarding, safeguards, notification, etc.

The specific suggestions within each of these elements must, necessarily, be considered preliminary at this early stage in the NWPA process.

The draft recommendations also suggest states examine how state liability laws will affect compensation under the Price-Anderson Act and that states examine the use of multi-state permit and fee systems.