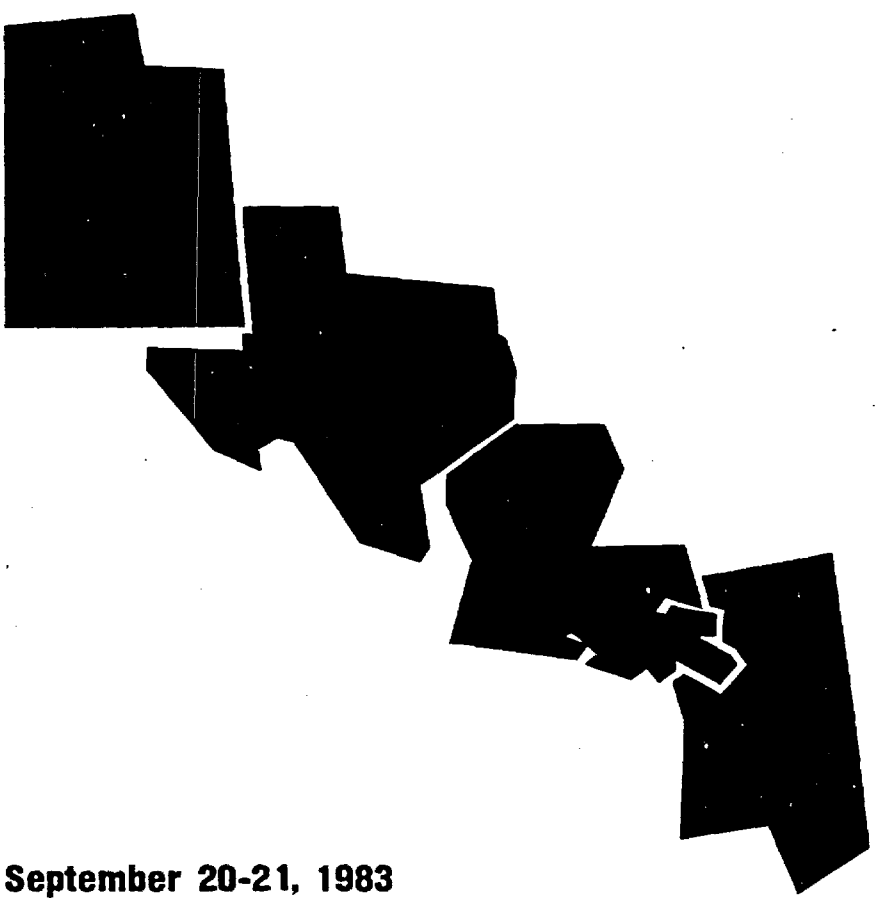
U.S. Department of Energy

National Waste Terminal Storage Program

Meeting with Salt State Representatives



September 20-21, 1983
Columbus, Ohio

Notes for 9/20-21/83 State Meeting

MISSION PLAN

Preliminary draft of Mission Plan being prepared by DOE:HQ. Early draft expected to be circulated to Field Offices and States in mid to late October. Has to be finalized - submitted to Congress not later than 17 months after enactment of NWPA (Sec 301).

YEAR END REVIEW

Key conclusions presented to HQ by 1st repository project was that a 1/1/85 site recommendation probably means that the repository recommendation could not be made until the 1989 - 1990 time frame. Given this date, repository operation could be as late as 2000-2001.

SCHEDULE

Planning Schedule for FY-84:

Draft EA	2/84
Final EA	6/84
Nomination	7/84
Recommendation	1/85
Presidential Approval	3/85
Shaft Start	5-9/86
Complete Shaft	2/88 - 10/88
EIS/Site Recommendation	1990

REPOSITORY A/E UPDATE

A contract for the architect-engineering services for the conceptual design of the repository will tentatively be signed on September 30, 1983. Fluor Engineers, Inc., of Irvine, CA is the selected firm. Their subcontractors are Morrison-Knudeson (Mining), Woodward-Clyde Consult. (Geoscience) ESD, Inc. (Special Process Equip.), and Science Applications, Inc. (Engineered Barriers). The conceptual design will occur over a period of approximately 30 months (October, 1983 to March, 1986). FY 84 activities will concentrate on those aspects of the design that are not site specific.

STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA, MAINE
04333

JOSEPH E. BRENNAN
GOVERNOR

September 7, 1983

The Honorable Donald Hodel, Secretary
U.S. Department of Energy
Forrestal Building
1000 Independence Avenue
Washington, D.C. 20585

Dear Secretary Hodel:

During the past six months while the Department of Energy has been formulating the Guidelines for the Recommendations of Sites for a Nuclear Waste Repository, the States have been devoting considerable time and resources to reviewing and commenting upon those Guidelines. We, in Maine, have been grateful for the opportunity provided by the Department of Energy to participate in this review process.

In keeping with the spirit of cooperation between the Department and the States, I would like to comment on two of the proposals put forth by the Department at the August 18th meeting in Dallas; one concerning implementation criteria and methodologies and the other concerning the issue of Environmental Assessments. First of all, we would urge that the Department reconsider its decision to place the implementation criteria and methodologies in a document separate from the Guidelines. How the Guidelines are going to be applied, how different factors are going to be weighted, is as important an issue to the States as the Guidelines themselves. Therefore, we would like to see the implementation section be a part of the final guidelines which will be sent to the Nuclear Regulatory Commission for concurrence.

Secondly, there is the issue of Environmental Assessments. Section 112 of the National Waste Policy Act (NWPA) of 1982 states that Environmental Assessments must be prepared prior to the nomination of five sites by the Secretary. The NWPA stated that these Environmental Assessments will be subject to judicial review. We know that DOE will be doing an Environmental Assessment on the nine preliminary sites prior to the nomination of five sites for the first repository and on the as yet undetermined number of preliminary sites for the second repository. We strongly urge that the DOE do Supplemental Environmental Assessments when reducing the five nominated sites for the first repository to the final three sites which will be recommended for site characterization by the Secretary to the President. An analogous stage should be established for the second repository as well. These Supplemental Environmental Assessments would, of course, be subject to judicial review. Considering

the potential impact that the selection of the final sites will have on the states involved, we believe the Supplemental Environmental Assessments are essential to assure that the President have all the information he needs to make the best decision regarding the locations of the two national waste repository sites.

Thank you for the opportunity to comment on these issues. I look forward to your reply.

Sincerely,

Joseph E. Brennan

JOSEPH E. BRENNAN
Governor

JEB:mas

MINUTES OF
SEPTEMBER MEETING WITH SALT STATE REPRESENTATIVES AND NRC

SEPTEMBER 20-21, 1983

BATTELLE MEMORIAL INSTITUTE
505 KING AVENUE
COLUMBUS, OHIO

A complete listing of all attendees is attached. (Attachment 1)
Actual agenda is attached. (Attachment 2)

September 20, 1983

Jeff Neff welcomed state and NRC representatives to the second state meeting. He asked for corrections to the minutes of the first meeting in July and received none. Jeff also asked if the calendar of state meetings as requested at the July meeting was serving the states' needs. It was suggested that a meeting date be starred (*) if the date was changed.

Jeff updated state participants on program activities, including the Mission Plan, Year-End Review, Schedule for FY84, and Repository A/E. (Attachment 3) Discussion followed on the schedule and possible changes in dates in the schedule. Specific questions concerned the SCP dates and their effects on the schedule.

Linda McClain discussed the Guidelines Process. She indicated that the draft version of the Guidelines would be out to the states by Friday (September 23). The states would then have a 2-week period to formulate their response letters. Morgan will meet with the states on September 30 and October 3. This will provide the states with two opportunities to discuss their remaining concerns about the Guidelines with Morgan. State comments are due October 7. The Guidelines package will be sent to NRC on October 10 and the states were assured that all comment letters would be attached. (Attachment 4)

A discussion followed on the guidelines schedule and the representatives expressed concern about meeting the deadline for final state comments.

Jeff adjourned this portion of the meeting to the lecture hall. Hassell E. Hunter, senior staff engineer at Conoco, Inc., was introduced to discuss the state of the art of big hole drilling. His presentation included the activities and steps leading to drilling a large hole. (Attachments 5 and 6)

Following his presentation, Mr. Hunter met with state representatives to answer their questions. The states were informed that videotapes of his presentation and other technical sessions were available to them for showing to other state officials.

Bob Wunderlich reviewed the status of the EA process. He indicated guidance is needed from DOE-HQ relating to the EA's depth and scope. This guidance is expected from DOE-HQ by October 10, 1983. Bob also stated that on October 10, 1983, the Guidelines were scheduled to be sent to NRC for their concurrence. These Guidelines and the DOE-HQ guidance on EA preparation will be used as the basis for initiating the EAs in all three salt basins. It was stated that by mid to late November, several sections of the EA are expected to be completed. Specifically, these sections are the comparison of the sites against the disqualifying factors in the Guidelines, the methodology for choosing a preferred site in a geohydrologic regime and the identification of these preferred sites. Bob stated that it would be possible to include a discussion of these EA sections at the next Salt States/NRC representatives meeting in November.

The Mississippi comments on ONWI-505 have been received and were reviewed by ONWI and NPO. A discussion followed on the EAs and the level of data required for them. (Attachments 7 and 8)

Stan Goldsmith presented an overview of the FY84 budget and ONWI program. (Attachment 9)

Alan Handwerker, NPO legal counsel, discussed five court cases whose outcome could have implications that will affect the NWTS program: the California case, PANE case, the New York City transportation case, the utility suit in connection with the NWPA, and Initiative 383 in Washington state.

Leslie Casey reviewed data transfer procedures. (Distributed at the meeting were the following: ONWI-200(1), Bibliography of Studies for the Salt Repository Office of Nuclear Waste Terminal Storage Program, April 1978-March 1983; BMI/ONWI-5001, Petrographic Report on Clay-Rich Samples from Permian Unit 4 Salt, G. Friemel #1 Well, Palo Duro Basin, Deaf Smith County,

Texas: Unanalyzed Data; and the Catalog and Procedures for Requesting Unanalyzed and Processed Data/Information from the NWTS-Salt Repository Project in Columbus, Ohio.) These were follow-up editions of items discussed with the states at the last state meeting. DOE and ONWI representatives expressed interest in receiving state comments on the catalog and unanalyzed data reports.

A discussion followed on the benefits to the states of having the catalog and turn-around time needed for information requests.

Bev Rawles explained the procedure for ordering reports. The current list of Interested Parties for the purpose of receiving copies and change pages for the catalog are shown on Attachment 10. Additions to this list can be made by calling Leslie Casey (614/424-5916). New catalog sheets will come out monthly. Reports can be expected 30-45 days from time data collection is complete. This assumes data collection occurs in less than 3 months. For data that is collected on an ongoing basis (i.e., for periods longer than 3 months), quarterly data reports will be issued.

Matt Golis presented an update on the Technical Data Management System (TDMS) and invited state participants to a hands-on demonstration on Wednesday afternoon during the open period. Matt requested that the states give him specific access areas they would want the TDMS to include. (Attachment 11)

September 21, 1983

Jeff reviewed the DOE-HQ organization charts. Although he had some names listed, Jeff emphasized that these positions are on an "acting" basis and that the new organization chart had not been approved. (Attachment 12)

Bob Johnson, NRC, covered the following topics:

- Schedule for technical meetings and workshops
- NRC review of Guidelines
- NRC reorganization for nuclear waste management
- NRC's prelicensing role and needs in collecting data
- Review of DOE catalog and proposed information system
  - A letter will be sent to DOE (with copies to the states) with NRC's complete comments on the information system.
- Need to continue technical meetings.

ACTION ITEM: Donna Mattson agreed to send DOE a listing of the materials currently in the Public Document Room related to high-level waste management.

A discussion followed on timely release of reports and unanalyzed data. NRC emphasized the need to have immediate access to data. Jeff assured NRC that they do have access and availability to all data--although it might not yet be in report format. (Attachment 13)

Following a state caucus during the lunch hour, Steve Frishman presented the state recommendations for the next meeting:

1. Recommended date for next state meeting - November 15-16
2. Agenda items for November meeting: (1) Invite EPA to present technical discussion of NAS (Pigford) report, (2) Discussion of mission plan proposal, (3) NRC's plans for '84, (4) Overall guidance and operation of the grants program, (5) Using ONWI-505 as a format, discussion of in-scope and out-of-scope issues for EA, (6) Status of public information activities and future plans in the states.

3. On-going topics to include: update on A/E, continuing discussion of data transfer system, continued status updates. Continue to have technical speakers.
4. Possible future topics: C&C agreement with Yakima tribe and transportation.

ACTION ITEM: States agreed to send 5-10 search ideas for the TDMS to DOE within the next 30 days.

Submitted by Debra Halliday, ONWI

LIST OF ATTACHMENTS TO
SEPTEMBER 20-21 MEETING MINUTES

1. Meeting Attendees
2. Meeting Agenda
3. J. Neff's handout
4. State Letters to Secretary Hodel on Siting Guidelines
5. Resume of Hassell E. Hunter
6. H. Hunter's handout - Oil & Gas Journal reprint
7. R. Wunderlich's viewgraphs
8. R. Wunderlich's handout - Draft Annotated Outline for Characterization of a Site for a Candidate Repository Site Pursuant to the Nuclear Waste Policy Act of 1982.
9. S. Goldsmith's viewgraphs
10. List of Catalog Holders
11. M. Golis' handout
12. J. Neff's handout
13. R. Johnson's handout

ATTACHMENT 1

ATTENDEES

MEETING WITH SALT STATE REPRESENTATIVES AND NRC
SEPTEMBER 20-21, 1983

NAME	AFFILIATION	ADDRESS
Renwick DeVille	Louisiana Geological Survey	P.O. Box G Baton Rouge, LA 70893
Ronald Forsythe	Mississippi Energy & Transportation Board	300 Watkins Bldg., 510 George St Jackson, MS 39202
Alvin Bicker	Mississippi Bureau of Geology	P.O. Box 5348 Jackson, MS 39216
Mack Cameron	Mississippi Attorney General's Office	Box 220 Jackson, MS 39205
Steve Frishman	Texas Governor's Office	P.O. Box 12428 Austin, TX 78711
Dan Smith	Texas Governor's Office	P.O. Box 12428 Austin, TX 78711
Randy Moon	Utah Governor's Office	116 State Capitol Salt Lake City, UT 84114
Robert Johnson	NRC/Waste Management	Washington, D.C. 20555
Donna Mattson	NRC/Waste Management	Washington, D.C. 20555
Jay Rhoderick	NRC/Waste Management	Washington, D.C. 20555
Arlie Howell	Battelle Advisor-Mississippi	Route 6, Box 540 Lucedale, MS 39452
Charles Killgore	Battelle Advisor-Louisiana	506 Hundred Oaks Drive Ruston, LA 71270
George Loudder	Battelle Advisor-Texas	P.O. Box 15047 Amarillo, TX 79105
Jeff Neff	DOE-Columbus	505 King Avenue Columbus, OH 43201
Bob Wunderlich	DOE-Columbus	505 King Avenue Columbus, OH 43201
Linda McClain	DOE-Columbus	505 King Avenue Columbus, OH 43201
Leslie Casey	DOE-Columbus	505 King Avenue Columbus, OH 43201

NAME	AFFILIATION	ADDRESS
Tom Baillieul	DOE-Columbus	505 King Avenue Columbus, OH 43201
Alan Handwerker	DOE-Columbus	505 King Avenue Columbus, OH 43201
Keith Robinette	DOE-Columbus	505 King Avenue Columbus, OH 43201
John Moore	Maxima	505 King Avenue Columbus, OH 43201
Bill Moore	Decision Planning Corp.	505 King Avenue Columbus, OH 43201
Gary Marmer	Argonne National Lab	505 King Avenue Columbus, OH 43201
Albert LaSala, Jr.	USGS	505 King Avenue Columbus, OH 43201
Diana Noga	Weston	2301 Research Blvd. Rockville, MD 20850
Stan Goldsmith	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Don Keller	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Bev Rawles	Battelle-BPMD	505 King Avenue Columbus, OH 43201
Matt Golis	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Bill Merriman	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Helen Latham	Battelle-ONWI	505 King Avenue Columbus, OH 43201
John Suchy	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Mike Glora	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Bill McIntosh	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Curt Knudsen	Battelle-ONWI	505 King Avenue Columbus, OH 43201
Debra Halliday	Battelle-ONWI	505 King Avenue Columbus, OH 43201

ATTACHMENT 2

AGENDA

MEETING WITH SALT STATE REPRESENTATIVES AND NRC
SEPTEMBER 20-21, 1983

BATTELLE MEMORIAL INSTITUTE
BY THE 505 KING AVENUE LOBBY
COLUMBUS, OHIO

Tuesday, September 20 - Conference Room H		Discussion Leader
9:00 - 9:15 a.m.	Opening Remarks	Jeff Neff
9:15 - 9:30 a.m.	Program Update (Mission Plan, A/E Procurement, Schedule, Year-End Review)	Jeff Neff
9:30 - 10:00 a.m.	Update on Guidelines	Linda McClain
Lecture Hall		
10:00 - 12:00	Large Hole Diameter Drilling Discussion	Hassell Hunter
Cafeteria Room 6		
12:00 - 1:00 p.m.	Lunch	
Conference Room H		
1:30 - 2:00 p.m.	Questions and Answers	Hassell Hunter
2:00 - 3:00 p.m.	Status of EA Process	Bob Wunderlich
3:00 - 3:30 p.m.	FY84 Budget Overview and FY84 ONWI Program	Stan Goldsmith
3:30 - 4:00 p.m.	Recent Decisions (Supreme Court)	Alan Handwerker
4:00 - 5:00 p.m.	Status of Data Transfer Procedures	Leslie Casey Bev Rawles Matt Golis
5:00 p.m.	Wrapup	Jeff Neff

Wednesday, September 21 - Conference Room G

9:00 - 9:30 a.m.	DOE Organization	Jeff Neff
9:30 - 10:30 a.m.	NRC Report	Bob Johnson
10:30 - 11:00 a.m.	Discussion	
11:00 - 1:00 p.m.	States Caucus, Lunch	
1:00 - 1:30 p.m.	States' Response	Steve Frishman
1:30 - 1:45 p.m.	Closing Remarks	Jeff Neff
1:45 p.m. -	Open time for scheduling individual sessions with NPO, ONWI staff or attending demonstrations of the Records Management System or Technical Data Management Systems.	

ATTACHMENT 3

ATTACHMENT 4

MARK WHITE
GOVERNOR

OFFICE OF THE GOVERNOR
STATE CAPITOL
AUSTIN, TEXAS 78711

August 29, 1983

Dear Secretary Hodel:

During the past six months, Texas has participated in an extensive review of the Department of Energy's proposed Siting Guidelines for selection of nuclear waste repositories. This process has included comments on four separate drafts of the Guidelines, testimony at DOE-sponsored regional hearings, individual state consultation with DOE personnel, and participation in two general meetings involving the States and Federal agencies.

We have devoted extensive staff time and State resources to this review because we believe the development of a credible set of Siting Guidelines is essential to achieving the technical and political consensus necessary to select candidate sites for repositories. The Nuclear Waste Policy Act specifically sets forth a process, starting with the Guidelines, which will allow our nation to achieve a safe and equitable means of disposal for high-level nuclear waste.

In order for this process to function effectively, the Guidelines must establish not only general principles and technical factors for selection but also a specific implementation methodology which can be applied to the screening of sites, as well as to the nomination and recommendation of sites for detailed characterization. We have pressed this point in our review of each successive draft of the Siting Guidelines and believe the Guidelines in their present form remain seriously flawed for lack of a specific implementation methodology.

In meetings with DOE personnel in Dallas, Texas, August 18, 1983, representatives of Texas recommended, along with twenty other States, that appropriate implementation methodologies for screening, nomination, and recommendation of sites be incorporated in the Guidelines. Although we understand DOE's wish to conform with the time schedules set forth in the Nuclear Waste Policy Act, we are concerned that the Department has only now addressed the need for implementation criteria to bridge the gap between general guidelines and the recommendation decisions.

The following proposal outline provides a sequential process for the development of Guidelines for site nominations and recommendations pursuant to Section 112(a) of the Nuclear Waste Policy Act and further outlines a procedure by which nomination and recommendation of candidate sites for site characterization activities would be achieved in full compliance with the letter and spirit of the Act.

I. Finalize Guidelines for nomination and recommendation of sites for site characterization.

   A. Develop new Implementation Guidelines and Methodology, which include:
      1. Implementation Methodology for identifying potentially acceptable sites.
      2. Implementation Methodology for nomination of sites.

   B. Develop Technical Guidelines for evaluation of sites.

II. Nominate at least five sites.

   A. Develop Draft Environmental Assessments.
      1. Apply I.A.2 in evaluation and comparison of sites.

   B. Develop Final Environmental Assessments.

III. Recommend three sites for site characterization.

   A. Finalize amendment to Guidelines for implementation Methodology for recommendation of sites for site characterization.

   B. Develop Draft Supplements to Final Environmental Assessments.
      1. Apply III.A. in evaluation of nominated sites.
      2. Apply Section 112(b)(1)(H)(3) of Nuclear Waste Policy Act.

   C. Develop Final Supplements to Final Environmental Assessments.

IV. Develop Screening Methodology Report (Second Repository Program).

   A. Apply I.A.1.

V. Redraft Regional Characterization Report (Second Repository Program)

VI. Develop Area Recommendation Reports and Area Characterization Reports (Second Repository Program).

NOTES: After I is completed,

1. Sections II and III.A. may be undertaken concurrently.
2. Sections II and IV may be undertaken concurrently.

The above proposal permits the sequential development of Guidelines of increasing rigor appropriate to the three stages of site selection--initial screening, nomination, and recommendation.

At each level of evaluation, the principles of the Guidelines applicable to potentially acceptable sites would be further refined, increasingly detailed in their conception and application, and would apply progressively more detailed mechanisms for weighting the technical factors involved in the evaluations. At the culmination of the three stage evaluation process, sites would be recommended for characterization on the basis of a methodology which assigns numerical values and weights to the factors under consideration. This process would result in a cumulative "score" that would be used as the basis for recommending three sites to the President.

The proposed implementation methodology would be applied, in accord with the Act, to the development of environmental assessments in support of DOE's site nomination and recommendation decisions.

The Act requires that the environmental assessments include a reasonable comparative evaluation among sites that will be considered. The comparisons at the nomination stage should be made by application of the implementation methodology appropriate to the stage. It will also be necessary that the Guidelines provide a methodology at this stage for comparison of sites, both within and among hydrogeologic settings.

It would be preferable to incorporate the implementation methodology in the current Guidelines for all three stages of screening, nomination, and recommendation; however, in the interest of assisting you and your staff in your efforts to comply with the decision schedule of the Act, an alternative, yet acceptable progression of actions and decision is proposed in the above outline. This provides for development of implementation guidelines and methodology for potentially acceptable sites and for nomination of sites as part of the current Guidelines for submission to the Nuclear Regulatory Commission.

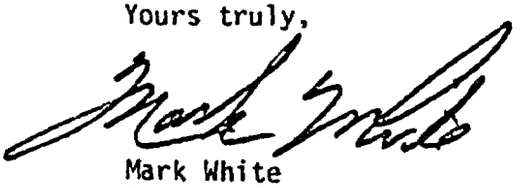
Once the initial Guidelines are completed, the environmental assessment process for nomination of sites could proceed concurrently with the preparation of the implementation methodology for recommendation of sites for site characterization. This implementation methodology would be subject to the State and Federal agency consultation provision of Section 112(a) and the NRC concurrence requirement; and would be promulgated by you as an amendment to the Guidelines already adopted.

Following the promulgation of the implementation methodology for site recommendation, this methodology would be applied to the five nominated sites, along with other available information developed pursuant to Section 112(b)(1)(H)(3) of the Act, to arrive at three sites for recommendation. Documentation in support of your recommendation of the three sites would be in the form of draft supplemental environmental assessments evaluating and comparing the nominated sites.

We believe the above proposal satisfies our mutual goal of a timely, reproducible and defensible sequence of decisions leading to the recommendation to the President of three sites for characterization and, this sequence can be achieved within the schedule set forth in the Nuclear Waste Policy Act for the Nomination and Recommendation of Sites.

I look forward to your reply.

Yours truly,



Mark White
Governor of Texas

The Honorable Donald P. Hodel, Secretary
U. S. Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C.

MW:mamf

JOHN SPELLMAN
Governor

DONALD W. MOOS
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504 • (206) 459-6000

August 26, 1983

Honorable Donald Hodel, Secretary
U.S. Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Secretary Hodel:

During the past six months State of Washington personnel have participated in an extensive review of the Department of Energy's proposed General Guidelines for Recommendation of Sites for Nuclear Waste Repositories. This process included comments on four separate drafts of the Guidelines, testimony at USDOE-sponsored regional hearings, individual state consultation with USDOE personnel, and participation in two general meetings involving the states and Federal agencies.

We have devoted extensive staff time and state resources to this review because we believe the development of a credible set of Siting Guidelines is essential to achieving the technical and political consensus necessary to select candidate sites for repositories. The Nuclear Waste Policy Act specifically sets forth a process, starting with the Guidelines, which will allow our nation to achieve a safe and equitable means of disposal for high-level nuclear waste.

In order for this process to function effectively, the Guidelines must establish not only general principles and technical factors for selection, but also a specific implementation methodology. This methodology should be applied to the screening of sites, as well as to the nomination and recommendation of sites for detailed characterization. We have pressed this point in our review of each successive draft of the Siting Guidelines and believe the Guidelines in their present form remain seriously flawed for lack of a specific implementation methodology.

In meetings with DOE personnel in Dallas, Texas, on August 18, State of Washington representatives recommended, along with twenty other states, that appropriate implementation methodologies for screening, nomination, and recommendation of sites be incorporated in the Guidelines. Although we understand USDOE's wish to conform with the time schedules set forth

in the Nuclear Waste Policy Act, our greatest concern is that USDOE develop and implement adequate Guidelines. Your adoption of appropriate implementation policies will ensure a timely, reproducible, and defensible sequence of decisions leading to the recommendation of three sites for characterization.

Please contact us if you have any questions.

Sincerely,

Donald W. Moos
Director
Department of Ecology

Susan E. Gould by ds
Susan E. Gould
Chair, Nuclear Waste Policy
and Review Board and
Chair, Nuclear Waste Advisory
Council

DWM/SEG:bjw

cc: Holmes Brown, NGA
David Stevens
Policy and Review Board

State of South Carolina

Office of the Governor

RICHARD W. RILEY
GOVERNOR

POST OFFICE BOX 11450
COLUMBIA 29211

September 2, 1983

The Honorable Donald P. Hodel
Secretary of Energy
United States Department of Energy
Washington, D.C. 20585

Dear Secretary Hodel:

For the past six months my state has been involved in consultations with the Department of Energy regarding the Crystalline Rock Project as well as other aspects of the National Terminal Waste Storage Program as authorized by the Nuclear Waste Policy Act of 1982 (P.L. 97-425). Over this period of time we have become increasingly concerned with the nature and the sequencing of the program activities being undertaken by the Department.

The Nuclear Waste Policy Act of 1982 (NWPA) sets forth a specific process which will allow our nation to achieve a safe and equitable means for the disposal of high level radioactive wastes. This process is to begin with the establishment of national Siting Guidelines. These Guidelines are intended to specify not only the technical criteria for the selection of sites, but also the methodology for the implementation of those technical criteria.

As of this date, the Siting Guidelines have not been finalized by the Department, and yet, work goes on in the Crystalline Rock Project. Last spring the Department issued Draft Regional Characterization Reports for the three Regions covered by the Crystalline Rock Project. These Draft Reports identified twelve crystalline rock bodies in South Carolina and purportedly represented the data base for identifying those rock masses which would be suitable for further evaluation for potential repository sites. However, no description of the repository is included; the screening methodology for the Crystalline Rock Project has not been established; and Siting Guidelines, technical criteria and methodology remain incomplete.

We understand that similar problems with inappropriate sequencing of program steps have occurred with respect to the nine potentially acceptable sites which are currently being considered for site characterization for the first repository.

We recognize the Department's legitimate desire to conform to the time schedules set forth in the NWPA. However, we believe that the most important objective must be for the Department to establish and maintain a credible programmatic approach to carrying out its responsibilities under the Act. As Mr. Robert L. Morgan has testified before the Congress, doing the job right is more important than meeting a given deadline. We wholeheartedly subscribe to Mr. Morgan's statement of approach.

We believe that this objective can be accomplished in the following manner:

(A) Siting Guidelines

The Department should finalize the Siting Guidelines as proposed by the states at the national Siting Guidelines meeting in Dallas, Texas, on August 18, 1983. Specifically this would involve finalizing Implementation and Technical Guidelines to define the decision-making processes for the identification of potentially acceptable sites and for the nomination of sites for characterization.

The portion of the Guidelines dealing with the decision to identify potentially acceptable sites, Guideline 960.3-2-1 of the August 1, 1983, version of the Siting Guidelines should be revised to read as follows:

> Site screening activities to identify potentially acceptable sites for development of other than the first repository shall systematically focus on identifying successively smaller areas within those large areas of land given initial consideration. The identification of potentially acceptable sites shall be determined through the application of a formal screening methodology to be developed by the Department in consultation with the states. This methodology shall take into consideration:
>
> 1) diversity of geohydrologic settings and rock types, as specified in Guidelines 960.3-1-1 and 960.3-1-2;
>
> 2) regionality, as specified in Guideline 960.3-1-3;
>
> 3) sites previously recommended for characterization under Guideline 960.3-2-3; and
>
> 4) qualifying, disqualifying, favorable and potentially adverse criteria identified in all the Guidelines contained in Subpart C and in Subpart D.

> The process of site screening shall result in the selection of potentially acceptable sites for nomination and recommendation for characterization. To identify a site as such, the Secretary shall identify the State within which the site is located in a draft recommendation report issued for review and comment by the States. When the recommendation report has been finalized, the Secretary shall notify in writing the Governor and the State legislature of that State, and the tribal council of any affected Indian tribe in that state, of the potentially acceptable site.

All references to systems guidelines and engineered barriers should be deleted from the Final Guidelines. The Final Guidelines should state that siting decisions will be made in accordance with the criteria established by the Nuclear Regulatory Commission in 10 CFR PART 60 (Technical) and the standards established by the Environmental Protection Agency in 40 CFR PART 191. The provisions which make references to system guidelines and engineered barriers are both inappropriate and unnecessary.

Once this step has been accomplished, work can proceed on the Crystalline Rock Project (see below) and on the Draft and Final Environmental Assessments of the five sites to be nominated for characterization for the first repository.

Subsequently, we request that the Implementation and Technical Guidelines be formally revised to cover the decision-making process for selecting no less than three sites for detailed site characterization. When this has been accomplished the decision to select these sites should be documented in Draft Supplements to the Final Environmental Assessments referenced above.

(B) Crystalline Rock Project

We are submitting our State's detailed comments on the Draft Regional Characterization Reports to Dr. Sally A. Mann, Manager, Crystalline Rock Project. (Enclosed you will find a copy for your information.) Over and above the deficiencies of these particular documents, we have again raised our concern with the process being followed by the Department. We have recommended the following approach:

1) Finalize the Siting Guidelines for identifying potentially acceptable sites before making any more decisions in the Crystalline Rock Project.

2) Based on the Final Siting Guidelines, develop a formal Crystalline Rock Project Screening Methodology in consultation with the states.

3) Based on the Screening Methodology, develop Revised Regional Characterization Reports in consultation with the states.

4) Based on the results of steps (2) and (3) above, develop an Area Recommendation Report and an Area Characterization Plan in consultation with the states.

We believe the approaches outlined above, both for finalizing the Siting Guidelines and for carrying out the programmatic work of the National Waste Terminal Storage program under the Guidelines, will satisfy our mutual goal of achieving timely, reproducible, and defensible decisions for the siting and development of permanent repositories for our nation's high level radioactive waste. Furthermore, we believe that credible decisions can be made within the framework of the timetables and decision schedules provided for by Congress in the NWPA.

I look forward to your reply.

Yours sincerely,

Dick Riley

Richard W. Riley

RWR:mc

Enclosures

cc: South Carolina Congressional Delegation
South Carolina AFR Consultation Committee

State of South Carolina

Office of the Governor

RICHARD W. RILEY
GOVERNOR

POST OFFICE BOX 11450
COLUMBIA 29211

September 2, 1983

Dr. Sally A. Mann
Crystalline Rock Program Office
United States Department of Energy
Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439

Dear Dr. Mann:

Enclosed you will find South Carolina's comments on the Draft Southeast Regional Characterization Reports issued last May by your office for State review and comment.

In the course of this review as well as in our interactions with the Department on other aspects of the National Waste Terminal Storage Program, we have become increasingly concerned about the nature and sequencing of various program activities being conducted by the Department. We have addressed these concerns in the enclosed comment document. In addition, I have written to Secretary Hodel on these matters (see enclosed copy of the September 2, 1983 letter to the Secretary).

The success of the Department's program to site and develop permanent repositories for high level radioactive waste is of vital concern to our State. For over thirty years now, the Department has been accumulating these wastes at the Savannah River Plant in our State. If the Department's current efforts fail, these wastes will continue to accumulate in our State for the indefinite future.

As we note in the Executive Summary of our comments, the fundamental issue is credibility. Without public confidence, the Department will not be able to carry out the mandate given to it by the Congress in the Nuclear Waste Policy Act of 1982. Thus, it is in the spirit of constructive criticism that we offer these comments, with the hope and expectation that the Department will be able to correct current weaknesses and build the strong programmatic base necessary for achieving the objectives of the 1982 Act.

I would very much appreciate hearing from you as to what you plan to do with these comments and those offered by the other states involved in the Crystalline Rock Project. If you have any questions about these comments, please contact Dr. John J. Stucker of my staff.

Yours sincerely,

Richard W. Riley

RWR:mc

Enclosures

cc: South Carolina Congressional Delegation
South Carolina AFR Consultation Committee

DEPARTMENT OF ENERGY & TRANSPORTATION
Watkins Building, 510 George Street
Jackson, Mississippi 39202-3096
601/961-4733

September 2, 1983

Honorable Donald Hodel
Secretary
U. S. Department of Energy
Forrestal Building
1000 Independence Avenue, S. W.
Washington, D. C. 20545

Dear Secretary Hodel:

For the past six months, the State of Mississippi, through the Energy and Transportation Board has participated in an extensive review of the Department of Energy's proposed General Guidelines for Recommendation Sites for nuclear waste repositories.

Comments on four separate drafts of the Guidelines, testimony at DOE-sponsored regional hearings, individual state consultation with DOE personnel, and participation in two general meetings involving the States and Federal agencies has occurred during this process.

Extensive staff time and State resources have been devoted to this review as the development of a credible set of Siting Guidelines is essential to achieving the technical and political consensus necessary to select candidate sites for repositories. The Nuclear Waste Policy Act specifically sets forth a process, starting with the Guidelines, which will allow the nation to achieve a safe and equitable means of disposal for high-level nuclear waste.

In order for this process to function effectively, the Guidelines must establish not only general principles and technical factors for selection but also a specific implementation methodology which can be applied to the screening of sites, as well as to the nomination and recommendation of sites for detailed characterization. This point has been strongly emphasized in our review of each successive draft of the Siting Guidelines. The Guidelines in their present form remain seriously flawed for lack of a specific implementation methodology.

In meetings with DOE personnel in Dallas, Texas, August 18, representatives of the Mississippi Nuclear Waste Technical Review Committee, along with twenty-one other states, recommended that appropriate implementation methodologies for screening, nomination, and recommendation of sites be incorporated into the Guidelines. The Department of Energy is pressed by the time

schedules set forth in the Nuclear Waste Policy Act; however, the State's Technical Community is concerned that the Department has only now acknowledged the need for implementation criteria to bridge the gap between general guidelines and the recommendation decisions.

The following proposal provides an orderly process by which site nominations and recommendations pursuant to Section 112(a) of the Nuclear Waste Policy Act can be accomplished and further outlines a procedure by which nomination and recommendation of candidate sites for site characterization activities would be achieved in full compliance with the letter and spirit of the Act.

I. Finalize Guidelines for nomination and recommendation of sites for site characterzation.

   A. Develop new Implementation Guidelines and Methodology, which include:

      1. Implementation Methodology for identifying potentially acceptable sites.

      2. Implementation Methodology for nomination of sites.

   B. Develop Technical Guidelines for evaluation of sites.

II. Nominate at least five sites.

   A. Develop Draft Environmental Assessments.

      1. Apply I.A.2 in evaluation and comparison of sites.

   B. Develop Final Environmental Assessments.

III. Recommend at least three sites for site characterization.

   A. Finalize amendment to Guidelines for implementation Methodology for recommendation of sites for site characterization.

   B. Develop Draft Supplements to Final Environmental Assessments.

      1. Apply III.A. in evaluation of nominated sites.

      2. Apply Section 112(b)(3) of Nuclear Waste Policy Act.

   C. Develop Final Supplements to Final Environmental Assessments.

IV. Develop Screening Methodology Report (Second Repository Program).

A. Apply I.A.I.

V. Redraft Regional Characterization Report (Second Repository Program).

VI. Develop Area Recommendation Reports and Area Characterization Reports (Second Repository Program).

NOTES: Following I,

1. Sections II and III.A. may be undertaken concurrently.

2. Sections II and IV may be undertaken concurrently.

The above proposal permits the sequential development of Guidelines of increasing rigor appropriate to the three states of site selection--initial screening, nomination, and recommendation.

At each level of evaluation, the principles of the Guidelines applicable to potentially acceptable sites would be further refined, increasingly detailed in their conception and application, and would apply progressively more detailed mechanisms for weighting the technical factors involved in the evaluations. At the culmination of the three state evaluation process, sites would be recommended for characterization on the basis of a methodology which assigns numerical values and weights to the factors under consideration. This process would result in a cumulative "score" that would be used as the basis for recommending three sites to the President.

The proposed implementation methodology would be applied, in accordance with the Act, to the development of environmental assessments in support of DOE's site nomination and recommendation decisions.

The Act requires that the environmental assessments include a reasonable comparative evaluation among sites that will be considered. The State of Mississippi proposes that comparisons at the nomination stage be made by application of the implementation methodology appropriate to that stage. It will be necessary that the Guidelines provide a methodology at this stage for comparison of sites, both within and among geohydrologic settings.

It would be preferable to incorporate the implementation methodology in the Guidelines for all three states of screening, nomination, and recommendation; however, in the interest of assisting (the Department) in complying with the decision schedule of the Act, an alternative, yet acceptable, progression of actions and decision is proposed. This provides for development of implementation guidelines and methodology for potentially acceptable sites and for

nomination of sites as part of the current Guidelines for submission to the Nuclear Regulatory Commission.

Once the initial Guidelines are completed, the environmental assessment process for nomination of sites could proceed concurrently with the preparation of the implementation methodology for recommendation of sites for site characterization. This implementation methodology would be subject to the State and Federal agency consultation provision of Section 112(a) and the NRC concurrence requirement; and would be promulgated as an amendment to the Guidelines already adopted.

Following the promulgation of the implementation methodology for site recommendation, this methodology would be applied to the five nominated sites, along with other available information developed pursuant to Section 112(b)(3) of the Act, to arrive at three sites for recommendation. Documentation in support of your recommendation of the three sites would be in the form of draft supplemental environmental assessments evaluating and comparing the nominated sites.

The State's Technical Review Committee and the Energy and Transportation Board believe the above proposal satisfies the goal of a timely, reproducible and defensive sequence of decisions leading to the recommendation (of three sites for characterization) to the President. This sequence can be achieved with the schedule set forth in the Nuclear Waste Policy Act for the Nomination and Recommendation of Sites.

Thank you for your consideration in this most important matter.

Very truly yours,

Wilbur G. Ball

Wilbur G. Ball
Executive Director

WGB:F:pf

cy: Mr. Robert Morgan

State of Rhode Island and Providence Plantations
EXECUTIVE CHAMBER, PROVIDENCE

J. Joseph Garrahy
Governor

September 2, 1983

The Honorable Donald Paul Hodel
Secretary
United States Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Secretary:

As you are well aware, the State of Rhode Island is very concerned about the safe disposal of high-level nuclear waste. Accordingly, our State is committed to an extensive review of the Department of Energy's Proposed Siting Guidelines for the selection of nuclear waste repositories. We believe that the development of a detailed set of Siting Guidelines, acceptable to the states and tribes, is essential to attain the technical and political consensus necessary to select sites for these nuclear waste repositories.

The Nuclear Waste Policy Act specifically sets forth a process, starting with the Guidelines, which should allow our nation to achieve a safe and equitable means of disposal. Our review of the Guidelines, however, indicated that a precise and detailed methodology for implementing them was omitted, thereby violating the spirit if not the letter of the Act. A specific methodology for implementation is absolutely essential to assure that the screening, nomination, and site recommendation process will proceed in an orderly fashion, with the full participation of the States and tribes affected.

Recommendations toward this end were made at the August 18th meeting in Dallas, Texas, by representatives of 20 states involved in the siting of the first and second repositories. I am hereby requesting that the Department of Energy give full and serious attention to the alternative implementation procedures developed at that meeting. An outline of those procedures is attached to this letter. Under this proposal, the nomination and recommendation of sites for characterization would be achieved in full compliance with the Nuclear Waste Policy Act.

The State of Rhode Island submits that the attached proposal satisfies our mutual goal of a timely, reproducible, and defensible sequence of decisions leading to the recommendation to the President of three sites for characterization.

Thank you for your consideration of this issue. I look forward to your reply.

Sincerely,

J. Joseph Garrahy
G O V E R N O R

Enclosure

PROPOSAL ADOPTED BY THE STATES

AT DALLAS, AUGUST 18, 1983

I. Finalize Guidelines for nomination and recommendation of sites for site characterization.

   A. Develop new Implementation Guidelines and Methodology, which include:

      1. Implementation Methodology for identifying potentially acceptable sites.

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   B. Develop Final Environmental Assessments.

III. Recommend at least three sites for site characterization.

   A. Finalize amendment to Guidelines for implementation Methodology for recommendation of sites for site characterization.

B. Develop Draft Supplements to Final Environmental Assessments.

1. Apply III.A. in evaluation of nominated sites.

2. Apply Section 112(b)(1)(H)(3) of Nuclear Waste Policy Act.

C. Develop Final Supplements to Final Environmental Assessments.

IV. Develop Screening Methodology Report (Second Repository Program).

A. Apply I.A.1.

V. Develop Area Recommendation Reports and Area Characterization Reports (Second Repository Program).

NOTES: Following I,

1. Sections II and III.A. may be undertaken concurrently.

2. Sections II and IV may be undertaken concurrently.

The above proposal permits the sequential development of Guidelines of increasing rigor appropriate to the three stages of site selection--initial screening, nomination, and recommendation.

ATTACHMENT 5

Resume

Hassell E. Hunter

7226 Tall Pines
Houston, Texas 77088
Phone 713-448-9782

Expertise: Drilling; design, engineering and management of drilling projects both onshore and offshore. Particuliarly proficient in large diameter drilled shafts and big rigs. Some Mining and nuclear energy.

Education:	Haskell High School, Haskell, Texas	1936-40
	Aero Industries Technical Institute Los Angeles, Ca. (Aeronautics)	1940-41
	U. S. Air Force Technical Schools (Radio and Radar)	1943-44
	Texas A&I University, Kingsville, Texas (Business Administration & Pre-Law)	1946-48
	Hardin-Simmons University, Abilene, Texas (Petroleum Engineering)	1948-49
	McMurry College, Abilene, Texas (Petroleum Engineering)	1955-57
	Texas University, Austin, Texas (Petroleum Engineering)	1956-56
Employment:	Assistant Manager, F. M. Robertson Oil Co. Abilene, Texas	1948-51
	Drilling Engineer and Production Supt., Rhodes Drilling Co., Abilene, Texas	1951-64
	Chief, Drilling and Mining Branch, U. S. Atomic Energy Commission, Las Vegas, Nv.	1964-73
	Senior Staff Engineer, Conoco Inc., Houston, Texas	1973-
Societies:	Society of Petroleum Engineers of AIME,	1951-
	Institute of Shaft Drilling Technology	1980-

Offices: Technical Program Director of Institute of Shaft Drilling Technology; Member of the U. S. National Committee on Tunneling Technology of the National Research Council

Papers: Six, mostly on large diameter drilled shafts and large drilling rigs.

Achievements: Served as Chief Drilling Engineer at the Nevada Test Site, directed all drilling activity and drilling research & development, contract administrator of all drilling related contracts and the architect-engineer. More recently, planned, designed, engineered and managed the Conoco Crownpoint Project in New Mexico which proved to be one of the most successful drilled shafts ever undertaken

Registered Professional Engineer, District of Columbia

ATTACHMENT 6

OIL&GAS JOURNAL

Reprinted from the February 14, 1972 edition

Advanced drilling assemblies solve unique snags in big holes

HASSELL E. HUNTER
Chief, Drilling & Mining Branch
U.S. Atomic Energy Commission
Las Vegas

THE UNDERGROUND nuclear-weapons testing program at the Atomic Energy Commission's Nevada Test Site has accelerated the development of big-hole drilling techniques.

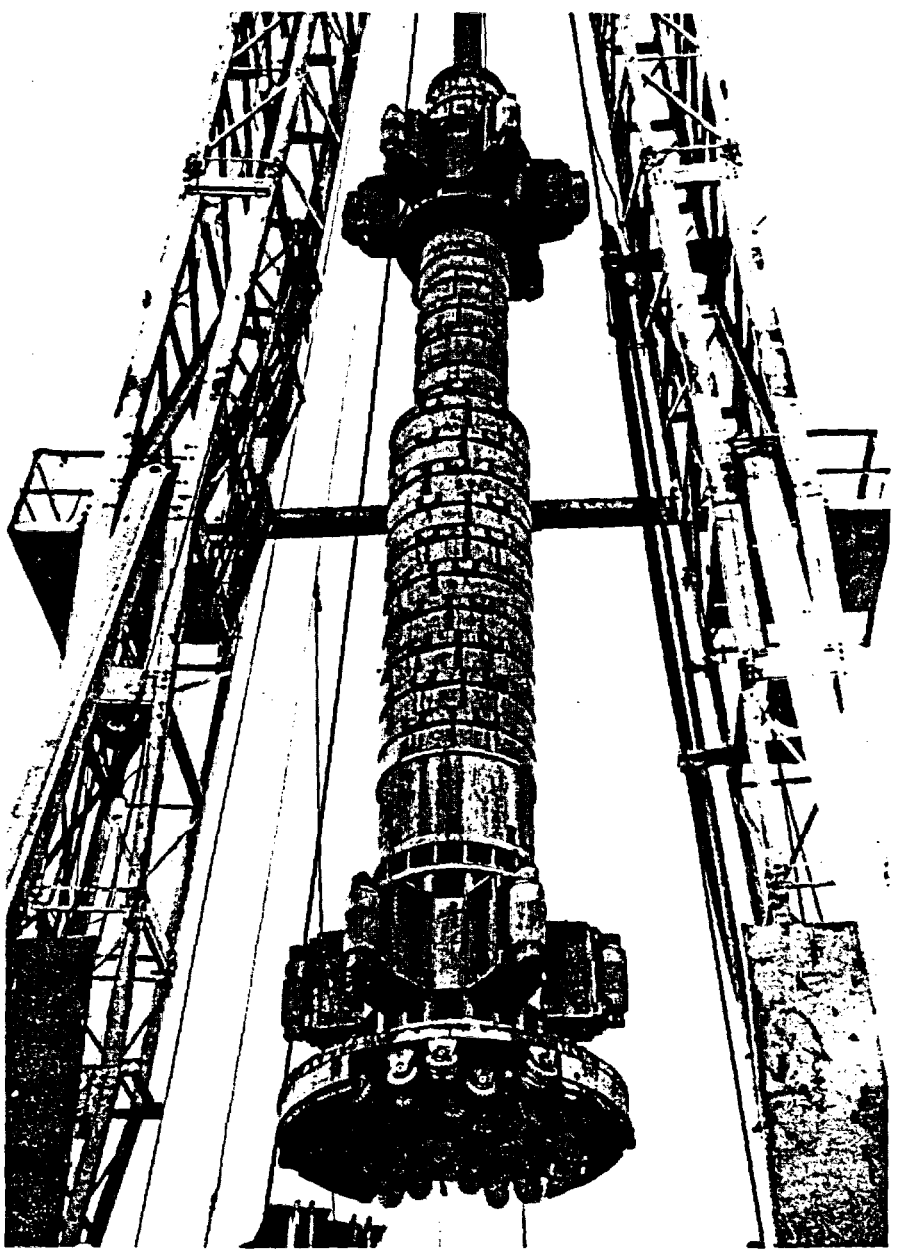
The equipment and technology developed by AEC, working in cooperation with industry, have not only revolutionized big-hole drilling. They have significantly advanced the state of the art of drilling generally.

The nuclear test conducted by AEC at NTS are at the bottom of drilled shafts. These shafts are as large as 120-in. diameter and as deep as 6,000 ft. AEC and industry have been challenged to find the most efficient methods to produce these holes.

How it started. Holes up to 108-in. diameter were drilled in Germany and Holland more than 40 years ago. Calyx drilling techniques for making 66-in.-diameter holes have been common in the mining industry since the 1930's. Holes of 49 to 84-in. diameter were drilled in Arkansas and Illinois in the 1940's, and by the 1950's big holes could be obtained by contract from several specialized firms.

First big holes at NTS were spudded in May 1957, when Terminal Drilling Co., Wilmington, Calif., moved two oilfield rotary rigs to the site to sink three 36-in. holes to 500 ft. In March 1959, Terminal returned to NTS to cut three more 36-in. holes to 510 ft.

From that beginning, here are other milestones in the progress of big-hole



CURRENT AEC big-hole drilling assemblies feature drill collars with 40-in. and 60-in. doughnut weights, near-bit and top-of-collar stabilization. Fig. 1.

work:

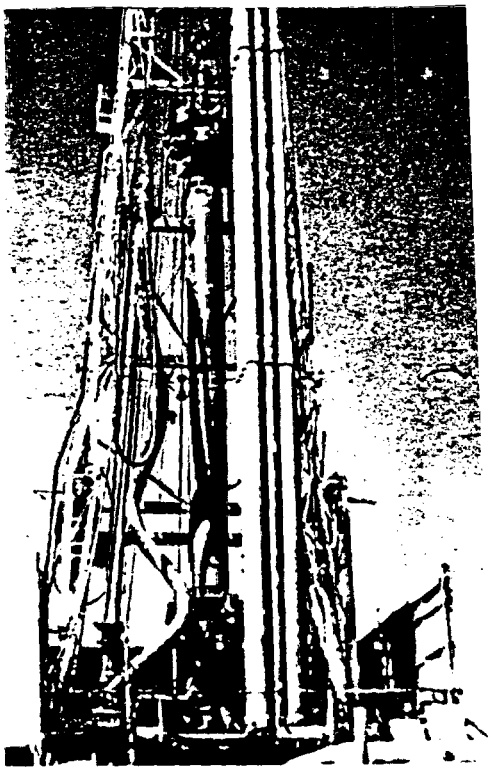
• On Jan. 1, 1959, Reynolds Electrical & Engineering Co. (Reeco) received responsibility for operating AEC-owned or leased drilling equipment and commenced an exploratory small-diameter drilling program on Rainier Mesa. Rigs leased from Terminal Drilling Co., and operated by Reeco drilled holes at scattered locations within NTS, beginning in mid-1960.

• Immediately after the nuclear-weapons moratorium ended in September 1961, AEC began leasing rotary drilling rigs under Reeco subcontracts for drilling large-diameter holes, exploratory holes, and post-shot exploratory holes. By December 1961, 43 rotary rigs were operating at the Nevada Test Site.

• AEC began the first of the 72-in.-diameter holes to depths below 4,000 ft in early 1964. Parco Inc., a subsidiary of Parker Drilling Co.; Big Hole Drillers Inc., a subsidiary of Kerr-McGee; Loffland Brothers Drilling Co.; and Shaft Drillers Inc., moved six large rotary drilling rigs to Pahute Mesa to begin the first generation of deep large-diameter emplacement holes under prime contracts with AEC.

Great progress has been made since then. Most spectacular holes drilled by the AEC to date have been located on Amchitka Island in the Aleutian Chain in Alaska, and in central Nevada near Tonopah.

Recently, AEC completed a 90-in.-



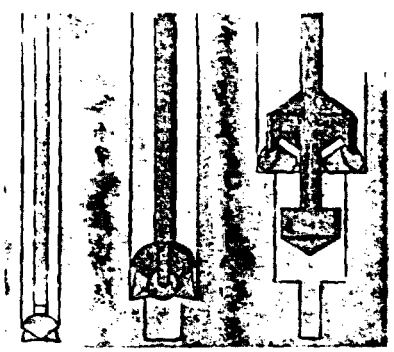
CEMENT-FILLED drill collars were flanged together to eliminate tool-joint failures due to excessive torque, Fig. 3. ▶

Fig. 2

Evolution of down-hole equipment for large-diameter wells

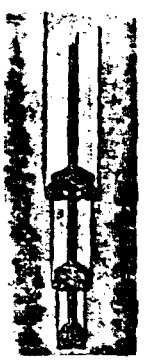
Several passes to open hole 2a

Three passes to 36 in.; direct circulation with mud; 4½ and 5 9/16-in. drill pipe



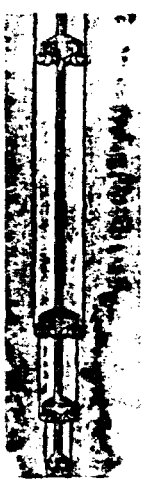
Single pass to 48 in. 2b

Tandem hole openers; 6⅝-in. API tool joints; direct air-water-detergent circulation



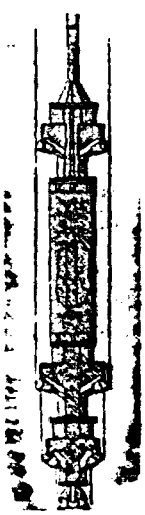
Single pass, stabilized 2c

Hole openers used for stabilization; 11-in. drill collars with 8⅛-in. API tool joints; diameters to 64 in.



Cement-filled collars 2d

Flange connections; circulation with air-foam; diameters to 86 in.



Integral stage bits 2e

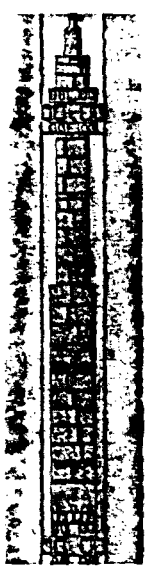
Roller stabilizer added at top

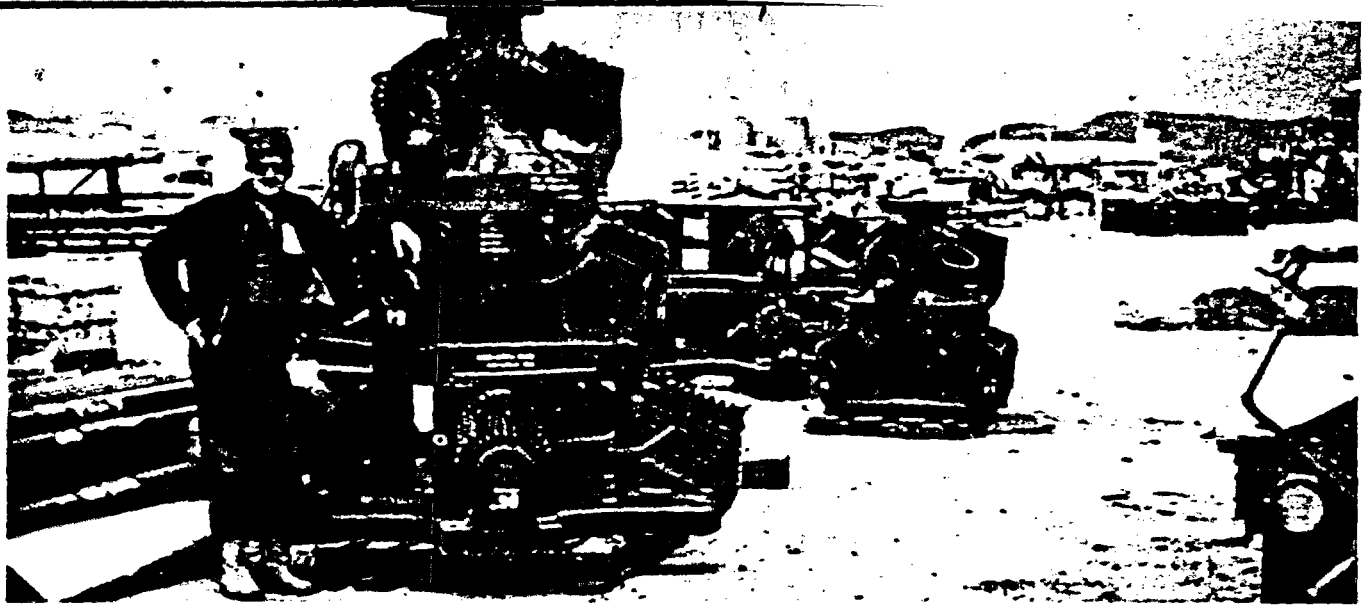
Plate bits 2f

Double drill collars; near-bit roller reamers; diameters to 96 in.

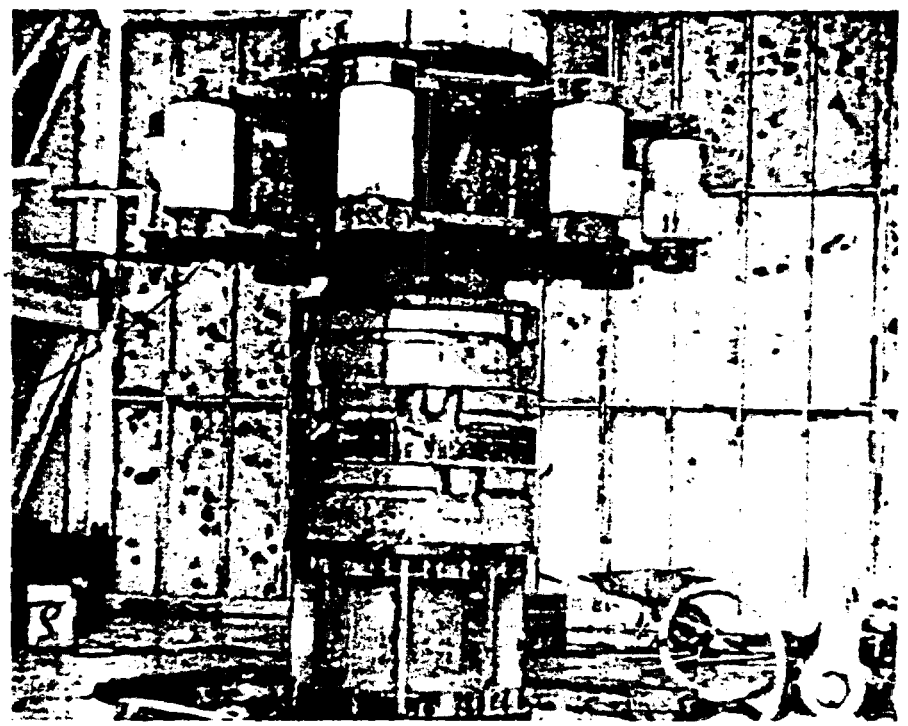
Doughnut-weight arrangement 2g

Dual drill pipe, 8⅝ x 6⅝ in.; air-water circulation; mandrel drill collars with split weights and integral reamers; plate bits with separator feature; diameters to 120 in.





MODIFIED bottom-hole stage bit spaced the cutter stages closer together, Fig. 4.



TOP ROLLER stabilizer is typical of those currently used by AEC, Fig. 5.

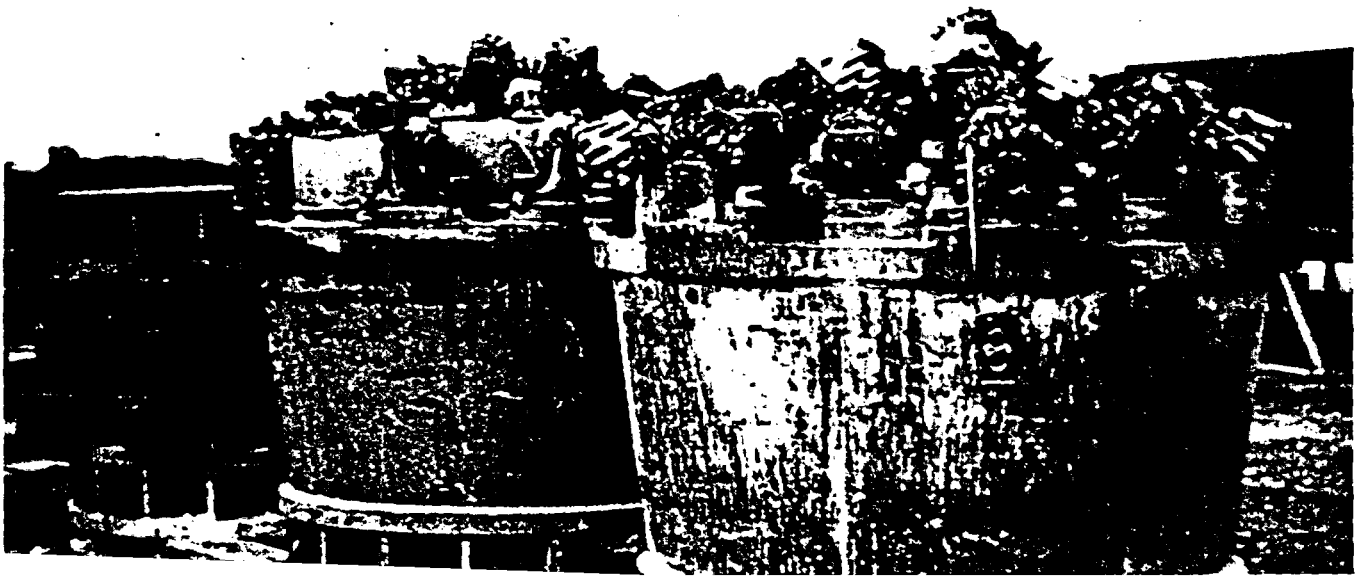
diameter hole to a depth of 6,250 ft at Amchitka. This hole, expended for the Cannikin Event, was cased with 54-in-diameter pipe. Parco, prime contractor on this hole, also drilled a 120-in. hole on Amchitka to 4,550 ft.

In central Nevada, Shaft Drillers Inc. drilled a 120-in.-diameter hole to 5,500 ft. And in the same area, Lofland Brothers drilled a 120-in. hole to 4,850 ft and cased it with 54-in. casing.

Drilling assemblies. Assemblies currently used by AEC are shown in Fig. 1. The 120-in. bit is stabilized near the bit and at the top of the drill collar. The drill collar is equipped with both 60-in. and 40-in. doughnut-type weights.

Probably, the very first big holes were conceived in the oil fields for setting large-diameter surface casing. A small-diameter hole was drilled to total depth and then opened up with as many successive stages as necessary. Large-diameter water wells were

EARLY flat-bottom mits had a 22° tapered bottom and a pattern of cantilever-type cutters covered the bottom of the hole, Fig. 6.



also drilled this way, Fig. 2a.

Usually, the first stage was 12¼-17½ in., the second stage 26-36 in., and the final stage was 48 in. First holes drilled at the Nevada Test Site used this method. At NTS, however, there were many disadvantages. It took as much time to open each successive pass as it did to drill the original hole.

Also, my experience has been that the hole-opener cutters are not as reliable as tricone or flat-bottom bits. Take, for instance, Gasbuggy, the gas-stimulation experiment in New Mexico. It was drilled with a 12¼-in. tricone bit to total depth and opened to its final diameter of 28 in. on the second pass with a hole-opener bit. Work was plagued with time-consuming and expensive fishing jobs caused by losing hole-opener cutters in the hole. NTS personnel saw the need to combine these successive hole-opening stages into a single stage. This led to another step in the evolution of big-hole drilling. The three separate hole-opener bits were combined into a tandem, stacked-bit assembly which would drill the big hole to its full diameter in a single pass, Fig. 2b. This setup was first used on NTS in 1961 or 1962.

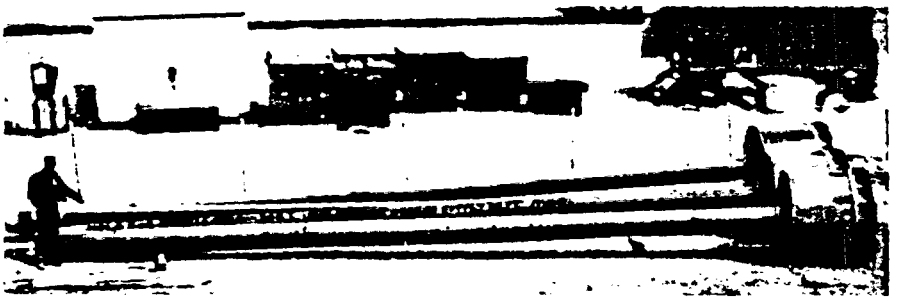
The assembly consisted of a 26-in. tricone bit, a 36-in. second stage, and a 48-in. third stage connected with tool-joint connections. The resulting 48-in. hole was cased with 36-in. pipe, the first fabricated, large-diameter casing used at NTS.

Because torque was greater when drilling with the tandem hole-opener assemblies, the 4½-in. and 5 9/16-in. drill pipe was abandoned. A 6⅝-in. drill pipe was adopted to drill holes 48 to 64 in.-diameter.

With conventional drill pipe and drill collars and the tandem-hole-opener assembly, it was difficult to obtain sufficient drilling weight until the hole was several hundred feet deep. Moreover, drilling assembly needed stabilization as well as a concentration of weight near the bit to achieve optimum penetration rate and a straight hole.

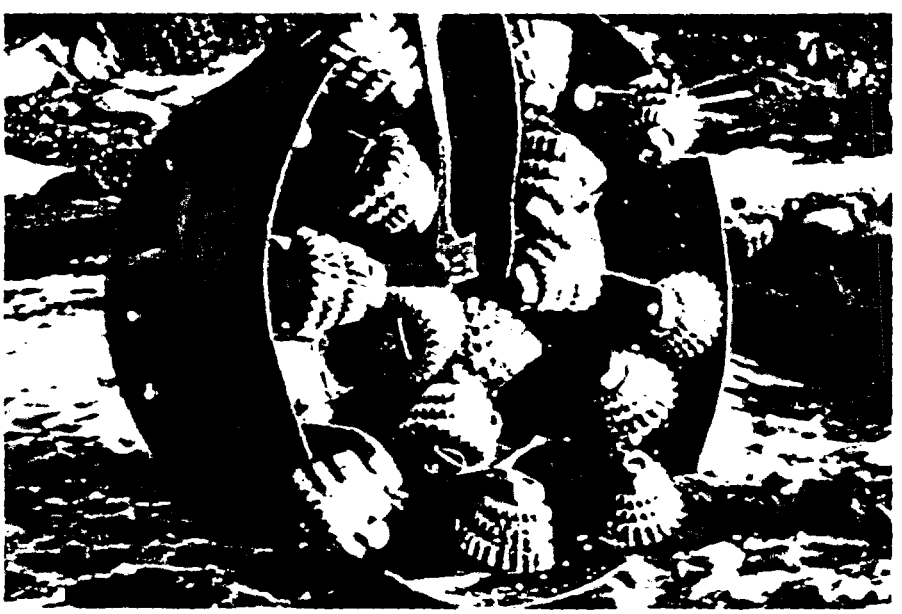
Hence, a second full-diameter stage bit was added about 30 or 40 ft above the top of the bit stack, Fig. 2c. This stabilized the hole-opener assembly or stack bit but was not intended to cut any new hole. It was spaced by 11-in. drill collars with 8⅝-in. API tool joints.

More weight. It was apparent from



DRILL-COLLAR stems are for use with doughnut weights, Fig. 7.

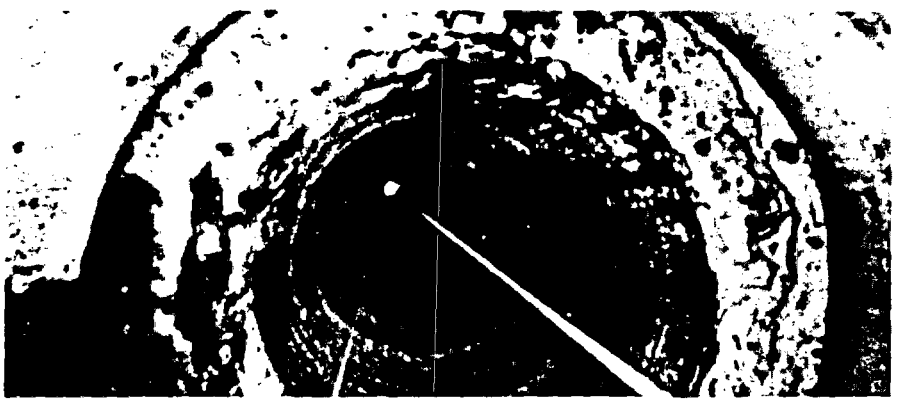
DOUGHNUT RINGS—the 60-in. size weighs about 11,000 lb—are placed on drill-collar mandrels, Fig. 8.



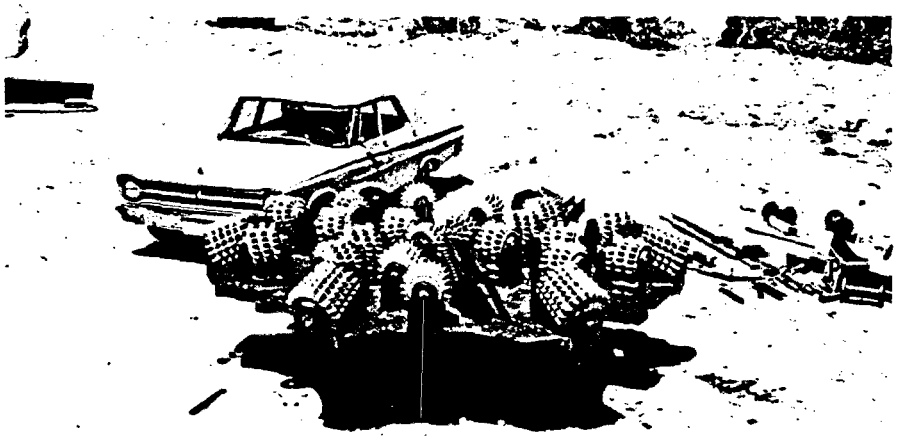
LARGE SADDLE-TYPE cutter is pinned at both ends and welded to the base plate, Fig. 9.

IMPROVED CUTTER performance resulted from this bit design, Fig. 10.

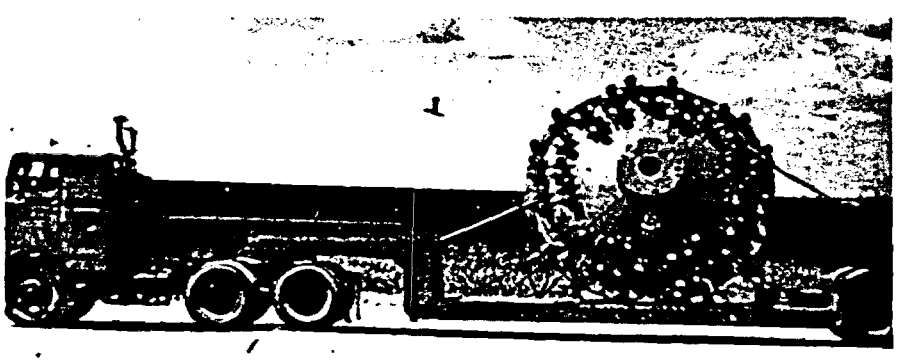
DIFFERENT BIT type featured six large roller cutters and a cantilever center cutter, Fig. 11.



STRAIGHT-HOLE requirements are strict in big-hole work. This 72-in. hole is visible at water table at 2,303 ft, Fig. 12.



GIANT BIT, 10 ft in diameter, was one of those used to drill 120-in. hole to 5,500 ft, Fig. 13.



LARGEST HOLE yet at Nevada Test Site was drilled with 160-in. single-pass stage bit to 300 ft, Fig. 14.

the beginning that the tandem hole openers did not suspend enough weight at the bit to keep the hole straight and to drill fast enough. More weight was needed at the bottom of the hole to be able to rotate while the drill pipe was in tension.

This led to another step in the development of big-hole tools, Fig. 2d. The extra weight was obtained by using a large-diameter, cement-filled drill collar. This was essentially a joint of large-diameter casing filled with cement and flanged at each end. There was also at least one lead-filled collar fabricated about this time.

Still using the hole-opener stacked-bit concept, the cement-filled drill collars permitted drilling even larger holes—up to 86-in. diameter—using the same 6⅝-in. drill pipe. The larger hole diameters and drill-collar weights, however, placed excess torsion loads on the tool-joint connections at the tandem-hole-opener bit assemblies. Tool joints failed in some assemblies, and others were difficult to break apart.

This torque problem was solved by replacing the tool-joint connections with flanges. Each successive stage bit was attached to the next successive stage with a bolted flange assembly. These drilling assemblies were referred to as stage bits. A full-gauge bit above the drill collar served as a stabilizer, Fig. 3.

The stage-bit drilling assembly was not entirely satisfactory because the top bit stabilizer could enlarge the drilled hole by "whipping" of the drilling assembly. So the top bit stabilizer was replaced with a roller-type stabilizer, Fig. 2e. A modified bottom-hole stage bit spaced the cutter stages closer together, Fig. 4.

The roller-type stabilizer was first used on Pahute Mesa in early 1964. One of the typical top roller stabilizers currently being used by the AEC is shown in Fig. 5.

Even the roller-type stabilizer creates problems because the moving roller enlarges the hole even though it cannot cut the formation. Nonrotating stabilizers are now being developed, and will become another step in the evolution of big-hole drilling.

Big-hole bits. All of the hole-opener-type bits were developed for use in soft alluvium formations at NTS. Hole-opener cutters had non-lubricated bearings, and were designed for a dry, air-foam. No mud was used.

When the deep emplacement holes were begun on Pahute Mesa in 1963 and 1964, a new type of drilling assembly evolved. With formations like basalts, rhyolites, welded tuff, and bedded tuff, Pahute Mesa presented new drilling problems. Formations were much harder, and a static water table was encountered at 2,200 ft. The stage-bit assembly was not applicable in such an environment.

The significant change in the Pahute Mesa drilling assembly was the introduction of flat-bottom-bit bodies, bottom-hole roller-reamer-type stazilization, and a drill-collar stem with cast-iron weights.

The first bits used on Pahute Mesa were not stabilized, but this was modified shortly with a roller-type reamer-stabilizer immediately above the flat-bottom-bit body. The cement-filled drill collars adapted to the top and bottom roller stabilization, and were used later in Yucca Flats with flat-bottom bits, Fig. 2f.

For the deep, large-diameter holes on Pahute Mesa, the cement-filled drill collars were abandoned. In their stead, collars were adopted which consist of a drill-collar stem upon which cast-iron doughnut-shaped rings were stacked, Figs. 2g and 1.

The Pahute Mesa bits were designed for reverse circulation, necessary when the circulating fluid is air, air mist, water, or mud. Only a stable foam can be used efficiently in a conventional circulating system. Reverse circulation was difficult to achieve with stage bits because not all the cutters are on the same plane. The flat-bottom bit was selected mainly to accommodate reverse circulation.

Original bits used for the 72-in. holes on Pahute Mesa had a 22° tapered bottom with a pattern of cantilever-type cutters to cover the bottom of the hole, Fig. 6. In this photo, the bit body in the background is equipped with cantilever cutters. On the bit body in the foreground, the original cantilever cutters have been replaced with saddle-type cutters. The reamer-stabilizer in the far background is one of the first near-bit stabilizers used on Pahute Mesa.

The cantilever cone cutters soon proved unsatisfactory. Many cutter cones failed and were left on bottom, causing time-consuming fishing jobs. So a full-gauge flat-bottom bit body with a cutting pattern of saddle-type roller cutters was developed. The flat-bottom bit is still the preferred design in present-day big-hole drilling operations.

Coincidental with the development on Pahute Mesa, flat-bottom bits were being tried in Yucca Flats in much softer formations in an attempt to solve crooked-hole problems. Most of these problems were corrected by the use of flat-bottom bits, a result contrary to previous thinking.

Up to this time, it was felt that stage bits would drill straighter than flat-bottom ones. It was thought the flat bottom might tend to drift. Such was not the case. The pendulum effect of the heavy drill-collar assembly was proven again, and flat-bottom bit assemblies have been used exclusively on both the hard-rock formations of Pahute Mesa and the soft unsolidated formations at Yucca Flats.

Doughnuts. By early 1967, the solid cast-iron drill-collar doughnuts, or washers, were modified to interlocking doughnut halves for easier loading onto the 16-in. drill-collar stem, or mandrel. Each 60-in. doughnut ring weighs about 11,000 lb. A 60-in drill collar with 20 doughnut weights, bit body, and top and bottom stabilizers, weighs about 350,000 lb.

The doughnut washers can be all one dimension. Or, a combination of sizes can be used, such as the 40 and 60-in. weights in Fig. 1. The assembly combines 90 and 60-in. weights and was used to drill one of the 120-in. holes in central Nevada near Tonopah. It weighs approximately 500,000 lb, concentrated in a 60-ft column.

It is common practice to drill with about 60% of the drill collar weight.

Figs. 7 and 8 show drill-collar stems and drill-collar weights stacked at NTS.

Most of today's big-hole drilling techniques were developed by AEC and its contractors, with support from tool and service companies.

A good example of the contribution of tool companies is the big-hole bit bodies and cutters. The original flat and cone-bottom bit bodies, equipped with cantilever cutters, gave some problems. One company designed the larger, saddle-type cutter, pinned at both ends, and welded to the base plate of the bit body, Fig. 9. Other bit companies offered new designs to improve cutter performance, Fig. 10.

Another company, recognizing the advantages of the larger saddle-type cutter, produced a 72-in. bit body with only six large roller cutters plus a cantilever center cutter, Fig. 11. This bit did not drill satisfactorily since the cutters were just too large for true rolling characteristics. But the same size cutter worked fine on the 120-in.-diameter bit bodies which came into use several years later.

Tough specs. Straight-hole requirements for large-diameter emplacement holes are far more exacting than for most other drilling. The large-diameter hole, in general, must be straight enough to lower the large-diameter casing string to total depth without buckling or bending.

Actually, most holes are line-of-sight. In other words, if it were possible to look from the top, a portion of the bottom of the hole would be visible. Fig. 12 shows how straight a 72-in. hole can be; the light reflection comes from the static water table at a depth of 2,303 ft on this Pahute Mesa hole. Light source is a camera flood light suspended on a wire line. Holes seldom deviate more than 2-4 ft in horizontal displacement.

Straight holes are not difficult to achieve because of the pendulum effect of the heavy drill collar. The drilling assembly in a 72-in. hole weighs about 350,000 lb, and a 120-in. hole around 450,000 to 600,000 lb. Hook loads to 900,000 lb are not uncommon on deeper holes.

Deepest large-diameter hole drilled so far by AEC was a 90-in.-hole sunk to 6,250 ft and cased with 54-in. pipe at Amchitka, Alaska. This hole was used for the nuclear experiment known as the Cannikin Event.

Most spectacular hole has been 120 in. drilled to 5,500 ft in central Nevada near Tonopah. The 10-ft-diameter bit, Fig. 13, is one used in this hole.

Largest diameter hole at NTS is 160-in.-diameter reaching a depth of 300 ft. This hole was drilled with a single-pass stage bit with the final 160-in. stage shown in Fig. 14.

While spectacular, these feats could not be called great scientific breakthroughs. It took time, a lot of engineering, a real know-how by many people to develop big-hole tools and techniques used today. And this discussion has only concerned bottom-hole drilling assemblies. Concurrent development of surface drilling equipment, circulating systems, and special tools includes many other advances.

END

ATTACHMENT 7

PUBLIC HEARING RESPONSE

- ONWI-505 ISSUES SUMMARY
- COMMENT/RESPONSE DOCUMENT
- IN SCOPE ISSUES ADDRESSED IN EAs

TOPICAL MEETINGS

AUGUST 23, 1983:

-- BOUNDARY DEFINITIONS

-- SALT MANAGEMENT

OCTOBER 24, 1983:

-- NUCLEAR WASTE TRANSPORTATION

-- WATER USE, AVAILABILITY AND WATER RIGHTS

SUGGESTED FUTURE TOPIC:

-- SOCIOECONOMICS AND COMMUNITY DEVELOPMENT PLANNING

SALT EA SCHEDULE (PROPOSED)

o	IMPACT DATA COLLECTION AND ANALYSES	IN PROGRESS
o	DOE GUIDELINES TO NRC	OCTOBER 10
o	CONTRACTOR INITIATES PREPARATION OF EAs	OCTOBER 10
o	NRC CONCURRENCE ON GUIDELINES	DECEMBER 10
o	DRAFT EAs TO HQ	JANUARY 30
o	PUBLIC DRAFT AVAILABLE FOR REVIEW	MARCH 21

ATTACHMENT 8

September 20, 1983

DRAFT
ANNOTATED OUTLINE
FOR CHARACTERIZATION OF A
SITE FOR A CANDIDATE REPOSITORY SITE
PURSUANT TO
THE NUCLEAR WASTE POLICY ACT OF 1982

The EA outline contains all requirements for EAs defined in Section 112 of NWPA 1982 as major chapters. "Site Description" and "Proposed Activities" chapters have been added for document readability and presentation purposes.

1.0 INTRODUCTION (By HQ)

Summary of decision process by which at least five sites were chosen for nomination. Disqualification factors addressed.

2.0 SITE IDENTIFICATION PROCESS

Describes the site screening process by which the site was identified, including site identification effort.

3.0 SITE DESCRIPTION AND AFFECTED ENVIRONMENT

Generally describes the features and conditions of the site and the region in which it is located. The features and conditions discussed are those that pertain to its suitability for development of a repository and which may be impacted by the activities detailed in Chapter 4 of this EA. Included in this chapter are descriptions of land use, socioeconomics, transportation, utilities, geology, hydrology, seismicity, natural resources, and site-specific environmental concerns.

4.0 PROPOSED ACTIVITIES

Describes field activities associated with the exploratory shaft and those studies needed to confirm site suitability and provide input paramenters for design. Provides a discussion of land access and protection, and exploratory shaft construction, testing, and site restoration.

5.0 SITE SUITABILITY FOR SITE CHARACTERIZATION

Evaluates the site as to whether it is suitable for site characterization based on the mandated NWPA Site Recommendation Guidelines.

6.0 SITE SUITABILITY FOR REPOSITORY

Evaluates the site as to whether it is suitable for development of a repository under each such Site Recommendation Guideline or subguideline that does not require site characterization as a prerequisite for its application.

7.0 IMPACTS ON PUBLIC HEALTH, SAFETY, AND ENVIRONMENT FROM SITE CHARACTERIZATION

Addresses the regional and local impacts of site characterization activities (Chapter 4) at or in the vicinity of the site on the public health, safety, and environment. Evaluates the impacts on the affected environment as detailed in Chapter 3. Alternative methods of site characterization to reduce or avoid projected impacts are also evaluated. Required by Section 112 (iii) of the NWPA.

8.0 REGIONAL AND LOCAL IMPACTS OF REPOSITORY

Describes site-specific repository design concepts with regard to proposed land protection, acquisition and control, construction, operation, and decommissioning. Makes preliminary assessment of post-closure performance. Evaluates the potential regional and local impacts of a repository to the public health, safety, and environment to the extent they are known without a site characterization. Type, degree, timing, and spatial extent of such impacts will be discussed. Required by Section 112 (vi) of the NWPA.

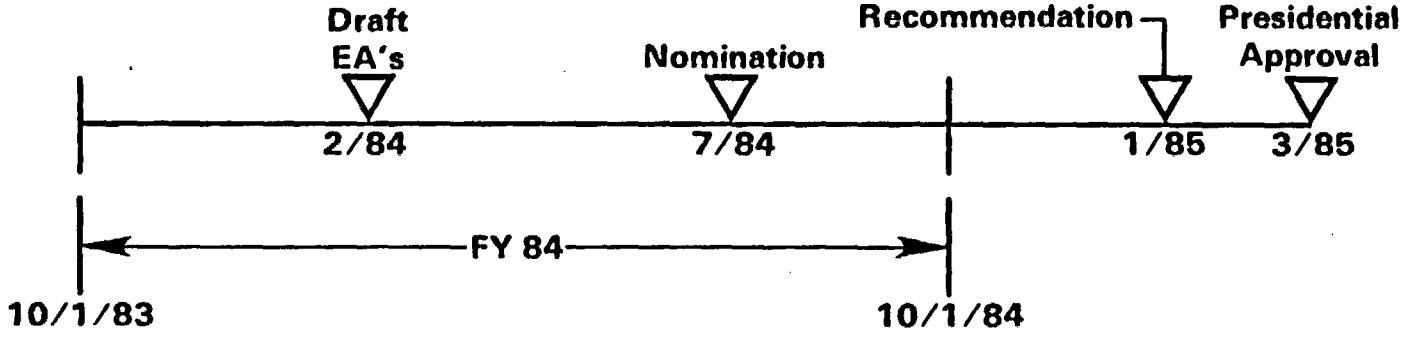
9.0 COMPARATIVE EVALUATION OF SITES TO BE NOMINATED (By HQ)

Pursuant to Section 112(b) (E) (iv), compares sites which the Department of Energy is considering as suitable for characterization as repository sites.

APPENDIX A: STATE, PUBLIC, AND AGENCY INTERACTION

ATTACHMENT 9

SALT PROJECT SCHEDULE



FY 84 PLANNING ASSUMPTIONS

- PREFERRED SITES IN GEOHYDROLOGIC SETTINGS ARE REVEALED PUBLICLY IN DRAFT EAs ISSUED 2/84
- FIELD WORK UNDERTAKEN IN THREE BASINS AS SOON AS POSSIBLE
- FLEXIBILITY IN TYPES AND AMOUNTS OF WORK IN EACH BASIN
- PROCEED AS IF ANY SITE COULD BE RECOMMENDED (ES ACCESS AND PERMITS AFTER FINALIZATION OF NOMINATION EA)
- FIELD WORK TO OPTIMIZE ES LOCATION AND STRENGTHEN SCP

SALIENT FEATURES OF PROPOSED PROGRAM FOR FY 84

- FIELD WORK IN ALL THREE SALT BASINS
- AVAILABILITY OF REPOSITORY A/E
- SUPPORT FOR INCREASED EFFORTS FOR SYSTEMS, PERFORMANCE ASSESSMENT, SOCIOECONOMICS, AND WASTE PACKAGE
- COMPLETE THREE EAs AND CONTINUE THREE SCPs
- INCREASED INSTITUTIONAL ACTIVITIES
- HARDEN QA PROCEDURES TO ENSURE MEETING NRC REQUIREMENTS
- FULLY DOCUMENT TECHNICAL DATA BASE FOR EAs AND SCPs AND PROVIDE NRC AND STATES ACCESS TO DATA BASE

SUMMARY OF FY 84 PROGRAM

- SYSTEMS
  - UPGRADE TECHNICAL DATA BASE MANAGEMENT SYSTEM TO ACCOMMODATE INFORMATION EXCHANGE WITH STATES AND NRC
  - SITE PERFORMANCE ASSESSMENTS
  - CODE VERIFICATION, VALIDATION, AND DOCUMENTATION
- WASTE PACKAGE
  - WASTE FORM AND PACKAGE TESTING
  - WASTE/ROCK/GROUND WATER INTERACTION EXPERIMENTS
  - ANALOGS OF LONG-TERM RADIONUCLIDE BEHAVIOR
  - SOURCE TERM MODELS

SUMMARY OF FY 84 PROGRAM (Continued)

- EXPLORATORY SHAFT
  - ES DESIGN AND TRADE STUDIES
  - PROCUREMENT PLANNING
  - PERMITTING AND LAND ACCESS PLANNING
  - IN SITU TEST PLANNING
- TESTING
  - COMPLETE VALIDATION OF THERMOMECHANICAL MODELS AT AVERY ISLAND
- LAND ACQUISITION
  - LAND ACQUISITION PLANNING FOR ES AND SURFACE-BASED INVESTIGATION
- FEDERAL/STATE ASSISTANCE
  - STATE PARTICIPATION IN PROJECT REVIEW

SUMMARY OF FY 84 PROGRAM (Continued)

- REPOSITORY
  - SALT DOME ENGINEERING STUDY FOR EA
  - ENGINEERING AND DESIGN FEASIBILITY STUDIES FOR EAs
  - ENGINEERING DESIGN STUDIES FOR SCP
  - THERMOMECHANICAL PROPERTIES OF SALT
  - ROCK MECHANICS TESTING
  - SEALING TECHNOLOGY
- REGULATORY
  - EA COMPLETION
  - SCP PREPARATION
  - NRC/REGULATORY INTERACTION AND INTEGRATION
- INSTITUTIONAL
  - TECHNICAL PUBLICATIONS AND DATA DISSEMINATION
  - PUBLIC OUTREACH AND REVIEW
  - STATE CONSULTANTS, INFORMATION OFFICES, LIAISON

SUMMARY OF FY 84 PROGRAM
(Continued)

- SITE
  - CORE CURATION AND SAMPLE MANAGEMENT
  - MICROSEISMIC NETWORK OPERATIONS
  - HYDROLOGIC TESTING IN PALO DURO (J. FRIEMEL)
  - SOCIOECONOMIC ANALYSIS
  - ENVIRONMENTAL STUDIES
  - GEOLOGIC FIELD WORK
    - SEISMIC SURVEYS
    - STRATIGRAPHIC HOLES
    - DEEP HYDROLOGIC NESTS
    - SHALLOW WELLS

ATTACHMENT 10

CATALOG HOLDERS*

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5. NRC
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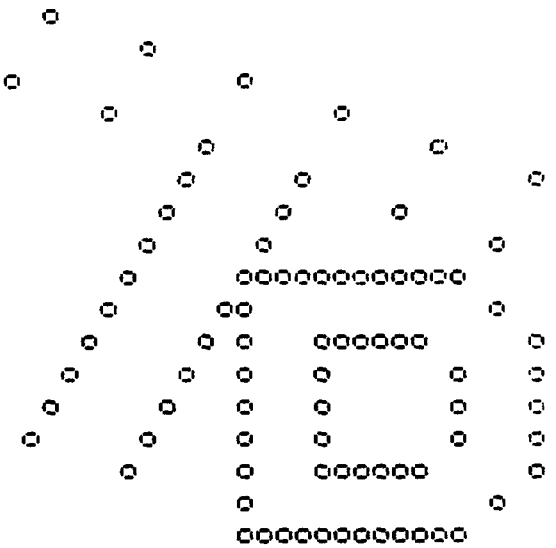
8. Weston
   Larry White - 1 copy

9. DOE-HQ
   Jim Fiore - 1 copy

*To change names on this list call Leslie Casey (614/424-5916.)

ATTACHMENT 11



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**********************************************
*              WELCOME TO THE                *
*  TECHNICAL DATA MANAGEMENT SYSTEM (TDMS)   *
**********************************************
ENTER YOUR REQUEST
   1/
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LAST UPDATE -
830920

CONTENTS -
35 SUMMARIES

16 borehole results
15 borehole summary
4 revision

Detten #1
Elk Ridge #1
Gibson Dome #1
Harman #1
LH-17A
MRIG-201
MRIG-202
MRIG-203
MRIG-204
MRIG-205
MRIG-208
MRIG-9
US DOE - Continental Forest Industries #1
US DOE - Smith #1
Zeeck #1

ACCESSION NUMBER :2
RECORD TYPE :borehole results
WELL ID :, Gibson Dome #1
UNIT,SUBUNIT :, Cycle 6
BASIN,SUBBASIN :, Paradox, Gibson Dome
COUNTY,STATE :, San Juan, UT
CORE SUPPLIER :, Woodward Clyde Consultants
MATERIALS ID :, salt
HORIZON :, 1000.1, (3281) meters(feet)
CREEP LAW PARAMETER: A :, 6.33 x 10E-4 MPaE-n per sec
CREEP LAW PARAMETER: n :, 1.86
CREEP LAW PARAMETER: Ea :, 11.9 x 10E-2
CREEP LAW PARAMETER: B :, 192
CREEP LAW PARAMETER: Ess* :, 5 x 10E-8 per sec
CREEP LAW PARAMETER: Q/R :, 6835 deg K
FAILURE CRITERION: k :, 2.2 MPa
FAILURE CRITERION: ALPHA :, 48.2 MPa
FAILURE CRITERION: BETA :, 0.0129 1/MPa
FAILURE CRITERION: EQUATION:, Mises-Schleicher
YOUNGS MODULUS [STATIC]: MIN :, 21.9 GPa
YOUNGS MODULUS [STATIC]: MAX :, 32.6 GPa
YOUNGS MODULUS [STATIC]: MEAN :, 26.9 GPa
YOUNGS MODULUS [STATIC]: STD DEV :, 3.2 GPa
POISSONS RATIO [STATIC]: MIN :, 0.17
POISSONS RATIO [STATIC]: MAX :, 0.39
POISSONS RATIO [STATIC]: MEAN :, 0.31
POISSONS RATIO [STATIC]: STD DEV :, 0.06
INITIALIZATION [date,field numbers,authorities,source] :
830825, all, S Versluis/MJ Golis, BJM, (1)
SOURCES:
, (1) Pfeifle, T.W., et al, 1983. Preliminary Constitutive Properties for Salt and Nonsalt Rocks from Four Potential Repository Sites. ONWI-450, RE/SPEC Inc.

```
CCESSION NUMBER                 :29
ECORD TYPE                      :borehole summary
ELL ID                          :, MRIG-202
ASIN, SUBBASIN                  :, Gulf Interior, Richton Dome
OUNTY, STATE                    :, Perry, MS
ATITUDE                         :, NR deg-min
ONGITUDE                        :, NR deg-min
ECTION, BLOCK                   :, Sec 26, T5N R10W
RILLING COMPLETION DATE         :, 791019 (yymmdd)
OREHOLE STATUS                  :, NR
ROUND LEVEL ELEVATION           :, NR meters(feet)
ELLY BUSHING ELEVATION          :, 86.0, (282) meters(feet) above msl
OTAL DEPTH OF BOREHOLE          :, 61.0, (200) meters(feet)
RILLING TECHNIQUE               :, mud rotary
RILLING FLUID PROGRAM           :, NR
RILLING PROGRAM [bit,dia.-cm(in),interval-m(ft),comments] :
 NR
ASING SUMMARY [diameter in cm(in),depth in m(ft),comments]:
 5.1, (2), 27.1, (89)
ITHOLOGIC LOGS                  :, NR
EOPHYSICAL LOGS                 :, YES, gamma, resistivity, SP, caliper.
                                  neutron
ORE LOGS                        :, NR
UD LOGS                         :, NR
ORMATIONS PENETRATED [interval in meters(ft)]                    :
 CITRONELLE, 0.0, 3.1, (0-10)
 HATTIESBURG, 3.1, 61.0, (10-200)
ORES [diameter in cm(in), interval in meters(ft),comments]:
 NR
AMPLING PROGRAM [type, interval in meters(ft),comments]    :
 NR
ORMATION TESTS [type,num.,interval in meters(ft),comments]:
 drill stem, NR, 26.8, 29.9, (88-98)
YDROGEOLOGIC MONITORING         :, YES, water levels between 74(243) and
                                  75(245) meters(feet)
EOMECHANICAL FIELD TESTS [type,comments] :
 penetration tests, 30 tests(ASTM D 1586-67, 2487-69, 2488-69)
EOMECHANICAL LAB TESTS [type,comments]    :
 NR,
OCK SAMPLE TESTS [type,comments]          :
 NR,
YDROCHEMICAL TESTS [type,comments]        :
 NR,
ITHOLOGY [formation,description]:
 CITRONELLE, yellowish orange coarse to fine gravelly sandy clay and
reddish brown medium to fine silty sand
, HATTIESBURG, seven variations of clay and sand
NITIALIZATION [date,field numbers,authorities,source]  :
30829, all, OE Swanson/MJ Golis, BJM, (1)
OURCES:
 (1) Law Engineering Testing Company, Gulf Coast Salt Domes Shallow
orings Report:Richton Dome, ONWI-167
```

```
WELL ID                          :, Gibson Dome #1
BASIN,SUBBASIN                   :, Paradox, Gibson Dome
COUNTY,STATE                     :, San Juan, UT
LATITUDE                         :, 37-17 deg-min
LONGITUDE                        :, 102-42 deg-min
SECTION,BLOCK                    :, Sec 21, T30S R21E
FORMATIONS PENETRATED [interval in meters(ft)]                :
, CUTLER, 0.0, 164.6, (0-540)
, CEDAR MESA, 164.6, 207.0, (540-679)
*, ELEPHANT CANYON, 207.0, 377.7, (679-1239)
, HONAKER TRAIL, 377.7, 798.0, (1239-2618)
, PARADOX, 798.0, 1678.6, (2618-5507)
, PINKERTON TRAIL, 1678.6, 1741.6, (5507-5714)
, MOLAS, 1741.6, 1786.5, (5714-5861)
, LEADVILLE LIMESTONE, 1786.5, 1929.7, (5861-6331)
, OURAY LIMESTONE, 1929.7, 1945.9, (6331-6384)
INITIALIZATION [date,field numbers,authorities,source]  :
830827, 2-80, RN Helgerson/MJ Golis, BJM, (1)
830827, 81, RN Helgerson/MJ Golis, BJM, (2) (3)
SOURCES:
, (1) Woodward Clyde Consultants, 1982. Well Completion Report for
 Gibson Dome #1 Borehole, ONWI-388
, (2) Pfeifle, T.W. et al, 1983. Constitutive Properties of Salt from
 Four Sites, ONWI-314, RE/SPEC Inc
  (3) Nelson, R.A. et al, 1982. Insitu and Laboratory Geotechnical Test
 Results from Borehole GD-1 in Southeast Utah, ONWI-400, Woodward Clyce
 Consultants



  17/ /revision
**************************************************************
* THIS PROFILE ASSISTS YOU IN FINDING THE REVISION
* RECORDS CONTAINING THOSE FIELDS WHICH HAVE BEEN
* REVISED.
**************************************************************
**
THE SEQUENCE IS AS FOLLOWS:
1. DISPLAY ACC FOR ( )
2. FIND RECREF FOR ( )
  17/ display acc for 1
       20
  17/ find recref=20
*       1   17/  recref=20
  18/ display all

ITEM 1

  SESSION NUMBER             :21
RECORD TYPE                  :REVISION
RECORD REFERENCE             :20
REVISION [#,field num,old value,reason,authority,source]:
1, FPBOT, 278, typo, Niehoff, ONWI-388
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MECHANICAL PROPERTIES (SALTS)

YOUNGS MODULUS-STATIC (GPa)

WELL	HORIZON(M)	MEAN	STD DEV
Gibson Dome #1	1000.1	26.9	3.2
Gibson Dome #1	1040.0	31.0	3.4
Grabbe #1	799.8	26.6	3.7
Mansfield #1	449.9	29.1	4.0
MRIG-9	374.9	31.5	3.0
US DOE-Smith #1	599.9	31.1	3.5

POISSONS RATIO-STATIC

WELL	HORIZON(M)	MEAN	STD DEV
Gibson Dome #1	1000.1	0.31	0.06
Gibson Dome #1	1040.0	0.36	0.10
Grabbe #1	799.8	0.33	0.05
Mansfield #1	449.9	0.33	0.01
MRIG-9	374.9	0.36	0.09
US DOE-Smith #1	599.9	0.39	0.03

MECHANICAL FAILURE CRITERIA (SALT)

WELL	BASIN, SUBBASIN, UNIT	HORIZON (M)	k MPa	ALPHA MPa	BETA 1/MPa
Gibson Dome #1	Paradox Gibson Dome Cycle 6	1000.1	2.2	48.2	0.0129
Gibson Dome #1	Paradox Gibson Dome Cycle 7	1040.0	1.6	51.4	0.0134
Grabbe #1	Permian Palo Duro Cycle 4	799.8	1.0	38.8	0.0174
Mansfield #1	Permian Palo Duro Cycle 5	449.9	1.1	43.5	0.0151
MRIG-9	Gulf Interior Richton Dome	374.9	0.2	40.0	0.0180
US DOE-Smith #1	Gulf Interior Vacherie Dome	599.9	0.7	46.4	0.0133

COMPRESSIVE STRENGTH, UNCONFINED (MPa)

WELL	MATERIAL	HORIZON(M)	MEAN	STD DEV
Gibson Dome #1	anhydrite	830.6	146.6	6.8
Gibson Dome #1	siltstone	320.0	69.0	6.1
Gibson Dome #1	silty limestone	640.1	135.8	8.5
Grabbe #1	anhydrite	655.3	148.1	43.8
Grabbe #1	mudstone	335.3	34.5	8.9
Grabbe #1	siltstone	502.9	15.3	2.0
US DOE-Smith #1	anhydrite	187.5	70.1	0.9
US DOE-Smith #1	anhydrite	211.5	66.5	2.9
US DOE-Smith #1	anhydrite	236.2	63.5	1.0

TENSILE STRENGTH, INDIRECT (MPa)

WELL	MATERIAL	HORIZON(M)	MEAN	STD DEV
Gibson Dome #1	anhydrite	830.6	-10.7	0.7
Gibson Dome #1	siltstone	320.0	-6.4	1.1
Gibson Dome #1	silty limestone	640.1	-10.0	1.2
Grabbe #1	anhydrite	655.3	-11.7	0.4
Grabbe #1	mudstone	335.3	-5.0	0.1
Grabbe #1	siltstone	502.9		
US DOE-Smith #1	anhydrite	187.5	-7.6	1.6
US DOE-Smith #1	anhydrite	211.5	-5.4	0.3
US DOE-Smith #1	anhydrite	236.2	-6.7	0.2

YOUNGS MODULUS-STATIC (GPa)

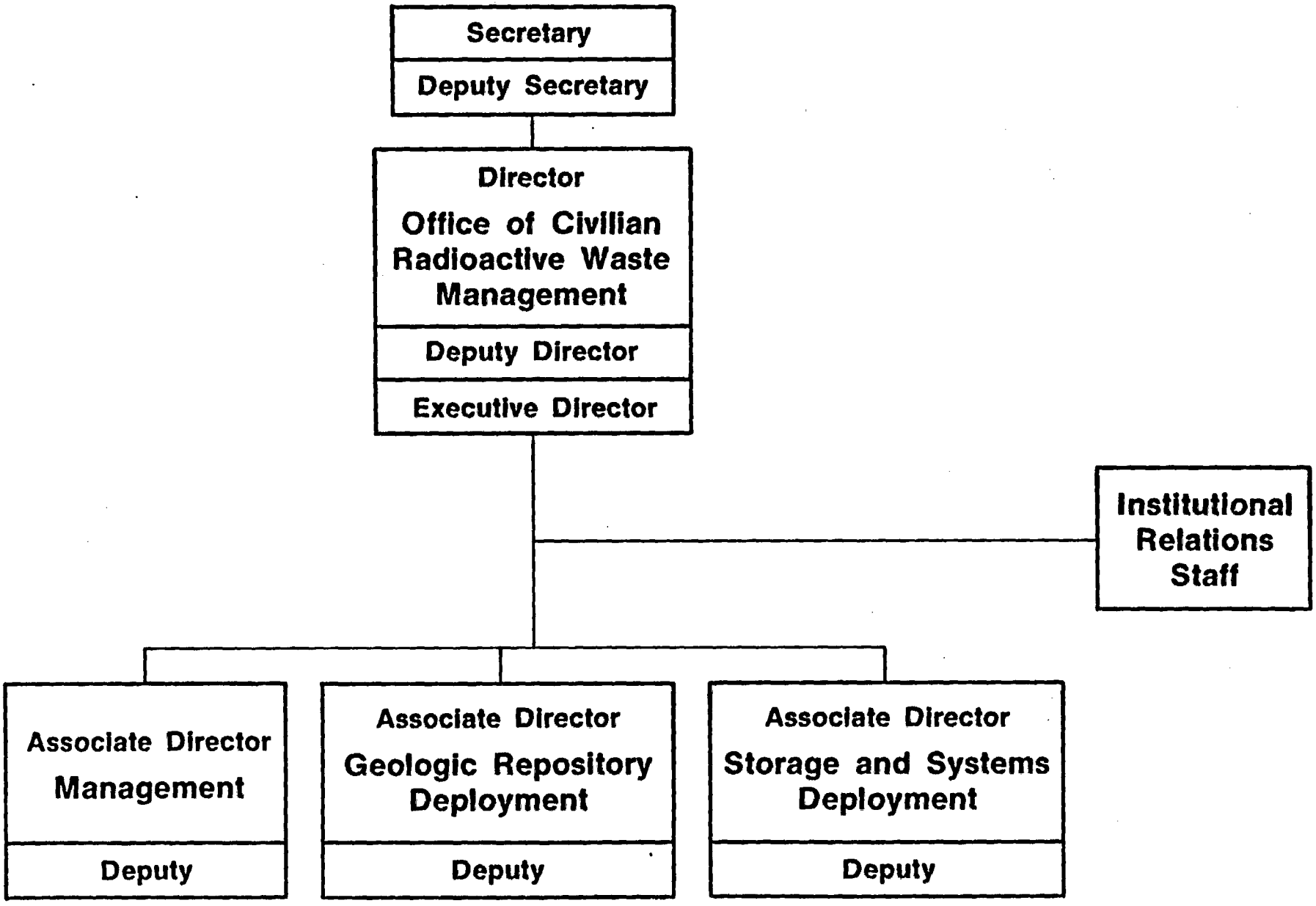
WELL	MATERIAL	HORIZON(M)	MEAN	STD DEV
Gibson Dome #1	anhydrite	830.6	65.0	3.1
Gibson Dome #1	siltstone	320.0	13.8	0.7
Gibson Dome #1	silty limestone	640.1	43.1	0.6
Grabbe #1	anhydrite	655.3	59.1	3.7
Grabbe #1	mudstone	335.3	9.4	2.4
Grabbe #1	siltstone	502.9	2.5	0.8
US DOE-Smith #1	anhydrite	187.5	83.9	1.4
US DOE-Smith #1	anhydrite	211.5	74.7	2.0
US DOE-Smith #1	anhydrite	236.2	79.6	0.6

POISSONS RATIO-STATIC

WELL	MATERIAL	HORIZON(M)	MEAN	STD DEV
Gibson Dome #1	anhydrite	830.6	0.40	0.04
Gibson Dome #1	siltstone	320.0	0.23	0.03
Gibson Dome #1	silty limestone	640.1	0.27	0.02
Grabbe #1	anhydrite	655.3	0.36	0.04
Grabbe #1	mudstone	335.3	0.25	0.05
Grabbe #1	siltstone	502.9	0.26	0.06
US DOE-Smith #1	anhydrite	187.5	0.32	0.04
US DOE-Smith #1	anhydrite	211.5	0.32	0.02
US DOE-Smith #1	anhydrite	236.2	0.32	0.02

ATTACHMENT 12

Office of Civilian Radioactive Waste Management
Proposed Organization



Geologic Repository Division

- Director — J. W. Bennett
- Deputy — R. Stein, J. G. Vlahakis, Judy Simon, Sylvia Hardenburgh

Program Management Team

- Team Leader — J. Fiore, T. Longo, J. Smiley, D. Pappas, Z. Kaufman, R. Coleman, G. Ginalick, B. Pershing

- o Policy & Budget
- o PPB
- o MSA
- o International
- o Program Plan and Strategies
- o Project Decision Schedule
- o Annual Report/Mission Plan
- o Weston

Engineering & Licensing Team

- Team Leader — M. Frei, V. Lowery, W. Eister, C. Brooks, C. Newton, M. Crum

- o Exploratory Shaft/Repository Design
- o Test Facilities
- o TEF
- o GRD Safety/Quality Assurance/ Standards
- o NRC License Application
- o Waste Package
- o Systems Engineering
- o Liaison with DP/NE

Geosciences & Technology Team

- Team Leader — C. Cooley, C. Klingsberg, D. Youngburg, V. Der, C. Litten

- o Site Characterization Plans
- o USGS Liaison
- o Geohydrologic & Geochemical Testing
- o Site Tectonics
- o At-Depth Testing
- o Systems Performance Assessment Methodology
- o Subseabed Program

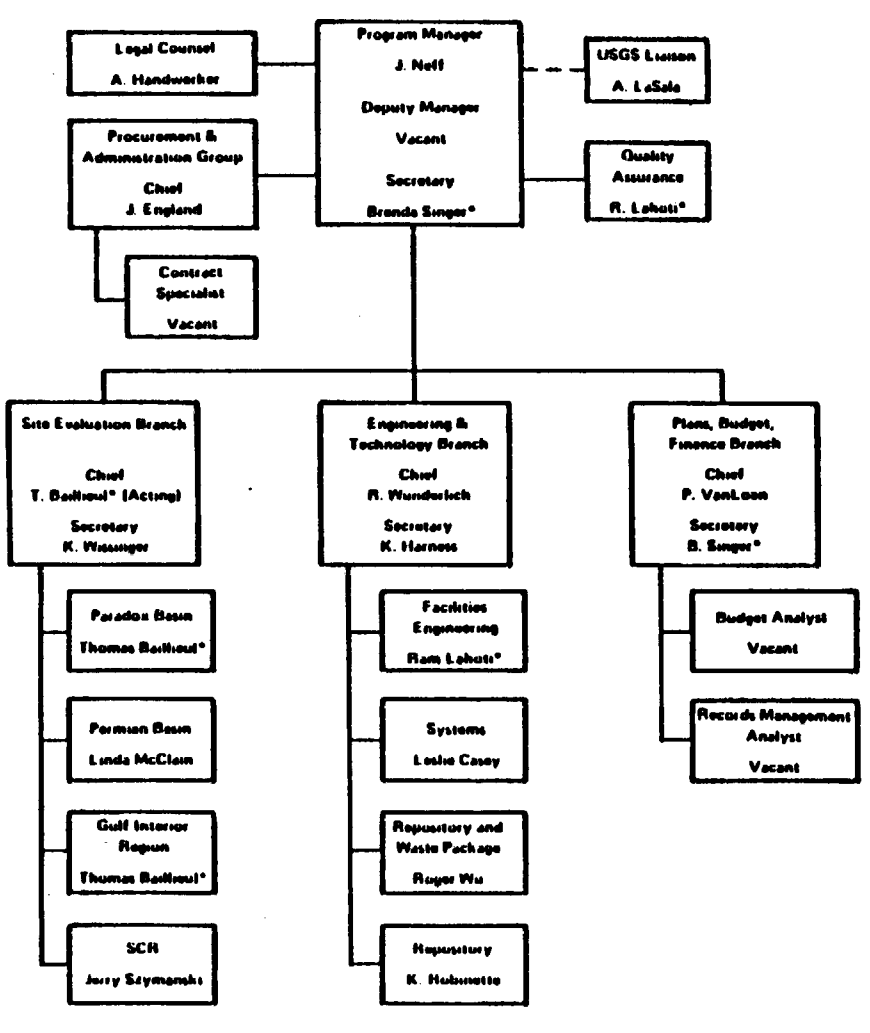
Siting Team

- Team Leader — E. Burton, B. Gale, B. McNutt, C. Hanlon, J. Shaheen, J. Wesley

- o Non-Geoscience Siting Guidelines
- o Site Nomination/ Recommendation
- o Siting for Second Repository
- o Liaison With EPA, CEQ and DOI
- o States/Local Governments/Indian Tribes
- o Public Hearings/ Meetings
- o Land Acquisition
- o C&C Record and Document System
- o Socioeconomic Impacts

Current

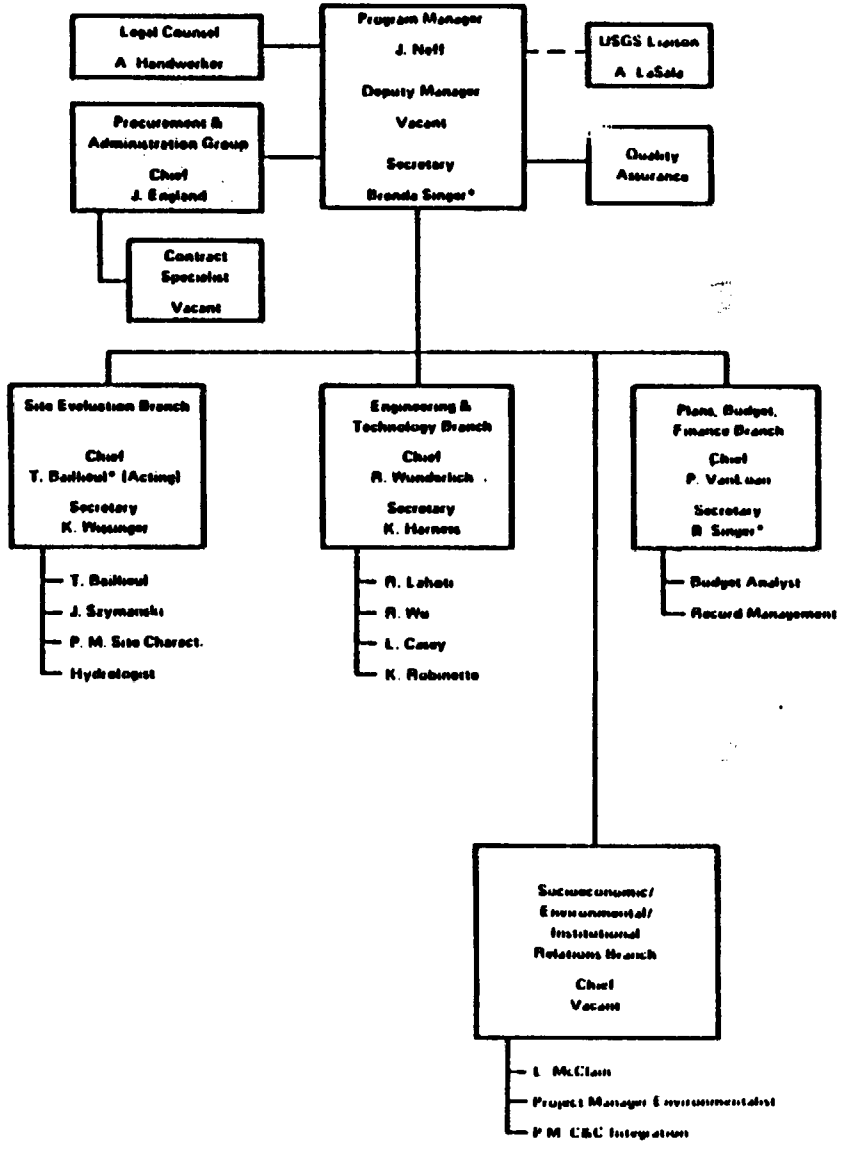
DOE CHICAGO OPERATIONS OFFICE
NWTS PROGRAM OFFICE
(DOE:CH:NWTS)



*Dual assignment.

Proposed

DOE CHICAGO OPERATIONS OFFICE
SALT REPOSITORY OFFICE
(DOE:CH:SRO)



ATTACHMENT 13

NRC STAFF COMMENTS ON
THE DOE SALT REPOSITORY PROJECT
INFORMATION MANAGEMENT AND TRANSFER SYSTEM

OBJECTIVE:

BACKGROUND:

DOE PROPOSED SYSTEM

NRC'S ROLE DURING PRELICENSING

NRC NEEDS WITH RESPECT TO INFORMATION ACCESS

NRC REVIEWS

9/21/83

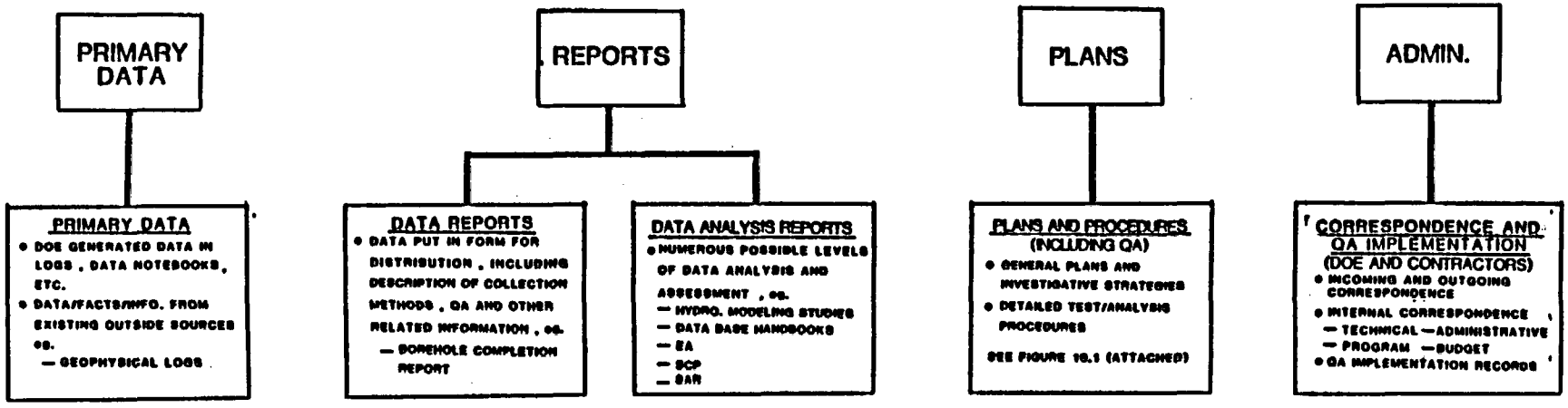
NRC STAFF COMMENTS ON
THE DOE SALT REPOSITORY PROJECT
INFORMATION MANAGEMENT AND TRANSFER SYSTEM

MAJOR COMMENTS:

- TIMELY AVAILABILITY OF DATA COLLECTION RESULTS
  - IMMEDIATE AVAILABILITY
  - CONTENTS OF DATA REPORTS
  - SEARCH CAPABILITY FOR PRIMARY DATA
- TECHNICAL DATA BASE
  - TREATMENT OF UNCERTAINTIES
  - TRACEABILITY TO SOURCES
  - EXTENDED DATA BASE
- OBSERVING STUDIES
- TECHNICAL CONTACTS

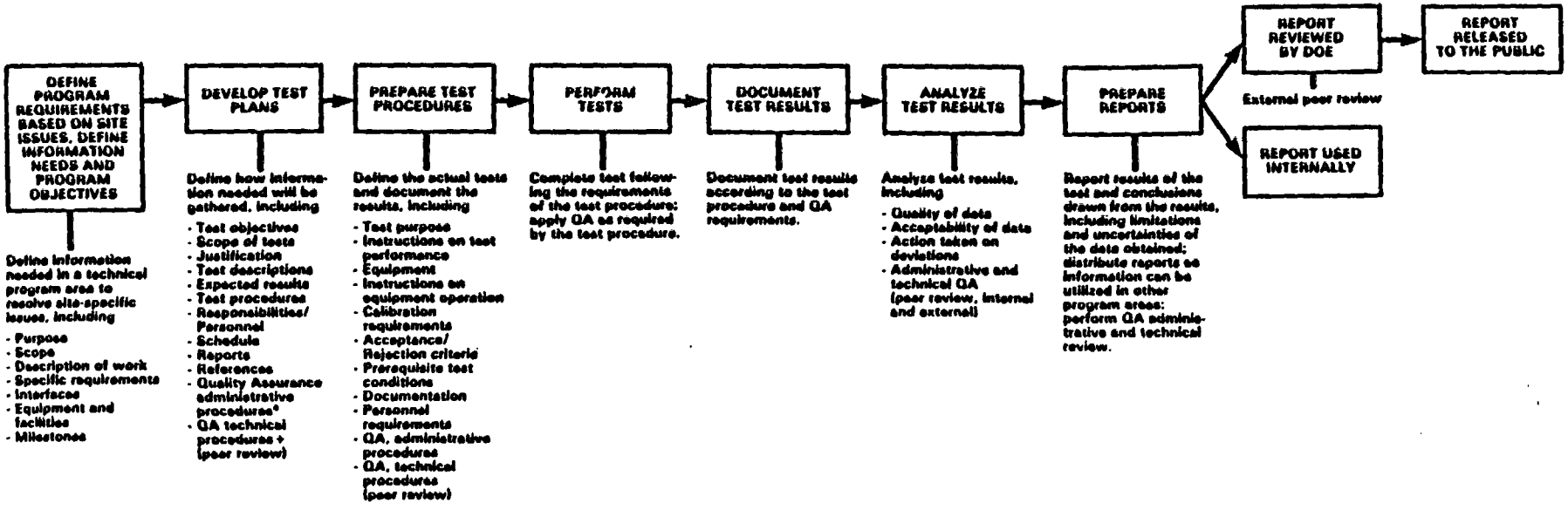
OTHER SELECTED COMMENTS:

9/21/83



TYPES OF TECHNICAL DOCUMENTS

9/21/83



*QA administrative procedures include procedures for: (1) document control; (2) documented instructions, procedures, and drawings; (3) control of materials, equipment, and services; (4) use of qualified personnel; (5) inspections; (6) documented test plans; (7) control of test equipment; (8) control of samples; (9) nonconformance reports; (10) corrective action; (11) peer review (both management and technical); (12) audits.

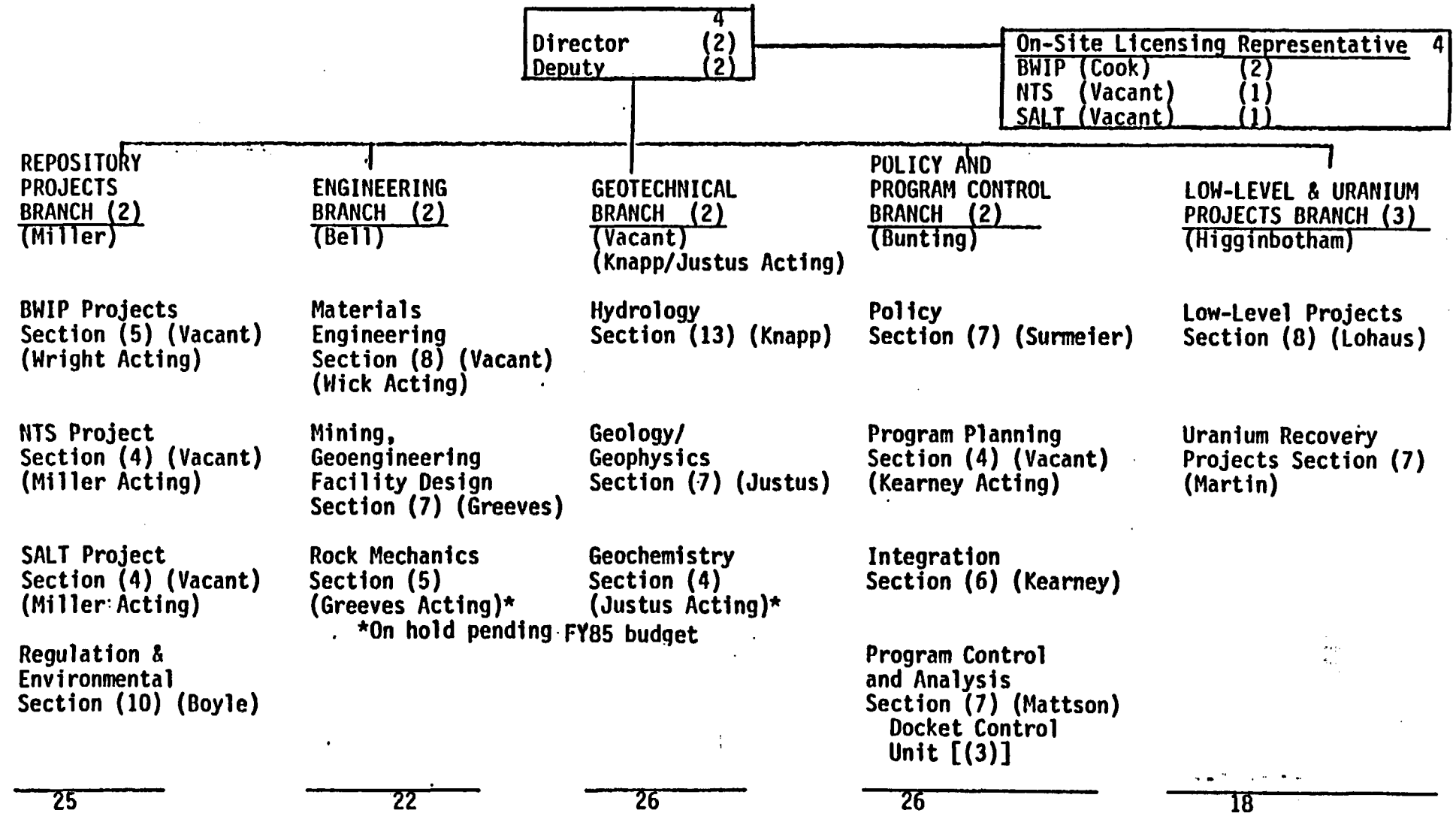
+ QA technical procedures include the actual internal and external peer reviews (both management and technical).

SCOPE OF DIAGRAM:
To show chronology of events in development of a testing program.

PURPOSE OF DIAGRAM:
(1) To show a breakdown sequence of development of plans to resolve problem of timely access to data by NRC. (2) To show the involvement of QA, both administrative and technical, in each step of program.

Figure 10.1 Technical program control: test plans and procedures (illustrative)

DIVISION OF WASTE MANAGEMENT

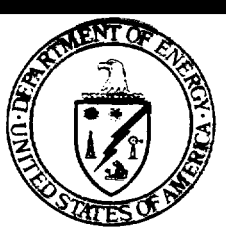


*On hold pending FY85 budget

TOTAL - 125

ORGANIZATIONAL CHART

9/14/83



Office of Nuclear Waste Isolation
505 King Avenue
Columbus, Ohio 43201