



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

86 AUG 22 P3:11

WM DOCKET CONTROL  
CENTER

8/22/86

Jim Knight, DOE

In answer to your request  
I have attached the handouts  
from the three managements  
meetings with DOE projects that  
contain our proposed Appendix 7  
assignments.

Robert Johnson

WM Record File

106

WM Project

16

Docket No.

PDR

LPDR

Distribution:

Lincoln

5/11

(Return to WM, 623-SS)

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PDR WASTE  
WM-16 PDR

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APPENDIX 7 ASSIGNMENTS

Geology

Review (overview) networks, SBTP, study plans, reference geology for ESF design, TBEG plans, generic salt programs

Review selected draft geologic study plans in detail, released proprietary seismic data

Site visit

Observe selected SRP meetings

WIPP visit

Hydrology

Review (overview) networks, SBTP, study plans, reference hydrogeology for ESF design, TBEG plans, generic salt programs, performance allocation

Review selected draft hydrogeologic study plans in detail, specific performance allocation

Site visit

Observe selected SRP meetings

Geochemistry

Review (overview) networks, revised geochemistry program plan, waste package program plan, TBEG plans, generic salt programs

Review selected draft geochemistry study plans in detail, specific performance allocation

Observe selected SRP meetings

WIPP visit

### Waste Package

Review (overview) networks, waste package program plan, generic salt programs, performance allocation; detailed review of PNL data and laboratory test plans/procedures

Review selected study plans

Review waste package conceptual design and material selection documents

Observe selected SRP meetings

### Rock Mechanics

Review (overview) networks, revised underground test plan, generic salt programs, reference information for ESF design, performance allocation (how much testing is enough)

Review ESF design, construction, sealing documents

Review selected draft study plans

Review conceptual repository design and retrievability documents

Observe selected SRP meetings

WIPP visit

### Performance assessment

Review networks, revised performance assessment plan, performance allocation, generic salt programs

Observe selected SRP meetings

### Quality Assurance

Determine QA schedules and contractor/subcontractor activities

Review PNL waste package laboratory test plans/procedures documentation (support of waste package Appendix 7)

Review ESF design documents (support ESF design Appendix 7)

Review geology study plans (pre-SCP) documentation (support geology study plan Appendix 7)

Pre-SCP-audit of PNL waste package laboratory test program

Pre-SCP audit of ESF design activities

Pre-SCP audit of geologic portion of surface based testing program

Observe selected SRPO QA audits, readiness reviews, DOE audits of SRPO

#### Environment/Socioeconomics

Reviews (overview) networks, program plans

Site visit

Observe selected SRP meetings

#### Project Management

Review selected program documents, networks (associated with quarterly management meetings)

Observe selected SRP meetings

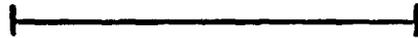
**PRELIMINARY/GENERAL SCHEDULE FOR  
NRC REVIEW PREPARATIONS FOR THE  
DEAF SMITH SITE SCP**

| JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY |

App. 7 assign. (8)  
- networks  
- program plans  
- generic salt program  
- etc.



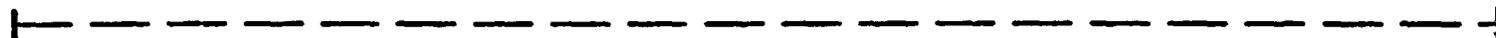
Briefings (3)  
- SBTP  
- Perf. Alloc.  
- ESF



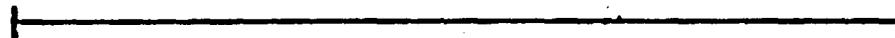
App. 7 assign. (8)  
- study plans  
- perf. alloc.  
- design doc.  
- QA review/audits



App. 7 assign.  
- observe meetings



Technical meetings (9)



Site visits (4)  
(Deaf Smith, WIPP)



Management Meetings (4)



Assumed DOE release of  
Deaf Smith SCP



NRC Plans - Status of Site Specific Planning

## Pre-SCP Areas of Concern in Geology/Geophysics

**Seismotectonics:** Fault activity and its significance in terms of siting and designing a HLW repository. It affects pre-closure and post-closure. Pre-closure--surface facilities and operations; retrievability. Post-closure--waste isolation (container rupture); change in pathways to water table and accessible environment.

Existence and significance of faults showing Quaternary movement.  
 Potential significance of detachment faulting.  
 Regional and local stress distribution and relationship to faulting/seismicity at Y.M.  
 Approaches to interpreting seismotectonic data relative to siting and designing a repository at Y.M.  
 Subsurface structure of Jackass Flats and Crater Flat (Mine Mountain Fault continuation; caldera or not; regional stress distribution).  
 Volcanic hazards--potential for and significance of.

Actions: Appendix 7 visit to site to see field evidence on faulting and tectonics--Aug/Sept.  
 Appendix 7 visit to USGS to review seismotectonic data and mapping--Aug.  
 Meeting to reach agreement on approach to seismotectonic data.

## Vein Deposits: Origin and Significance.

Possible that hot corrosive fluids could contact the waste package and perhaps also more readily dissolve the waste.  
 Possible host for precious metal deposits (an area that we are concerned NNWSI Project is overlooking).  
 Possible that they are a result of perched water tables that could cause problems during excavations for surface or subsurface facilities.

Actions: App. 7 visit (maybe combined with one of the seismotectonics App. 7 visits) to see plan before it goes to peer review group.  
 Meeting 1/87 to reach agreement on plan.

## Erosion: threat to waste isolation.

Action: App. 7 visit to USGS by Purcell to look at Quaternary mapping.  
 Discussion at surface investigations plan meeting.

Licensing usability of geologic data, especially core.

Action: attendance at pre-startup audits; review of new procedures.

### Pre-SCP Areas of Concern in Hydrology

#### Unsaturated Zone

- Vertical flux of water
- Fracture flow--amount and significance
- Degree and variability of saturation
- Possibility of permeability and capillary barriers between tuff units
- Air entrapment as a possible barrier to downward flow
- Possibility of free drainage in the host rock
- Possibility of perched water, at structural features or otherwise
- Ranges of hydrologic parameters

#### Saturated Zone

- Limitations in understanding of 3-D distribution of hydrologic parameters;
- Limitations in understanding of flow system boundaries

Actions: App. 7 visit to USGS to get familiar with the program.  
Meeting to address problematic areas in surface investigations plans identified in App. 7 visit or otherwise.

### Pre-SCP Areas of Concern in Performance Assessment

#### Performance Allocation--Approach and Implementation

Actions: Briefing at NRC on performance assessment program, spotlighting performance allocation;  
App. 7 visit to SNL to fill gaps in our knowledge of program;  
Meeting on performance allocation approach;  
At a time closer to release of the SCP, a meeting on performance allocation as implemented for the entire repository (natural and engineered systems).

#### Use of Expert Judgment Where Quantitative Approaches Cannot Be Used

Action: App. 7 visit (perhaps combined with one mentioned above) to exchange ideas on application of this approach prior to when NNWSI uses it in connection with the vein deposits.

Pre-SCP Areas of Concern in Waste Package

Susceptibility of austenitic stainless steel to non-uniform corrosion mechanisms

Action: App. 7 visit to LLNL to review program (pre-end of summer), with the possibility of a followup meeting (early 1987).

Spent fuel cladding as potential barrier:

Long term integrity;  
potential contribution of partially breached fuel cladding as barrier to reduce radionuclide releases.

Action: App. 7 visit to PNL to review work on cladding (Fall, 1986); Meeting to focus on and resolve issues arising from App. 7 visit

Status of NNWSI spent fuel programs; identification of areas needing further consideration for developing compliance with EBS release rate criterion.

Action: App. 7 visit to PNL (see fuel cladding App. 7) to review work on spent fuel;  
Meeting to focus on and resolve issues arising from App. 7 visit

Waste package performance assessment--direction of efforts.

Action: Combine with App. 7 visit above to LLNL or get a briefing at NRC, possibly followed by an App. 7 visit to LLNL on this topic.

GENERIC WASTE PACKAGE MEETING TOPICS MENTIONED BY TIM JOHNSON:

Extrapolation methodology for performance prediction;  
Substantially complete containment;  
Definition of engineered barrier system;  
Reasonable assurance.

Pre-SCP Areas of Concern in Rock Mechanics/Design

Resolution of items remaining in way of shaft construction

Open items from Aug. 1985 ES Design/Construction meeting;  
Revised performance analysis;  
Open items from NRC formal comments on response to Coplan 1983 letter

Action: App. 7 visit to LANL or on-site contractors to review ESF drawings, specifications, and calculations (Summer, 1986); ESF meeting to close out open items and to review status of designs and strategy.

#### Exploratory Shaft Testing in Selected Areas:

Coupled effects--kinds of tests, duration, scale.  
Representativeness and key rock mechanics/design parameters.  
Flexibility of repository block (space problem of situating repository in the present repository block)--can block be expanded?

Action: App. 7 visit to LANL or Las Vegas to look over ESTP (?)  
ESTP meeting to review strategy, rationale, testing--Fall, 1986

#### Selected Aspects of Repository Design:

Stability of repository (will their minimal support system be adequate, especially when heated?);  
Seismic/fault design criteria;  
NNWSI retrieval strategy.

Action: App. 7 visits to Parsons-Brinckerhoff and to Bechtel to review design, drawings, specifications, and calculations for repository surface and subsurface facilities--summer 1986 and every few months thereafter.  
Repository Design Meeting to review status of repository conceptual design and to resolve issues from App. 7 visits.

#### Pre-SCP Areas of Concern in Geochemistry

##### Characterization of groundwater in unsaturated zone

chemistry and variability in chemistry;  
age of groundwater;

Action: discussion of testing during ESTP meeting and possibly Surface investigations meeting.

##### Solubility of key radionuclides

Action: App. 7 visit to LANL to see solubility experiments

Radionuclide mobility at Yucca Mountain:

Determination of radionuclide sorption;  
Status, role, and application of matrix diffusion for characterization  
of radionuclide mobility;  
Conceptual model of radionuclide transport at Yucca Mountain.

Action: App. 7 visit (combined with solubility) to LANL in Aug-Sept.  
Meeting in Oct-Nov time frame

Stability of potentially sorptive minerals under expected repository conditions  
at Yucca Mountain

Action: App. 7 visit mentioned above might include examination of LANL  
experiments in this area.

PRE-SCP SIGNIFICANT AREAS OF CONCERN FOR DESIGN/ROCK MECHANICS

- 0 EXPLORATORY SHAFT STUDY PLAN
  - RATIONALE AND BASIS FOR PROPOSED TESTING PROGRAM
  - IMPACT OF ADVANCE CONCEPTUAL DESIGN ON PROPOSED TESTING PROGRAM
- 0 SYSTEM PERFORMANCE ANALYSIS SUPPORTING ES AND FACILITY DESIGN DECISIONS

ACTIONS: APPENDIX 7 TO REVIEW BOREHOLE TEST DATA, REVISED CONCEPTUAL DESIGN, DRAFT STUDY/TEST PLANS, AND DRAFT SCP CHAPTER 8

MEETING TO DISCUSS CONCERNS ON PERFORMANCE ANALYSIS METHODOLOGY FOR THE ES AND ES FACILITY

MEETING TO DISCUSS SPECIFIC STUDY/TEST PLANS WHERE CONCERNS HAVE BEEN IDENTIFIED.

## SIGNIFICANT PRE-SCP CONCERNS FOR HYDROLOGY

- 0 APPROACH TO DETERMINING GWTT
  - ADEQUACY OF DATA BASE
  - ASSUMPTIONS USED IN APPLICATION OF MODELS
  
- 0 HYDROGEOLOGIC TESTING STRATEGY
  - OBJECTIVES
  - PROCEDURES
  - TESTING METHODS QA PROCEDURES

ACTIONS: APPENDIX 7 ASSIGNMENT TO REVIEW DRILL CORE, TESTING DATA, REVISED HYDROLOGIC STRATEGY AND TEST PLAN TO ASSIST STAFF IN PREPARING FOR MEETING ON HYDROLOGIC TESTING, DRAFT SCP CHAPTER 8.

MEETING TO CLOSE OUT OPEN ITEMS ON HYDROLOGIC TESTING STRATEGY.

SIGNIFICANT PRE-SCP CONCERNS FOR WASTE PACKAGE

0 PERFORMANCE

- HOW DOES PROPOSED TESTING COVER THE PROJECTED RANGES OF THE GEOTECHNICAL ENVIRONMENT
    - SUSCEPTIBILITY OF STEEL CONTAINER TO NON-UNIFORM CORROSION MECHANISMS.
    - EFFECTS OF NEAR-FIELD GEOCHEMICAL REACTION KINETICS ON CONTAINER PERFORMANCE
    - EFFECTS OF ENTRAPPED MOISTURE ON PACKING PERFORMANCE AND OVERALL WASTE PACKAGE PERFORMANCE
- 

ACTIONS: APPENDIX 7 ASSIGNMENT TO REVIEW TESTING DATA, DRAFT STUDY/TEST PLANS AND PROCEDURES, ADVANCED CONCEPTUAL DESIGN, PRELIMINARY RELIABILITY ANALYSIS AND DRAFT SCP CHAPTER 8

MEETING TO DISCUSS REVISED CONCEPTUAL DESIGN AND PERFORMANCE CONCERNS .

## SIGNIFICANT PRE-SCP AREAS OF CONCERN FOR GEOLOGY/GEOPHYSICS

- 0 PROPOSED TESTING ACTIVITIES, SUCH AS GEOPHYSICAL SURVEYS, WHICH WILL BE UTILIZED DURING SITE CHARACTERIZATION
  - CAPABILITIES OF METHODS TO PROVIDE ADEQUATE CHARACTERIZATION INFORMATION
- 0 SEISMOTECTONICS
  - CHARACTERISTICS OF MICROEARTHQUAKE SWARMS AND IMPACT ON PRE-CLOSURE AND POST-CLOSURE PERFORMANCE
  - FAULT ACTIVITY AND ITS IMPACT ON PRE-CLOSURE AND POST-CLOSURE PERFORMANCE

ACTION: APPENDIX 7 ASSIGNMENT TO REVIEW SEISMOTECTONIC AND FIELD MAPPING DATA; SEE FIELD EVIDENCE OF FAULTING AND TECTONICS; DRAFT STUDY/TEST PLANS, AND DRAFT SCP CHAPTER 8.

MEETING TO RESOLVE SPECIFIC CONCERNS RELATED TO PROPOSED SURFACE GEOPHYSICAL TESTING, MACRO AND MICROSEISMIC ACTIVITY,

SIGNIFICANT PRE-SCP AREAS OF CONCERN FOR GEOCHEMISTRY

- O CHARACTERIZATION OF PRE AND POST EMPLACEMENT ROCK CHEMISTRY/MINEROLOGY/PETROLOGY
- O CHARACTERIZATION OF PRE AND POST EMPLACEMENT GROUND WATER CHEMISTRY
- O CHARACTERIZATION OF PRE AND POST EMPLACEMENT REDOX CONDITIONS
- O CHARACTERIZATION OF RADIONUCLIDE SOURCE TERM AND RADIONUCLIDE TRANSPORT

ACTION: APPENDIX 7 ASSIGNMENT TO REVIEW DOE'S DATA NEEDS ASSESSMENT, TEST DATA, DRAFT STUDY/TEST PLANS AND DRAFT SCP CHAPTER 8.

### SIGNIFICANT PRE-SCP CONCERNS FOR PERFORMANCE ASSESSMENT

- 0 OVERALL PERFORMANCE ALLOCATION APPROACH AND PROPOSED IMPLEMENTATION FOR EACH SYSTEM
- 0 PERFORMANCE ASSESSMENT PLAN/SYSTEMS INTEGRATION PLAN
  - STRATEGY AND APPROACH FOR IMPLEMENTING PERFORMANCE ASSESSMENT AND PROPOSAL FOR ACHIEVING CONTINUITY BETWEEN VARIOUS TECHNICAL AREAS

ACTIONS: BRIEFING AT NRC ON SITE SPECIFIC PERFORMANCE ALLOCATION

MEETING ON BWIP PERFORMANCE ASSESSMENT METHODOLOGY FOCUSED ON SPECIFIC CONCERNS.



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 WASHINGTON, D. C. 20555

FACSIMILE SERVICE REQUEST

DATE 8/22/86

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VERIFICATION NUMBER -

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301-427-4403 3M VRC AUTOMATIC

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