



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

Reply to:

1050 East Flamingo Road  
Suite 319  
Las Vegas, Nevada 89119  
(Tel: (702) 388-6125  
FTS: 598-6125

M E M O R A N D U M

DATE: December 10, 1987

FOR: Robert E. Browning, Director  
Division of Waste Management

FROM: Paul T. Prestholt, *PTP* - NNWSI

SUBJECT: NNWSI Site Report for Months of October and November,  
1987

1. QUALITY ASSURANCE

A. The Lawrence Livermore National Laboratory stop work order was lifted on November 12, 1987. The USGS stop work order was rescinded on December 10, 1987. All participants are now back to work.

B. The NNWSI Quality Assurance Plan, NVO-196-17 revision 5 is now in effect. DOE Hq. signed off on rev. 5 on October 20 and

*SEE FILE JACKET*

8803240429 871210  
PDR WASTE  
WM-11 PDR

88144531  
WM Projects WM-11  
PDR w/encl  
(Return to WM, 623-SS)

WM Record Files 102  
LPDR w/encl

*H*

all participants have revised (to rev. 5) QA plans in for NNWSI review.

## II. GEOLOGY-HYDROLOGY

A. The core library in area 25, NTS, is about 25% complete. Work has been resumed now that all labor disputes have been resolved.

B. Dale Hammermeister, former head of the hydrology group stationed at the NTS has resigned. Barney Lewis has assumed Dr. Hammermeister's duties.

## III. GEOCHEMISTRY - Nothing to report

## IV. ROCK MECHANICS, FACILITY DESIGN, EXPLORATORY SHAFT

A. A readiness review of Fennix & Scisson's plans to start Title I design of the exploratory shaft is scheduled for December 11, 1987. Title I design activities should start before year end.

B. It is anticipated that exploratory shaft collar construction will start in June of 1989. The actual start will, of course, depend on politics and budget.

C. Prototype testing in "G" tunnel was stopped when the crafts went on strike. Now that all labor disputes are resolved and everyone is back to work, prototype testing is still on hold waiting for resolution of the DOE budget. Mr. Carl Gertz, WMPO manager is traveling to DOE Hq. on December 22 to participate in budget discussions. Hopefully the budget situation will be resolved and the various effected projects will know their fate.

## V. WASTE PACKAGE - Nothing to report

## VI. PERFORMANCE ASSESSMENT - ALLOCATION - Nothing to report

## **VII. ENVIRONMENT**

During the October TPO-Project Manager Meeting, there was a presentation that discussed the "Environmental Regulatory Compliance Program Phases" (handout enclosed). The program is divided into five phases:

- o Phase I - Regulatory requirements determined and ERCP developed;
- o Phase II - Agency consultations;
- o Phase III - Permit applications and documents prepared;
- o Phase IV - Agency review and approval;
- o Phase V - Ongoing compliance activities.

Each of these phases are discussed in the handout. The various federal and state statutes and regulations that the NNWSI must work to are noted. A schedule for regulatory compliance and the table of contents for the "Environmental Regulatory Compliance Plan" are presented.

## **VIII. LICENSING AND NRC-DOE INTERACTIONS**

On November 6, 1987, I was given a briefing by WMPD and SAIC on the new responsibilities that SAIC has undertaken as an "Integration Contractor". Max Blanchard, WMPD, and William McNabb and Michael Voegele, SAIC, led the briefing.

As I understand it, with a few exceptions (meteorology), SAIC will be responsible for the integration (pulling together) of the work done by the other project participants and for the production of major documents (EA, SCP, etc.). SAIC will not be directing the work of the participants; that responsibility remains with WMPD.

Enclosed are an agenda for the briefing and the latest OCRWM organization chart.

## **IX. SCP AND STUDY PLANS**

A. The State of Nevada has requested a total of 14 days of workshops through February and March, 1988. The proposed schedule is as follows:

**JANUARY 28-29, 1988 (Thursday - Friday)**

**-Denver Plenary Session for Program Managers**

### **Nevada NWPO and Observers Topical Workshops**

**FEBRUARY 3 (Wednesday)**

**-Nevada NWPO Plenary - Overview of SCP and Environmental Socioeconomic Planning Documents**

**FEBRUARY 11 (Thursday)**

**-Climatology and Meteorology (Chapter 5 and Chapter 8 Plans) and Surface Hydrology (Chapter 3 and Chapter 8 Plans)**

**FEBRUARY 16 (Tuesday)**

**-Quality Assurance (Chapter 8.6), Including Plans for Environmental and Socioeconomic Analyses**

**FEBRUARY 24-25 (Wednesday-Thursday)**

**-Geology (Chapter 1 and Chapter 8 Plans)**

**MARCH 7-8 (Monday-Tuesday)**

**-Hydrology (Chapter 3 and Chapter 8 Plans)**

**MARCH 9 (Wednesday)**

**-Geochemistry and Geoengineering (Chapters 2, 4, and Chapter 8 Plans)**

**MARCH 10 (Thursday)**

**-Waste Package (Chapter 7 and Chapter 8 Plans)**

**MARCH 16 (Wednesday)**

**-Exploratory Shaft and Facility Plans (Chapter 8)**

**MARCH 17 (Thursday)**

**-Repository Conceptual Design (Chapter 6)**

**MARCH 29-30 (Tuesday-Wednesday)**

**-Issue Resolution and Performance Assessment (Chapter 8)**

**MARCH 31 (Thursday)**

**-Wrap-Up - Integration of Program Plans, to Include Decontamination and Decommissioning Plans**

**Total workshop days - 14 with Nevada NWPO**

**NOTE: All presentation and discussion of plans to include relevant environmental and socioeconomic plans and documents**

**General Public Workshops**

**FEBRUARY 4, 1988 (Thursday - afternoon and evening)**

**-Plenary Discussion and Public Comment**

**MARCH 24 (Thursday - afternoon and evening)**

**-Issue Resolution, Performance Assessment, Wrap-Up Discussion and Public Comment**

**The State has proposed that these workshops be held in Carson City, Nevada. It is my understanding that this schedule has WMPO approval.**

**B. Enclosed is the latest study plan list and proposed schedule. Given are the study plan number and corresponding SCP section number, title of the study and/or activity covered, the name of the participant preparing the study plan, the plan priority (1-4), and the scheduled completion date.**

**X. STATE INTERACTIONS**

**The next meeting of the Nevada Commission on Nuclear Projects is scheduled for December 15, 1987, in Las Vegas. Scheduled to give presentations are Charles E. Kay, Acting Director, DCRWM, and Carl Gertz, Manager, NNWSI. I will attend.**

cc: With enclosures:

J. J. Linehan  
K. Stablein  
S. Wastler

cc: No enclosures:

	M. J. Bell
C. P. Gertz	G. Cook
J. P. Knight	N. Still
R. R. Loux	C. Abrams
J. Szymanski	F. R. Cook
M. Glora	J. K. Goodmiller
D. M. Kunihero	R. Johnson
J. J. K. Daemen	L. Kovach
	S. Gagner

Enclosures:

10/26-27/87 TPO Handouts, i.e., Agenda; SCP Consultation Drafts, Overview Committee, 10/14-15/87; Environmental Regulatory Compliance Program Phases; SCP Status & Study Plan Status;

11/23-24/87 TPO Handouts, i.e., Agenda; Status of Waste Legislation; SEMP Status; Recent WMPD Public Affairs Activities; NRC Action Items and Information Requests; NNWSI Study Plan List; Study Plan Status; SCP Status;

Prestholt Briefing, 11/6/87; Letters dated 11/3/87 and 11/23/87 to C. P. Gertz, WMPD, from R. R. Loux, State of Nevada

# AGENDA

## NNWSI PROJECT MANAGER-TECHNICAL PROJECT OFFICER MEETING

LOCATION: 101 Convention Center Drive

PAGE: 1

Las Vegas, Nevada

DATE: OCT. 26 - 27, 1987

TIME	WHAT	HOW	WHO	EXPECTED OUTCOME	REF. MATERIAL & COMMENTS
Monday October 26 1:30- 1:40	INTRODUCTIONS/ROLES -AGENDA/OUTCOMES	REVIEW AGENDA & OUTCOMES	JOY/CARL/TPOs	AGREE TO AGENDA & EXPECTED OUTCOMES	
1:40- 1:55	LEGISLATIVE UPDATE	PRESENT CURRENT STATUS	CARL	UNDERSTAND IMPACTS OF CURRENT LEGISLATIVE ON PROJECT	
1:55- 2:50	FYIs	AROUND THE TABLE (5 MIN. EA.)	TPOs/BR CHIEFS		
2:50- 3:00	BREAK				
3:00- 3:15	SCP	PRESENT STATUS	MAX	UNDERSTAND STATUS	
3:15- 3:30	STUDY PLANS	PRESENT STATUS	DAVE	UNDERSTAND STATUS	
3:30- 4:15	ENV PREREQUISITES TO START WORK	PRESENT WHAT MUST BE DONE TO START FIELD WORK	ED/BOB	UNDERSTAND WHAT MUST BE DONE PRIOR TO COMMENCING FIELD WORK	
4:15- 5:15	SCP PUBLIC INFORMATION METTINGS	PRESENT AROUND TABLE OPINIONS ON HAVING PUBLIC INFORMATION MEETINGS. DISCUSS MERITS AND CONTENT OF THESE MEETINGS AND PROPOSE IDEAS TO HQ.	CARL/TPOs/BR CHIEFS	AGREE ON WHETHER TO RECOMMEND TO HQ THAT WE DO OR DO NOT HAVE PUBLIC MEETINGSS	

# AGENDA

## NNWSI PROJECT MANAGER-TECHNICAL PROJECT OFFICER MEETING

N-AD-028  
/86

LOCATION: 101 Convention Center Drive

PAGE: 2

Las Vegas, Nevada

DATE: OCT. 26 - 27, 1987

TIME	WHAT	HOW	WHO	EXPECTED OUTCOME	REF. MATERIAL & COMMENTS
Monday October 26 5:15- 5:35	PROJECT MANAGERS MEETING	AROUND THE TABLE: SUGGEST ISSUE TO BE BROUGHT BACK TO 10/28-29 PM MEETING	TPOs	AGREE TO ISSUES CARL WILL PRESENT AT PM MEETING	
5:35- 5:45	BREAK				
5:45- 6:30	EXECUTIVE SESSION		CARL, TPOs, BR CHIEFS ONLY		



**SCP CONSULTATION DRAFTS  
OVERVIEW COMMITTEE  
OCTOBER 14-15, 1987**

**MEMBERSHIP:** Ralph Stein, Chairman  
Paul Gnirk, Respec  
Pat Camella, Weston  
Lee Merkhoffer, Applied  
Decision Analysts  
Rex Brown, Consultant  
Tom Cotton, Consultant  
Bob Jackson, Weston

- PURPOSE:**
1. Review technical approach taken in SCPs
    - (a) Uncertainties
    - (b) Approach to achieve confidence
    - (c) Defense in depth
    - (d) Shorten time and scope of site characterization
    - (e) Critical review of issues hierachy
    - (f) Analyze cost and schedule
  2. Reports to Steve Kale
    - (a) Interim - October 31
    - (b) Final - November 30

## **AGENDA:**

**October 14 - Presentations by:**  
**OGR - Alexander and Nelson**

**NNWSI Project -  
Blanchard and Voegele**

**October 15 - Presentations by:**  
**NNWSI Project -  
Voegele, Younker,  
Dobson  
Support for  
Questions: Wilson,  
USGS, Raup, USGS  
Pendleton, SAIC  
Sinnock, SNL**

**November - Visit to all three  
Project Offices for  
briefing in greater  
detail**

U.S. DEPARTMENT OF ENERGY

**O  
C  
R  
W  
M**

**OGR**

**N**evada  
**N**uclear  
**W**aste  
**S**torage  
**I**nvestigations  
**PROJECT**

**WASTE  
MANAGEMENT**

**Nevada  
Nuclear Waste  
Storage Investigations Project**

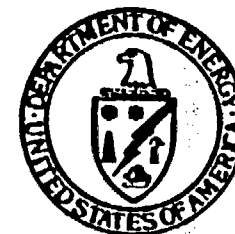
**SCOPE OF  
SITE CHARACTERIZATION**

*PRESENTED TO*

**SCP OVERVIEW COMMITTEE**

**October 14, 1987**

**United States Department of Energy  
Nevada Operations Office/Waste Management Project Office**



# AGENDA

## INTRODUCTION

- ORGANIZING PRINCIPLES
- APPLICABLE REGULATIONS
- ISSUES HIERARCHY
- PERFORMANCE & DESIGN ISSUES
- SITE PROGRAM LINKAGE TO PERFORMANCE AND DESIGN ISSUES

## PERFORMANCE ALLOCATION

- CONCEPT & USE
- SYSTEM ELEMENTS
- PRIMARY & BACKUP BARRIERS

## SUMMARY OF SELECTED ISSUES AND SITE PROGRAMS

- PERFORMANCE ISSUES
  - 1.1 TOTAL SYSTEM
  - 1.6 PRE-WASTE GWTT
  - 2.3 ACCIDENTAL RADIOLOGICAL RELEASES
- DESIGN ISSUES
  - 4.4 REPOSITORY PRECLOSURE DESIGN
  - 1.11 REPOSITORY POSTCLOSURE DESIGN
- SITE PROGRAMS
  - 8.3.1.17 PRECLOSURE TECTONICS
  - 8.3.1.2 GEOHYDROLOGY

## STUDY PLANS AND ACTIVITIES

## PRIORITIZATION

- WAYS TO PRIORITIZE
- REVISITING PERFORMANCE ALLOCATION
- ITERATIVE APPLICATION
- COSTS OF SITE CHARACTERIZATION

- ④ we have senior tech mgt here for focus'd due to challenge about tasks in 8.3 for tomorrow AM
- ⑤ Draft letter asked us to aim for last part (US) L.I.P. (prioritization). Done by committee goals and means to achieve those goals.
- ⑥ Parts 1-4 are aimed at building committee's understanding of the S&P & its inherent prioritization

## BLANCHARD

- ① NWPA, 10 CFR 60.11 - specify content & purpose of SC Reg Guide 4.17

## VOEGELE

## VOEGELE/YOUNKER

## PENDLETON/DOBSON

## BLANCHARD

# **PRIORITIZATION**

- **METHODS OF PRIORITIZATION STUDIES AND ACTIVITIES**
- **EXAMPLES OF CRITERIA FOR PRIORITIZATION**
- **POTENTIAL MAJOR PROGRAM REDUCTIONS; ADVANTAGES AND DISADVANTAGES**

## **POSSIBLE METHODS FOR PRIORITIZING PROGRAM**

- 1. COMPLETE PERFORMANCE ALLOCATION**
- 2. DELPHI PROCESS**
- 3. FORMAL DECISION ANALYSIS**
- 4. PEER REVIEW - POLITICAL OR TECHNICAL**
- 5. COMBINATION OF 1 THROUGH 4**
- 6. STRICT APPLICATION OF BUDGET**

## **STAGES WHEN REVISITING PERFORMANCE ALLOCATION WILL BE MEANINGFUL**

- **AFTER RECEIVING COMMENTS ABOUT THE  
CONSULTATION DRAFT SCP**
- **AFTER RECEIVING COMMENTS ABOUT THE SCP**
- **ANNUALLY BEFORE RELEASE OF SCP PROGRESS REPORTS**
- **ADMINISTRATIVE PRIORITIZATION WILL BE REASSESSED  
ANNUALLY AT EACH BUDGET CYCLE IN CONCERT WITH  
PERFORMANCE ALLOCATION**

# **POSSIBLE CRITERIA FOR PRIORITIZATION OF SCP STUDIES AND ACTIVITIES**

## **CRITERIA RELATED TO ISSUE RESOLUTION**

- 1. IS THE NEEDED CONFIDENCE FOR PARAMETERS TO BE DETERMINED BY THE STUDY/ACTIVITY HIGH?**
- 2. IS THE STUDY/ACTIVITY DESIGNED TO COLLECT INFORMATION TO CHARACTERIZE A PRIMARY BARRIER?**
- 3. IS THE DIFFERENCE BETWEEN THE CURRENT AND NEEDED CONFIDENCE FOR THE PARAMETERS DETERMINED BY THE STUDY/ACTIVITY HIGH?**
- 4. IS THERE A STRONG TIE BETWEEN THE STUDY/ACTIVITY AND PERFORMANCE REQUIREMENTS?**
- 5. IS THERE A STRONG TIE BETWEEN THE STUDY/ACTIVITY AND DESIGN REQUIREMENTS?**



# **POSSIBLE CRITERIA FOR PRIORITIZATION OF SCP STUDIES AND ACTIVITIES**

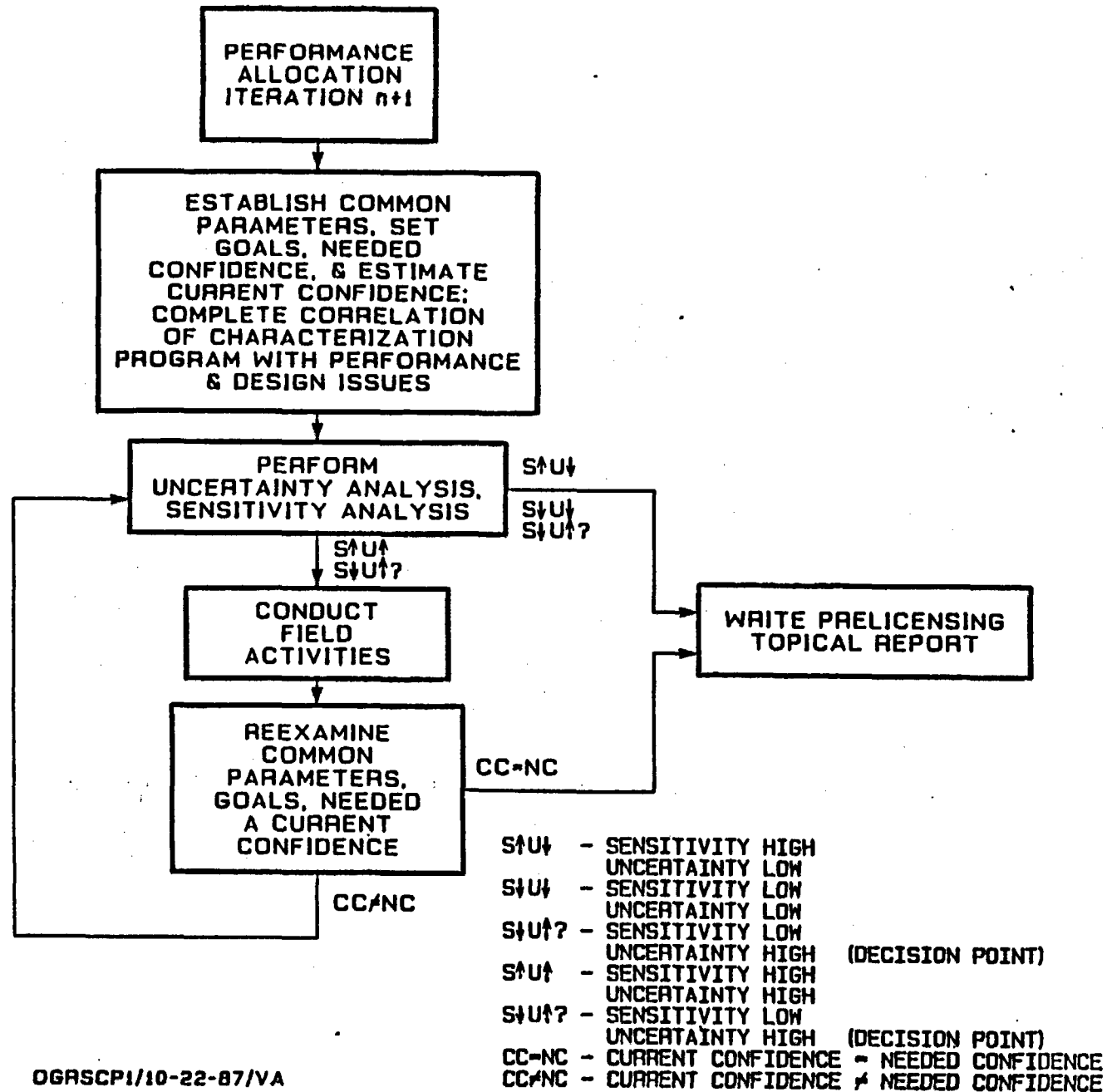
## **CRITERIA RELATED TO TECHNICAL AND MANAGEMENT CONCERNS**

- 1. WILL THE ACTIVITY REQUIRE A FEASIBILITY OF OR PROTOTYPE STUDY?**
- 2. IS THE COMPLETION OF THE ACTIVITY NEEDED FOR PLANNING PURPOSES OR IS THE INITIATION OF FUTURE PROGRAMS DEPENDENT ON COMPLETION OF THE ACTIVITY?**
- 3. IS THE ACTIVITY OF LONG DURATION, SUCH THAT EARLY INITIATION IS REQUIRED TO AVOID LATER DELAYS IN THE PROGRAM**
- 4. ARE THE DATA PROVIDED BY THE STUDY UNIQUE (AND NOT PROVIDED BY ANY OTHER STUDY)?**
- 5. IS THE ACTIVITY A HIGH PRIORITY WITH OUTSIDE ORGANIZATIONS (e.g., NRC OR THE STATE)?**
- 6. IS THE COST OF THE ACTIVITY HIGH?**

**TOPICS THAT COULD BE CONSIDERED  
FOR FUTURE REDUCTIONS**

- 1. ELIMINATE EXPLORATORY SHAFT AND INSITU TESTING AND RELY ON  
SURFACE BASED TESTING FOR DEMONSTRATION OF COMPLIANCE**
- 2. ELIMINATE AN INVESTIGATIVE PROGRAM AND COMPENSATE BY OVER DESIGN**  
---10,000 YEAR WASTE PACKAGE  
---SURFACE FACILITIES DESIGNED TO ULTRA-HIGH GROUND MOTION
- 3. REDUCE OR ELIMINATE CONSERVATISM**
- 4. USE NON-UNION CONTRACTORS**
- 5. WORK ONLY ON TASKS RELATED TO PRIMARY BARRIERS**
- 6. DRILL NO BOREHOLES WITHIN PERIMETER DRIFT OF REPOSITORY AND LIMIT  
TOTAL NUMBER OF DRILLHOLES**
- 7. QA Level III a back up or confirmatory data.**

# LOGIC FOR ITERATIVE APPLICATION OF PERFORMANCE ALLOCATION



United States Government

*Handwritten for Stein*  
*10-14-87*

Department of Energy

# memorandum

OCT 14 1987

DATE:

REPLY TO: RW 20

ATTN OF:

SUBJECT: SCP Consultation Drafts Overview Committee

TO: R. Stein, Director  
Engineering and Geotechnology Division

I would like you to form and chair a Committee to provide a short term review of the site characterization program as described in the consultation draft SCPs (CDS) and to report the results of your review to me prior to issuance of these documents. To accomplish this task you should draw upon the internal and external resources of OGR and, to the extent necessary, the resources of the Repository Project Offices. As guidance in implementing this activity, the following factors shall be considered:

1. The primary emphasis of the review shall be on the technical approach taken in the development of the SCPs. In particular, the Committee shall focus on matters such as: a) how uncertainties are treated; b) approach to achieving high confidence levels; c) defense in depth - what if a critical series of tests produces uncertain results; d) possibility of one (or few) set(s) of tests producing sufficient leverage on the program to shorten time to the LA; e) etc. In the process of evaluating these factors, a key consideration for the committee is to take a critical review of the SCP issues hierarchy and the suitability of this approach to the development of the test program and the demonstration of regulatory compliance.
2. As an adjunct to the technical review, the committee should be regularly briefed by and work with the cost and schedule overview committee to understand the relationship of the technical program to the costs and schedules and how potential changes to the technical program could affect both the end costs and schedules.

In addition, I am requiring that you, through the cost and schedule overview committee, obtain cost and schedule estimates of the work envisioned by the currently planned SCPs. If these estimates exceed those contemplated in the Mission Plan Amendment, I require your recommendation as to a course of action.

3. A final report to me (format TBD) will be due on November 30, 1987, prior to the start of CDS printing. An interim report is requested by October 31, 1987 coupled with weekly briefings. As part of the final report, a plan should be provided as to how any proposed SCP enhancements identified in the review can be accommodated in the NWPA SCP. Also, a proposal for addressing inconsistencies in the costs and schedules if any, with previously published information, should be developed.
4. The schedule for release of the CDS remains firm for January 8, 1988 and every effort to achieve that date is expected.
5. As part of your overall planning, the long-term (post CDS release) of this committee should be defined. It is my present intention at that point in time, the current committees (chaired by Messrs. Knight, Blaney, and Bresee) resume their chartered roles.
6. By copy of this memo, the committee efforts of Messrs. Knight, Blaney, and Bresee will report to you for overall direction and management action.

If you have any questions on this direction, please see me.



Stephen H. Kale  
Associate Director for  
Geologic Repositories

cc: Ed Kay  
Tom Isaacs  
Jim Bresee  
Jim Knight  
Richard Blaney  
Nello Del Gobbo  
Donald Alexander  
Stephan Brocoun  
John Anttonen, BWIP  
Carl Gertz, NNWSI  
Jeff Neff, SRPO  
Robert Jackson, Weston  
Jeff Nelson, Weston

# MAJOR CONSIDERATIONS IN THE DEVELOPMENT OF SCPs

Site Characteristics	YUCCA MOUNTAIN	DEAF SMITH	HANFORD
Rock Type	Welded tuff	Evaporites	Basalt-entablature
Constructability of what?	Limited difficulty	Moderate difficulty	Difficult
Geochemistry	Sorptive, oxidizing	<ul style="list-style-type: none"> <li>o Poorly sorptive</li> <li>o Slightly reducing</li> <li>o High ionic strength</li> </ul>	<ul style="list-style-type: none"> <li>o Excellent sorptive Capacity</li> <li>o Strongly reducing</li> </ul>
Hydrology	Unsaturated zone, low flux	Saturated, low flux	Saturated, moderate flux
Disruptive Scenarios	Faulting, volcanism, climate change	Human intrusion	Faulting
Engineered Barrier System	<ul style="list-style-type: none"> <li>o Simple design</li> <li>o Thin walled, stainless steel</li> <li>o No packing</li> </ul>	<ul style="list-style-type: none"> <li>o Simple design</li> <li>o Thick walled, low carbon steel</li> <li>o Packing optional</li> </ul>	<ul style="list-style-type: none"> <li>o Complex design</li> <li>o Thick walled, low carbon steel</li> <li>o Complex packing</li> </ul>
Availability of Information for Planning	Extensive	Limited	Extensive

See sketch of -  
what are the major uncertainties?

# SUMMARY OF NNWSI TOP-LEVEL STRATEGY

NRC 10CFR60 Performance Objectives	Unsaturated Zone			Saturated Zone	Waste Package	
	Topopah Spring	Calico Hills		Backup	Container	Waste Form
		(Zeolitic) Primary	(Vitric) Primary		Primary	
Total System Release Requirements	<ul style="list-style-type: none"> <li>- Low flux</li> <li>- Long time of ground-water travel</li> <li>- Geochemical properties limit radionuclide dissolution &amp; retard radionuclide transport</li> <li>- Climate and tectonic processes may be important</li> </ul>				<ul style="list-style-type: none"> <li>o Relied on for limiting gaseous releases</li> </ul>	
Substantially Complete Containment Within Waste Packages	Primary				Primary	
	<ul style="list-style-type: none"> <li>- Rely on very little or no water contacting package</li> <li>- Engineered to promote drainage <i>by gap</i></li> <li>- Thermal output maintains dry conditions</li> </ul>				<ul style="list-style-type: none"> <li>o 300 years cladding and container</li> <li>o 300-1,000 years container</li> <li>o Backup ceramic liner</li> </ul>	
Release Rate From The Engineered Barrier System	Primary				Backup	Primary
	<ul style="list-style-type: none"> <li>- Rely on very little or no water to dissolve waste</li> </ul>				<ul style="list-style-type: none"> <li>o Waste form solubility</li> <li>o New waste package design as backup</li> </ul>	
Ground-Water Travel Time Requirement	Backup	Primary	Primary	Backup		
	<ul style="list-style-type: none"> <li>- Low flux</li> <li>- Long time of ground-water travel flow mechanisms uncertain</li> </ul>			* Other units identified as Auxillary Barriers		

# SUMMARY OF SRP TOP-LEVEL STRATEGY

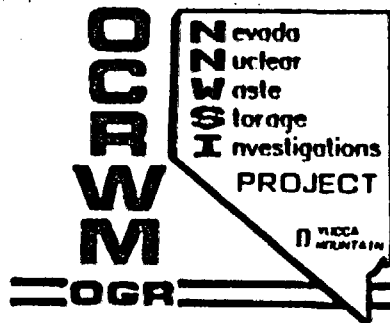
NRC 10CFR60 Performance Objectives	Natural Barriers			Engineered Barriers		
	HSU-A (Ogallala, Dockum)	HSU-B (Evaporites)	HSU-C (Paleozoics)	Container	Waste Form	Packing
		Primary	Primary	Primary	Backup	Backup
Total System Release Requirements	<ul style="list-style-type: none"> <li>- Long ground-water travel HSU-B and HSU-C</li> <li>- Retardation in HSU-B adds confidence</li> <li>- Disturbed case-bounding analysis to be made</li> </ul>			<ul style="list-style-type: none"> <li>o Container corrosion allowance</li> <li>o Packing control of mass transfer as backup</li> <li>o Waste form as backup control on dissolution</li> </ul>		
Substantially Complete Containment Within Waste Packages		Primary		Primary	Backup	Backup
	<ul style="list-style-type: none"> <li>- Limited water and low flux</li> </ul>			<ul style="list-style-type: none"> <li>o Distributed container failure</li> <li>o Packing control of mass transfer as backup</li> <li>o Waste form as backup control on dissolution</li> </ul>		
Release Rate From The Engineered Barrier System		Primary		Backup	Primary	Primary
	<ul style="list-style-type: none"> <li>- Limited water and low flux</li> </ul>			<ul style="list-style-type: none"> <li>o Packing control of mass transfer</li> <li>o Waste form control on dissolution</li> <li>o Container failure distribution as backup</li> </ul>		
Ground-Water Travel Time Requirement		Primary	Primary			
	<ul style="list-style-type: none"> <li>- Travel Time &gt; 10,000 years for small controlled area</li> <li>- Downward gradient</li> </ul>					

*How is this possible*



# SUMMARY OF BWIP TOP-LEVEL STRATEGY

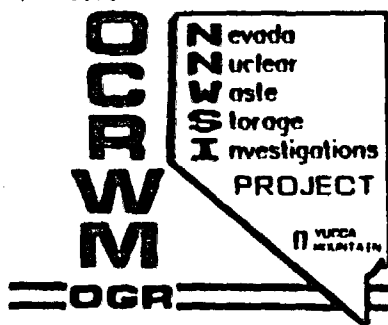
NRC 10CFR60 Performance Objectives	Natural Barriers			Engineered Barriers		
	(Above Vantage)	(Cohasset to Vantage)	(Birkett and Below)	Container	Waste Form	Packing
		Primary		Primary		Primary
Total System Release Requirements	<ul style="list-style-type: none"> <li>- Reliance on Cohasset dense interior</li> <li>- Reducing environment controls solubility</li> </ul>			<ul style="list-style-type: none"> <li>o Distributed container failure</li> <li>o Packing control on mass transfer</li> <li>o Packing control on redox</li> </ul>		
Substantially Complete Containment Within Waste Packages		Primary		Primary		Primary
	<ul style="list-style-type: none"> <li>- Host rock control on redox</li> </ul>			<ul style="list-style-type: none"> <li>o Distributed container failure</li> <li>o Packing control of mass transfer</li> <li>o Packing control on redox</li> </ul>		
Release Rate From The Engineered Barrier System		Primary		Primary		Primary
	<ul style="list-style-type: none"> <li>- Reducing environment controls solubility</li> </ul>			<ul style="list-style-type: none"> <li>o Distributed container failure</li> <li>o Packing control of mass transfer</li> <li>o Packing control on redox</li> </ul>		
Ground-Water Travel Time Requirement		Primary				
	<ul style="list-style-type: none"> <li>- Travel Time &gt; 10,000 years with probability &gt; 0.95</li> </ul>					



# ENVIRONMENTAL REGULATORY COMPLIANCE PROGRAM PHASES

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- **PHASE I - REGULATORY REQUIREMENTS DETERMINED AND ERCP DEVELOPED**
- **PHASE II - AGENCY CONSULTATIONS**
- **PHASE III - PERMIT APPLICATIONS AND DOCUMENTS PREPARED**
- **PHASE IV - AGENCY REVIEW AND APPROVAL**
- **PHASE V - ONGOING COMPLIANCE ACTIVITIES**



## ENVIRONMENTAL REGULATORY COMPLIANCE FOR SITE CHARACTERIZATION AT YUCCA MOUNTAIN

### PART I - FEDERAL STATUTES

### AGENCY

### REQUIRED ACTION

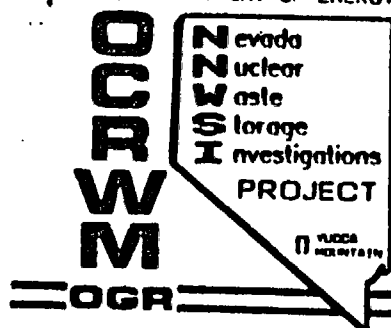
- |   |                |                        |
|---|----------------|------------------------|
| 1. AMERICAN INDIAN RELIGIOUS FREEDOM ACT  | NACHP/SHPO/BIA | PROGRAMMATIC AGREEMENT |
| 2. ENDANGERED SPECIES ACT                 | F&WS           | CONSULTATION           |
| 3. FARMLAND PROTECTION POLICY ACT         | SCS            | CONSULTATION           |
| 4. FEDERAL LAND POLICY AND MANAGEMENT ACT | BLM            | LAND ACCESS AGREEMENT  |
| 5. HAZARDOUS MATERIALS TRANSPORTATION ACT | DOT            | APPROVED CARRIERS      |

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# ENVIRONMENTAL REGULATORY COMPLIANCE FOR SITE CHARACTERIZATION AT YUCCA MOUNTAIN

(CONTINUED)

**PART I - FEDERAL STATUTES****AGENCY****REQUIRED ACTION****6. MATERIALS ACT****BLM****FREE-USE PERMIT****7. NATIONAL HISTORIC  
PRESERVATION ACT****NACHP/SHPO****PROGRAMMATIC AGREEMENT****8. SAFE DRINKING WATER  
ACT- UNDERGROUND  
INJECTION CONTROL PROGRAM****EPA****UIC CLASS V  
NOTIFICATION****9. EXECUTIVE ORDER 11988:  
FLOODPLAIN MANAGEMENT****DOE****COMPLIANCE REPORT****10. EXECUTIVE ORDER 11990:  
PROTECTION OF WETLANDS****DOE****COMPLIANCE REPORT**

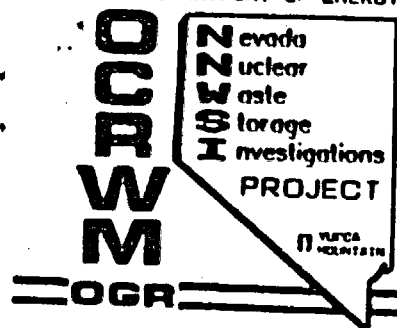


# ENVIRONMENTAL REGULATORY COMPLIANCE FOR SITE CHARACTERIZATION AT YUCCA MOUNTAIN

(CONTINUED)

## PART II - FEDERAL STATUTES WITH AUTHORITY FOR IMPLEMENTATION DELEGATED TO STATE

	AGENCY	REQUIRED ACTION
1. CLEAN AIR ACT	EPA/NDEP	REGISTRATION CERTIFICATE/ OPERATING PERMIT
2. CLEAN WATER ACT	EPA/NDEP	SANITARY SEWAGE DISPOSAL PERMIT
3. RESOURCE CONSERVATION AND RECOVERY ACT	EPA/NDEP	REGISTRATION AND EPA I.D. NUMBER
4. SAFE DRINKING WATER ACT	EPA/NDH	DRINKING WATER SYSTEM PERMIT

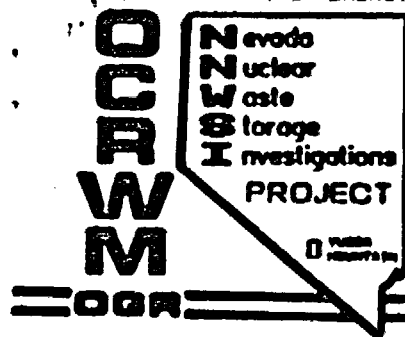


# ENVIRONMENTAL REGULATORY COMPLIANCE FOR SITE CHARACTERIZATION AT YUCCA MOUNTAIN

(CONTINUED)

## PART III - STATE REQUIREMENTS

	AGENCY	REQUIRED ACTION
1. GROUNDWATER USE	NSE	GROUNDWATER APPROPRIATION PERMIT
2. USE OF RADIOACTIVE MATERIALS	NDH	RADIOACTIVE MATERIALS LICENSE
3. FAUNA AND FLORA HABITAT MODIFICATION	NDOW	CONSULTATION



Thus, there will be no compliance consultations between the State of Nevada and DOE without first resolving the issue of comprehensive environmental baseline information, next assuring that DOE will establish an integrated environmental program, and finally having available full plans for the site characterization activities that DOE proposes.

*LOUX TO KUNICH, AUGUST 5, 1987*

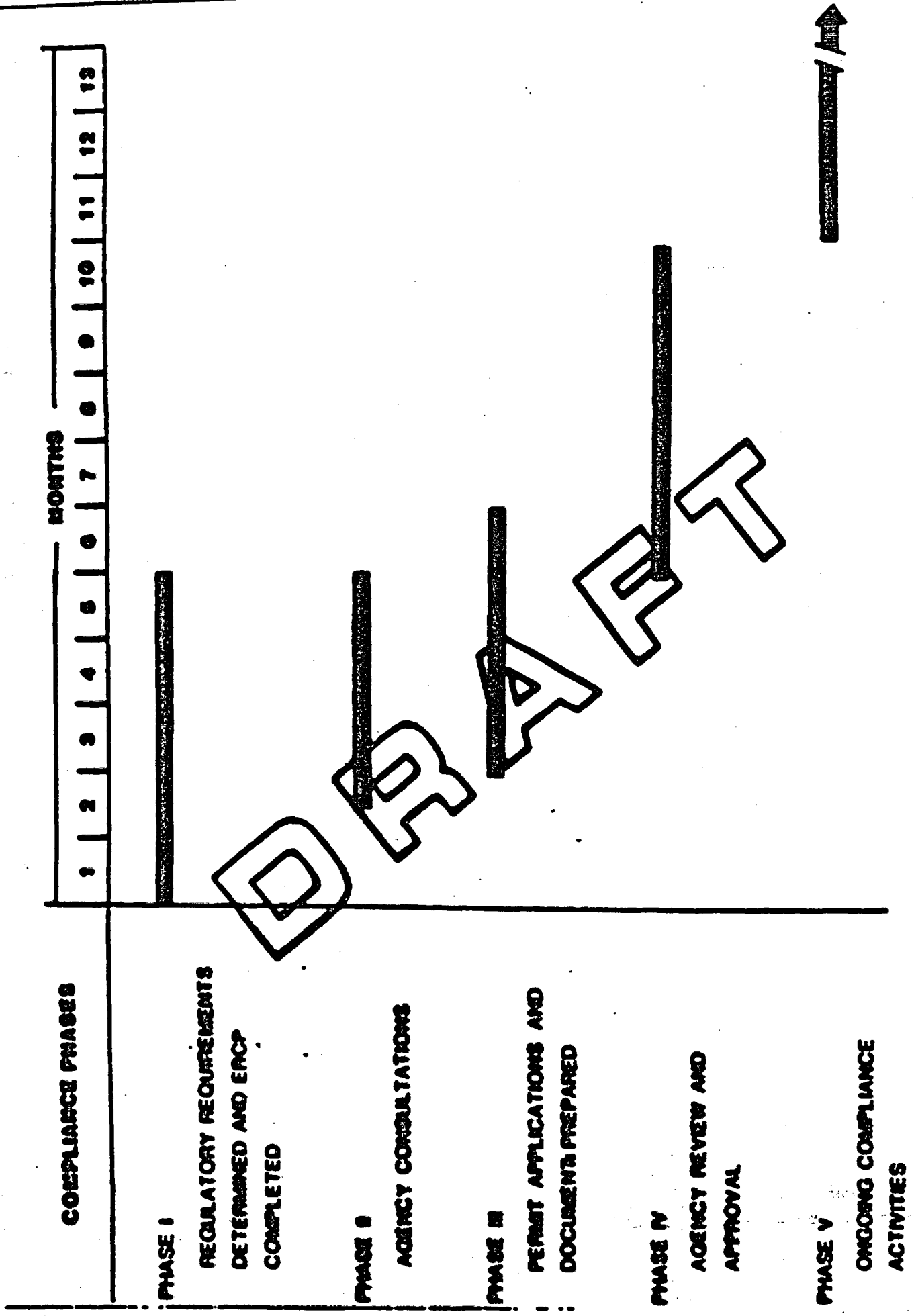


Figure 9-1. Environmental Regulatory Compliance Schedule.



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# **ENVIRONMENTAL REGULATORY COMPLIANCE PLAN FOR SITE CHARACTERIZATION**

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## **1. INTRODUCTION**

- IDENTIFIES THE ENVIRONMENTAL REGULATORY APPROVALS FOR SITE CHARACTERIZATION AND DESCRIBES A PLAN TO OBTAIN THESE APPROVALS

## **2. SITE CHARACTERIZATION PROGRAM SUMMARY**

- DESCRIPTION OF FIELD STUDIES AND THE EXPLORATORY SHAFT

## **3. PERMITS AND APPROVALS**

- DESCRIPTION OF FEDERAL AND STATE APPROVALS REQUIRED FOR SITE CHARACTERIZATION

## **4. PLAN FOR OBTAINING APPROVALS**

- APPROACH, ORGANIZATION, PROCEDURES AND QUALITY ASSURANCE TO BE USED TO OBTAIN PERMITS

## **5. SCHEDULE FOR OBTAINING APPROVALS**

- SCHEDULE FOR INTERACTING WITH AGENCIES, COMPLETING APPLICATIONS AND AGENCY APPROVAL

**SCP STATUS**

**&**

**STUDY PLAN STATUS**

## STATUS OF SCP

- o ALL TEXT REVISIONS AND CORRECTIONS WERE DUE AT SAIC ON 10/23/87
- o A SINGLE COMPILED MARKUP FOR ALL TEXT (EXCEPT AS NOTED IN NEXT BULLET) WILL BE READY FOR FINAL PRODUCTION ON OCTOBER 30, 1987
- o NEW TEXT & GRAPHICS FOR SCHEDULE/MILESTONE SECTIONS IN 8.3 WILL NOT BE READY TO INCORPORATE UNTIL AFTER NOVEMBER 6
- o SCHEDULED FOR NV/OGR CONCURRENCE FROM NOVEMBER 23 THROUGH DECEMBER 5

## STATUS OF SCP (CONTINUED)

- o FINAL POST-CONCURRENCE REVISIONS AT SAIC FROM DECEMBER 7 THROUGH DECEMBER 18
- o GPO PRINTING SCHEDULED FROM DECEMBER 21 THROUGH JANUARY 8
- o DISTRIBUTION SCHEDULED FOR WEEK OF JANUARY 11

## **STATUS OF SCP (CONTINUED)**

### **REVISIONS TO SCHEDULE/MILESTONE SECTIONS**

- o **LETTER DISTRIBUTED ON OCTOBER 19 ASSIGNED SAIC/PROJECT RESPONSIBILITIES FOR PREPARATION OF NEW MATERIAL FOR SCHEDULE/MILESTONE SECTIONS**
- o **DRAFT INPUT FOR EACH 8.3 SECTION DUE ON OCTOBER 28**

## STATUS OF SCP (CONTINUED)

- o DRAFT INPUT WILL BE REWORKED FROM OCTOBER 28 THROUGH NOVEMBER 5 TO PREPARE INFORMATION FOR FINAL PRODUCTION AS PART OF THE CONCURRENCE COPY OF THE CONSULTATIVE DRAFT
- o OCTOBER 19 LETTER REQUESTED ONE-DAY NNWSI PROJECT WORKSHOP ON NOVEMBER 6 AT SAIC TO REVIEW AND APPROVE THE FINAL SCHEDULE/MILESTONE INPUT
- o APPROVED SCHEDULE/MILESTONE SECTIONS WILL BE ADDED TO 8.3 SECTIONS ALREADY IN CAMERA-READY PRODUCTION

## STUDY PLAN STATUS

### o EXPLORATORY SHAFT CONSTRUCTION PHASE STUDY PLANS

#### - EXCAVATION INVESTIGATIONS

REVISED TEXT SUBMITTED FOR OGR APPROVAL 9/87  
INITIAL COMMENTS WERE ADEQUATELY RESOLVED  
37 ADDITIONAL COMMENTS RECEIVED

- CHARACTERIZATION OF PERCOLATION IN THE UNSATURATED ZONE  
COMMENT RESOLUTION MEETING 10/19-10/20  
APPROXIMATELY 150 COMMENTS RESOLVED

- CHARACTERIZATION OF STRUCTURAL FEATURES  
COMMENT RESOLUTION MEETING 10/21-10/22  
APPROXIMATELY 110 COMMENTS RESOLVED

## STUDY PLAN STATUS (CONTINUED)

### - CHLORINE 36

COMMENT RESOLUTION MEETING TENTATIVELY SCHEDULED FOR  
10/30/87

### - CHARACTERIZATION OF AMBIENT STRESS

COMMENT RESOLUTION MEETING TENTATIVELY SCHEDULED FOR  
THE WEEK OF 11/30



## **STUDY PLAN STATUS (CONTINUED)**

### **CONCERNS WITH STUDY PLAN REVIEW PROCESS**

- o **NEED TO REEVALUATE OGR REVIEW PROCEDURE**
- o **NEED TO REEVALUATE SCHEDULE FOR STUDY PLAN DEVELOPMENT**

# AGENDA

## NNWSI PROJECT MANAGER-TECHNICAL PROJECT OFFICER MEETING

N-AD-028  
/86

LOCATION: 101 Convention Center Drive

PAGE: 1

Las Vegas, Nevada

DATE: NOV 23-24, 1987

TIME	WHAT	HOW	WHO	EXPECTED OUTCOME	REF. MATERIAL & COMMENTS
Monday November 23 1:00- 1:15	INTRODUCTIONS/ROLES -AGENDA/OUTCOME  -MINUTES-SEPTEMBER & OCTOBER	'ROUND THE ROOM REVIEW, ADJUST, AGREE  CORRECT AND/OR APPROVE	ALL JOY/ALL  JOY/ALL	AGREED-UPON AGENDA & OUTCOMES APPROVED MINUTES	MINUTES SENT 10/26 & 10/29
1:15- 1:45	MANAGER FYIs -BUDGET -LEGISLATIVE UPDATE	PRESENT CURRENT STATUS	CARL	UNDERSTAND CURRENT STATUS	
1:45- 2:45	FYIs	PRESENT FYIs (5 MIN EACH) 'ROUND THE TABLE	TPOs/BR.CHFS	UNDERSTAND CURRENT STATUS	
2:45- 3:00	NRC OPEN ITEMS	PRESENT STATUS OF OPEN ACTION ITEMS	DAVE D.	UNDERSTAND STATUS AND WHAT ACTIONS ARE BEING TAKEN TO RESOLVE OPEN ITEMS	
3:00- 3:15	BREAK				
3:15- 3:45	SCP	STATUS OF SCP -CONCURRENCE DRAFT -TECHNICAL WORKSHOPS	MAX/JEAN		

# AGENDA

## NNWSI PROJECT MANAGER-TECHNICAL PROJECT OFFICER MEETING

N-AD-028  
/86

LOCATION: 101 Convention Center Drive

PAGE: 2

Las Vegas, Nevada

DATE: NOV 23-24, 1987

TIME	WHAT	HOW	WHO	EXPECTED OUTCOME	REF. MATERIAL & COMMENTS
Monday November 23 3:45- 4:00	SEMP	PRESENT STATUS; RESULTS OF COMMENT RESOLUTION MEETING	JOHN ROBSON	UNDERSTAND STATUS	
4:00- 4:15	STOP WORK ORDERS	PRESENT STATUS	JIM B.	UNDERSTAND STATUS	
4:15- 4:30	BLM RIGHT OF WAY AGREEMENT	STATUS OF AGREEMENT	WENDY/CARL	UNDERSTAND STATUS OF BLM AGREEMENT	
4:30- 4:45	PUBLIC OUTREACH	PRESENT SUMMARY OF PROJECT OUTREACH ACTIVITIES	CARL	UNDERSTAND EFFORTS BEING MADE TO INFORM PUBLIC (PROACTIVITY)	
4:45- 5:30	OPEN ITEMS				

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PROJECT

**YUCCA MOUNTAIN**

## STATUS OF WASTE LEGISLATION

I. LATEST SENATE ACTION

II. LATEST HOUSE ACTION

III. FUTURE ACTION

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## STATUS OF WASTE LEGISLATION

### I. SENATE ACTION

- o ENERGY AND WATER APPROPRIATION PASSED BY SENATE ON 11/18/87 [VOTE WAS 86 TO 9]
  - \$360M FOR WASTE PROGRAM
- o INCORPORATES JOHNSTON BILL, S.1668, WHICH WAS APPROVED ON 11/12/87
  - SELECT ONE SITE FOR CHARACTERIZATION BY 1/89
  - INCENTIVE PROGRAM
  - OTHER AMENDMENTS (TRANSPORTATION, REPROCESSING)
  - DOES NOT INCLUDE PROVISION FOR SURFACE BASED TESTING AT 2 REMAINING SITES
- o BREAUX/SIMPSON BILL REJECTED [VOTE 61 TO 34]
  - REQUIRED SITE SELECTION BY 1/91

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MOUNTAIN**

## STATUS OF WASTE LEGISLATION

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### II. HOUSE ACTION

- o UDALL BILL, HR 2967, PASSED BY COMMITTEE ON INTERIOR AND INSULAR AFFAIRS ON 10/28/87
  - POLICY REVIEW COMMISSION
  - 18-MO MORATORIUM ON SHAFT DRILLING
  - NEGOTIATOR TO FIND WILLING HOST FOR MRS/REPOSITORY
- o HR 2967 REFERRED TO ANOTHER HOUSE COMMITTEE FOR JOINT CONSIDERATION
  - SHARP (SUBCOMMITTEE ON ENERGY AND POWER)
  - DINGELL (COMMITTEE ON ENERGY AND COMMERCE)
- o SHARP MARK-UP IMMINENT
  - PROPOSES INCREASED ROLE OF REVIEW COMMISSION
  - REMOVES WORDING ON MRS

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## STATUS OF WASTE LEGISLATION

### III. FUTURE ACTIONS

- o JOINT CONFERENCE BETWEEN HOUSE AND SENATE ON ENERGY AND WATER APPROPRIATION
  - KEY MECHANISM FOR "COMPROMISE" ON WASTE PROGRAM
  - EXPECTED AROUND DECEMBER OR JANUARY
- o CONTRARY TO NORMAL PROCEDURE, HR 2967 NOT LIKELY TO GO TO FULL HOUSE FOR VOTE BEFORE CONFERENCE
  - HOWEVER, HOUSE CONFEREES WILL USE HR 2967 AS NEGOTIATING MECHANISM WITH SENATE
  - UDALL EXPECTED TO BE INVOLVED IN CONFERENCE

## **SEMP STATUS**

- o **ISSUED FOR PROJECT REVIEW ON 10/26**
  - **WMPO STAFF**
  - **SNL, LLNL, LANL, USGS**
- o **COMMENT RESOLUTION MEETING HELD ON 11/12 & 11/13**
  - **APPROXIMATELY 160 COMMENTS**
  - **ALL COMMENTS RESOLVED TO SATISFACTION OF REVIEWERS**
    - 145 ACCEPTED**
    - 9 REJECTED/REVIEWER ACCEPTANCE**
    - 6 WITHDRAWN BY REVIEWERS**
- o **INCORPORATE RESOLVED COMMENTS DURING THE WEEK OF 11/16**
- o **SUBMIT FOR WMPO APPROVAL & SUBSEQUENT SUBMITTAL BY WMPO FOR OGR REVIEW & APPROVAL ON 11/23**



## **MAJOR COMMENTS**

### **o ROLE AND RESPONSIBILITY OF THE SEIG**

#### **- ELIMINATED SEIG**

- SEMP RECOGNIZES THE NEED FOR A GROUP TO ADVISE WMPO ON SYSTEMS ENGINEERING ACTIVITIES (WITHIN PARTICIPANT ORGANIZATION BY INDIVIDUAL MEMBER AND AT THE PROJECT LEVEL AS A GROUP)**

### **o DETAIL OF INFORMATION IN THE SEMP**

- "WHAT" INFORMATION IS PROVIDED IN THE SEMP**
- "HOW" INFORMATION WILL BE PROVIDED IN IMPLEMENTING PROCEDURES**

November 23, 1987

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## RECENT WMPO PUBLIC AFFAIRS ACTIVITIES

### PROFESSIONAL MEETINGS

November 9-13	University of Nevada-Reno Seminar on Late Cenozoic Evolution of Southern Great Basin and Workshop	Reno, NV	S. Mattson, SAIC
December, 1987	American Geophysics Union	San Francisco	S. Mattson, SAIC

### COORDINATING GROUP

December 1-3	Institutional Socioeconomic Coordinating Group	Las Vegas, Nevada
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### PUBLIC INTERACTIONS

September 25	Presentation at PRSA Meeting	Las Vegas, Nevada	C. Gertz, WMPO
October 17	Presentation at Sigma Delta Chi Meeting	Las Vegas, Nevada	C. Gertz, WMPO
October 20	Presentation at the NV Legislative Committee on High-Level Radioactive Waste Meeting	Reno, Nevada	C. Gertz, WMPO
October 22	Presentation at Chamber of Commerce (Henderson)	Henderson, Nevada	C. Gertz, WMPO
October 26	Presentation at Southwest Rotary Meeting	Las Vegas, Nevada	C. Gertz, WMPO
November 11	Presentation on "Silver State" (PBS Public Affairs Interview Show)	Reno, Nevada	C. Gertz, WMPO
November 20	Presentation at Lake Mead Chapter of the Health Physics Society Meeting	Las Vegas, Nevada	C. Gertz, WMPO

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**NRC ACTION ITEMS  
AND  
INFORMATION REQUESTS**

**TPO  
11/23/87**

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**YUCCA MOUNTAIN**

## OVERALL STATUS

### ESF

TOTAL - 66

TOTAL CLOSED - 25

TOTAL OPEN - 41

[29 SHORT TERM, 9 LONG TERM, 3 NRC]

### OTHER

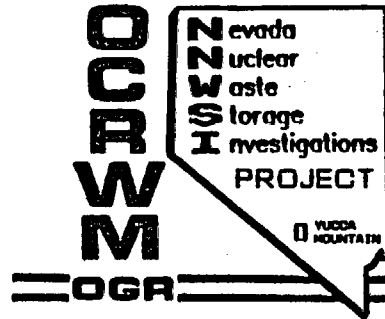
ACRS QUESTIONS

VOLCANISM CONCERNS OF NRC

NRC QUESTIONS ON SOUTHERN DRIFTING FROM ESF

NRC REQUESTS FOR DRAFT RIB AND SEPDB CATALOG

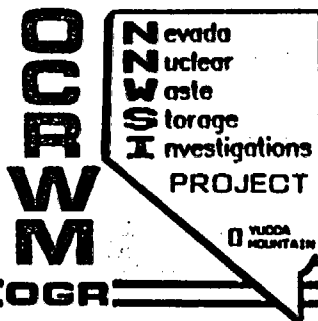
TPO  
11/23/87



## ACTIONS SINCE SEPTEMBER TPO MEETING REPORT

### PROPOSED CLOSURES

- o LETTER - GERTZ TO LINEHAN, DATED 10/16/87  
[WMPO:DHI-130]  
PROPOSED CLOSURE FOR 487AI 3 (DRIFT STABILITY)
  
- o LETTER - GERTZ TO LINEHAN, DATED 10/29/87  
[WMPO:DHI-167]  
PROPOSED CLOSURES FOR 487IR 1b; 111a,c; IV;  
Vb,c (SHAFT TEST IMPACTS, DRIFT CONSTRUCTION,  
REMEDIAL ACTIONS, CONSTRUCTION/TEST  
INTERFERENCE, SHAFT WALL DAMAGE)
  
- o LETTER - GERTZ TO LINEHAN, DATED 9/18/87  
[WMPO:LPS:2751]  
PROPOSED CLOSURES FOR 483IR 1f AND 885AI 20  
(G-4 HISTORY)

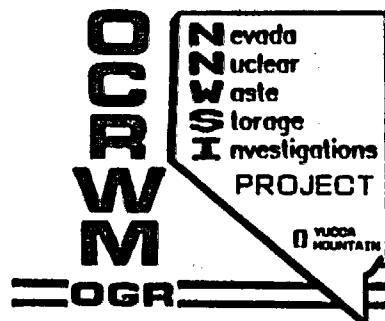


## ACTIONS SINCE SEPTEMBER TPO MEETING REPORT (CONT)

### HQ REVIEW/PARTICIPANT ACTION

- o LETTER - BLANCHARD TO KNIGHT, DATED 11/19/87  
[WMPO:MBB-473]  
PROPOSED CLOSURES FOR ACRS QUESTIONS
- o LETTER - BLANCHARD TO KNIGHT, DATED 11/10/87  
[WMPO:MBB-341]  
PROPOSED CLOSURE TO NRC VOLCANISM CONCERNS
- o DRAFT NRC  
LETTER - SUBMITTED TO HQ FOR COMMENT 9/21/87  
PROPOSED CLOSURE FOR NRC SOUTHERN DRIFTING  
CONCERNS
- o LETTER - GERTZ TO HUNTER, DATED 11/10/87  
[WMPO:LPS-356]  
REQUESTS DRAFT RIB AND SEPDB CATALOG  
COPIES FROM SNL TO SEND TO NRC

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UPCOMING  
MONTHLY ACTIONS  
[BASED ON REVISED STRATEGIES & STATUS REPORTS]

DECEMBER 1987

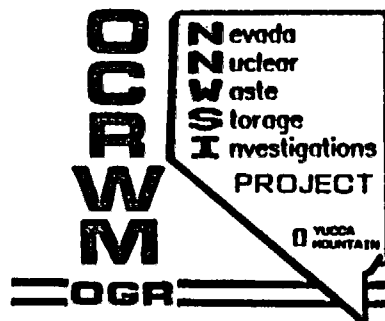
- o QA ACTION ITEM [483IR V1b1] - ESF CONSTRUCTION/  
TESTING QA PROCEDURES SCHEDULE

JANUARY 1988

- o DRIFT SIZE RATIONALE [487AI 2]
- o REPRESENTATIVENESS DOCUMENT [885AI 7 AND 12]
- o TITLE I DESIGN SCHEDULE [885AI 21]
- o SCP/STUDY PLAN LETTERS [885AI 14 AND 24;  
483IR 1e AND Va]\* - ESF TESTING LAYOUT, PERCHED WATER  
TESTS, SHAFT TESTS AND TEST LOCATIONS, SEALING DATA

\* BASED ON SCP CONSULTATIVE DRAFT TO NRC - 1/11/88

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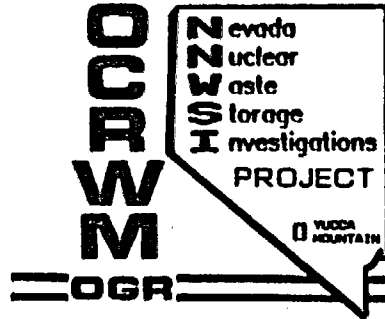
UPCOMING  
MONTHLY ACTIONS  
CONTINUED

FEBRUARY 1988

- o PERFORMANCE ANALYSIS DOCUMENT
- o VARIOUS SNL LETTER REPORTS
- o FINAL DESIGN REQUIREMENTS DOCUMENT

[4871R Ia, IIb, Va 1; 885A1 6, 22, 23;  
4831R Ia,b,d, IIIa,b,c, IVc] - FLOODING/EROSION,  
PERFORMANCE ANALYSIS ON 12 FOOT SHAFT, DAMAGE AROUND  
OPENINGS, LINER REMOVAL, SEALING MATERIALS,  
PLACEMENT, TESTS





## NRC ACTION ITEM WORK DELAYS

### I&MSS

- o ACTION ITEMS RE: STUDY PLANS
  - COMPLETION DATES CHANGED FROM 8/87 TO 1/88
  - DELAY DUE TO DIVERSION OF STAFF RESOURCES  
(TO WORK ON THE SCP)

### SNL

- o PERFORMANCE ANALYSIS AND VARIOUS LETTER REPORTS
  - COMPLETION DATES CHANGED FROM  
9/11/87 (PERF. ANAL.)  
10/9/87 AND 11/15/87 (LETTER REPORTS) TO 2/88
  - DELAYS DUE TO OUTYEAR PLANNING EXERCISE PRIORITIES

## NNWSI STUDY PLAN LIST

### EXPLANATION

STUDY PLAN # = SCP SECTION #

STUDY PLAN TITLE = SCP SECTION TITLE

### PRIORITIES FOR STUDY PLANS:

1. Exploratory Shaft - Construction Phase
2. First year
3. Second year and beyond
4. Pre-SCP (includes ongoing)

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.2.1.1	Study: Characterization of the meteorology for regional hydrology 8.3.1.2.1.1.1 Activity: Precipitation and meteorological monitoring	USGS	4	TBD
8.3.1.2.1.2	Study: Characterization of runoff and streamflow 8.3.1.2.1.2.1 Activity: Surface-water runoff monitoring 8.3.1.2.1.2.2 Activity: Transport of debris by severe runoff	USGS	4	01-04-88
8.3.1.2.1.3	Study: Characterization of the ground-water flow system 8.3.1.2.1.3.1 Activity: Assessment of regional hydrogeologic data needs in the saturated zone 8.3.1.2.1.3.2 Activity: Regional potentiometric level studies 8.3.1.2.1.3.3 Activity: Fortymile Wash recharge study 8.3.1.2.1.3.4 Activity: Evapotranspiration studies 8.3.1.2.1.3.5 Activity: Regional hydrochemical tests and analyses	USGS	4	12-14-87
8.3.1.2.1.4	Study: Regional hydrologic system synthesis and modeling 8.3.1.2.1.4.1 Activity: Conceptualization of regional hydrologic flow models 8.3.1.2.1.4.2 Activity: Subregional two-dimensional areal hydrologic modeling 8.3.1.2.1.4.3 Activity: Subregional two-dimensional cross-section hydrologic modeling 8.3.1.2.1.4.4 Activity: Regional three-dimensional hydrologic modeling	USGS	2	09-01-88
8.3.1.2.2.1	Study: Characterization of unsaturated-zone infiltration 8.3.1.2.2.1.1 Activity: Characterization of hydrologic properties of surficial material 8.3.1.2.2.1.2 Activity: Evaluation of natural infiltration 8.3.1.2.2.1.3 Activity: Evaluation of artificial infiltration	USGS	4	12-04-87
8.3.1.2.2.2	Study: Water movement tracer tests using chloride and chlorine-36 measurements of infiltration at Yucca Mountain 8.3.1.2.2.2.1 Activity: Chloride and chlorine-36 measurement of percolation at Yucca Mountain	LANL	1	09-24-87 (IN REVIEW)
8.3.1.2.2.3	Study: Characterization of percolation in the unsaturated zone—surface-based study 8.3.1.2.2.3.1 Activity: Matrix hydrologic properties testing 8.3.1.2.2.3.2 Activity: Site vertical borehole studies 8.3.1.2.2.3.3 Activity: Solitario Canyon horizontal borehole study	USGS	4	12-11-87
8.3.1.2.2.4	Study: Characterization of Yucca Mountain percolation in the unsaturated zone—exploratory shaft facility investigations 8.3.1.2.2.4.1 Activity: Intact-fracture test in the exploratory shaft facility 8.3.1.2.2.4.2 Activity: Infiltration test in the exploratory shaft facility 8.3.1.2.2.4.3 Activity: Bulk-permeability test in the exploratory shaft facility	USGS	1	09-11-87 (IN REVIEW)

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
	8.3.1.2.2.4.4 Activity: Radial borehole tests in the exploratory shaft facility			
	8.3.1.2.2.4.5 Activity: Excavation effects test in the exploratory shaft facility			
	8.3.1.2.2.4.6 Activity: Calico Hills test in the exploratory shaft facility			
	8.3.1.2.2.4.7 Activity: Perched water test in the exploratory shaft facility			
	8.3.1.2.2.4.8 Activity: Hydrochemistry tests in the exploratory shaft facility			
8.3.1.2.2.5	Study: Diffusion tests in the exploratory shaft facility	LANL	2	12-21-87
	8.3.1.2.2.5.1 Activity: Diffusion tests in the exploratory shaft facility			
8.3.1.2.2.6	Study: Characterization of flux within the Paintbrush nonwelded unit in the vicinity of the Ghost Dance Fault	USGS	2	10-01-89
	8.3.1.2.2.6.1 Activity: Plan to characterize the flux within the Paintbrush nonwelded unit in the vicinity of the Ghost Dance Fault			
8.3.1.2.2.7	Study: Characterization of gaseous-phase movement in the unsaturated zone	USGS	4	12-18-87
	8.3.1.2.2.7.1 Activity: Gaseous-phase circulation study			
8.3.1.2.2.8	Study: Hydrochemical characterization of the unsaturated zone	USGS	4	05-01-88
	8.3.1.2.2.8.1 Activity: Gaseous-phase chemical investigations			
	8.3.1.2.2.8.2 Activity: Aqueous-phase chemical investigations			
8.3.1.2.2.9	Study: Unsaturated-zone flow and transport modeling	USGS	2	10-01-88
	8.3.1.2.2.9.1 Activity: Preliminary numerical modeling of the site hydrogeologic system			
	8.3.1.2.2.9.2 Activity: Simulation of the natural hydrogeologic system			
	8.3.1.2.2.9.3 Activity: Stochastic modeling and uncertainty analysis			
8.3.1.2.2.10	Study: Unsaturated-zone system analysis and integration	USGS	2	12-01-88
	8.3.1.2.2.10.1 Activity: Conceptualization of the unsaturated-zone hydrologic flow system			
	8.3.1.2.2.10.2 Activity: Numerical simulation of the concepts			
	8.3.1.2.2.10.3 Activity: System integration: Definition of flow paths and calculation of fluxes and velocities within the unsaturated zone			
8.3.1.2.3.1	Study: Characterization of the site saturated-zone ground-water flow system	USGS	4	06-01-88
	8.3.1.2.3.1.1 Activity: Solitario Canyon fault study in the saturated zone			
	8.3.1.2.3.1.2 Activity: Site potentiometric-level evaluation			
	8.3.1.2.3.1.3 Activity: Analysis of previously completed hydraulic-stress tests			

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8.3.1.2 GEOHYDROLOGY PROGRAM

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.2.3.1.4	Activity: Multiple-well interference testing			
8.3.1.2.3.1.5	Activity: Testing of the C-hole sites with conservative tracers			
8.3.1.2.3.1.6	Activity: Well testing with conservative tracers throughout the site			
8.3.1.2.3.1.7	Activity: Testing of the C-hole sites with reactive tracers			
8.3.1.2.3.1.8	Activity: Well testing with reactive tracers throughout the site			
8.3.1.2.3.2	Study: Characterization of the site saturated zone hydrochemistry	USGS	2	01-01-89
8.3.1.2.3.2.1	Activity: Assessment of site hydrochemical data availability and needs			
8.3.1.2.3.2.2	Activity: Hydrochemical characterization of water in the upper part of the saturated zone at the site			
8.3.1.2.3.3	Study 1.13.3.3: Saturated zone hydrologic system synthesis and modeling	USGS	2	02-01-89
8.3.1.2.3.3.1	Activity: Conceptualization of saturated zone flow models within the boundaries of the accessible environment			
8.3.1.2.3.3.2	Activity: Development of fracture network model			
8.3.1.2.3.3.3	Activity: Calculation of flow paths, fluxes, and velocities within the saturated zone to the accessible environment			

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.3.1.1	Study: Ground-water chemistry model	LANL	3	TBD
8.3.1.3.2.1	Study: Three-dimensional mineral distribution at Yucca Mountain	LANL	4	12-21-87
8.3.1.3.2.1.1	Activity: Petrologic stratigraphy of the Topopah Spring Member			
8.3.1.3.2.1.2	Activity: Mineral distributions between the host rock and the accessible environment			
8.3.1.3.2.1.3	Activity: Fracture mineralogy			
8.3.1.3.2.2	Study: History of mineralogic and geochemical alteration of Yucca Mountain	LANL	4	12-21-87
8.3.1.3.2.2.1	Activity: History of mineralogic and geochemical alteration of Yucca Mountain			
8.3.1.3.2.2.2	Activity: Smectite, zeolite, and manganese minerals, glass dehydration and transformation			
8.3.1.3.2.2.2.1	Long-Term Heating Experiments in Unsaturated to Saturated Conditions			
8.3.1.3.3.1	Study: Natural analog of hydrothermal systems in tuff	LANL	3	TBD
8.3.1.3.3.1.1				
8.3.1.3.3.2	Study: Kinetics and thermodynamics of mineral evolution	LANL	4	12-20-87
8.3.1.3.3.2.1	Activity: Kinetic studies of zeolite and related framework silicates			
8.3.1.3.3.2.2	Activity: Determination of end-member free energies for clinoptilolite, heulandite, albite, and analcime			
8.3.1.3.3.2.3	Activity: Solid solution description of clinoptilolite/heulandite and analcime			
8.3.1.3.3.3	Study: Conceptual model of mineral evolution	LANL	4	12-20-87
8.3.1.3.4.1	Study: Batch sorption studies	LANL	4	TBD
8.3.1.3.4.1.1	Activity: Batch sorption measurements as a function of solid phase composition			
8.3.1.3.4.1.2	Activity: Sorption as a function of sorbing element concentrations (isotherms)			
8.3.1.3.4.1.3	Activity: Sorption as a function of ground-water composition			
8.3.1.3.4.1.4	Activity: Sorption on particulates and colloids			
8.3.1.3.4.1.5	Activity: Statistical analysis of sorption data			
8.3.1.3.4.2	Study: Biological sorption and transport	LANL	4	12-11-87
8.3.1.3.4.2.1				
8.3.1.3.4.3	Study: Development of sorption models (isotherms)	LANL	4	12-30-87
8.3.1.3.5.1	Study: Dissolved species concentration limits	LANL	4	12-30-87
8.3.1.3.5.1.1	Activity: Solubility measurements			
8.3.1.3.5.1.2	Activity: Speciation measurements			

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
	8.3.1.3.5.1.3 Activity: Solubility modeling			
8.3.1.3.5.2	Study: Colloid behavior	LANL	4	12-30-87
	8.3.1.3.5.2.1 Activity: Colloid formation characterization and stability			
	8.3.1.3.5.2.2 Colloid Modeling			
8.3.1.3.6.1	Study: Dynamic transport column experiments	LANL	4	12-30-87
	8.3.1.3.6.1.1 Activity: Crushed tuff column experiments			
	8.3.1.3.6.1.2 Activity: Mass transfer kinetics			
	8.3.1.3.6.1.3 Activity: Unsaturated tuff columns			
	8.3.1.3.6.1.4 Activity: Fractured tuff column studies			
	8.3.1.3.6.1.5 Activity: Filtration			
8.3.1.3.6.2	Study: Diffusion	LANL	4	12-30-87
	8.3.1.3.6.2.1 Activity: Uptake of radionuclides on rock beakers in a saturated system			
	8.3.1.3.6.2.2 Activity: Diffusion through a saturated tuff slab			
	8.3.1.3.6.2.3 Activity: Diffusion in an unsaturated tuff block			
8.3.1.3.7.1	Study: Retardation sensitivity analysis	LANL	4	01-15-88
	8.3.1.3.7.1.1 Activity: Analysis of physical/chemical processes affecting transport			
	8.3.1.3.7.1.2 Activity: Geochemical/geophysical model of Yucca Mountain and integrated geochemical transport calculations			
	8.3.1.3.7.1.3 Activity: Transport models and related support			
8.3.1.3.7.2	Study: Demonstration of applicability of laboratory data to repository transport calculations	LANL	3	TBD
8.3.1.3.8.1	Study: Gaseous radionuclide transport calculations and measurements	LANL	3	TBD
	8.3.1.3.8.1.1 Activity: Physical transport mechanisms and rates—retardation mechanisms and transport with retardation			
	8.3.1.3.8.1.2 Activity: Gas transport measurements			

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8.3.1.4 ROCK CHARACTERISTICS PROGRAM (POSTCLOSURE)

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.4.2.1	Study: Characterization of the vertical and lateral distribution of stratigraphic units within the site area	USGS	2	05-01-88
8.3.1.4.2.1.1	Activity: Surface and subsurface stratigraphic studies of the host rock and surrounding units			
8.3.1.4.2.1.2	Activity: Surface-based geophysical surveys			
8.3.1.4.2.1.3	Activity: Borehole geophysical surveys			
8.3.1.4.2.1.4	Activity: Petrophysical properties testing			
8.3.1.4.2.1.5	Activity: Magnetic properties and stratigraphic correlations			
8.3.1.4.2.2	Study: Characterization of the structural features within the site area	USGS	1	09-11-87
8.3.1.4.2.2.1	Activity: Geologic mapping of zonal features in the Paintbrush Tuff at a scale of 1:12,000			(IN REVIEW)
8.3.1.4.2.2.2	Activity: Surface-fracture network studies			
8.3.1.4.2.2.3	Activity: Borehole evaluation of faults and fractures			
8.3.1.4.2.2.4	Activity: Geologic mapping of the exploratory shaft and drifts			
8.3.1.4.2.2.5	Activity: Seismic tomography/vertical seismic profiling studies			
8.3.1.4.2.3	Study: Three-dimensional geologic model	USGS	2	08-01-89
8.3.1.4.2.3.1	Activity: Development of a three-dimensional geologic model of the site area			
8.3.1.4.3.1	Study: Systematic acquisition of site-specific subsurface information	SNL	3	TBD
8.3.1.4.3.1.1	Activity: Systematic drilling program			
8.3.1.4.3.2	Study: Three-dimensional rock characteristics models	SNL	3	12-01-88
8.3.1.4.3.2.1	Activity: Development of three-dimensional models of rock characteristics at the repository site			



Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.5.1.1	Study: Characterization of modern regional climate 8.3.1.5.1.1.1 Activity: Synoptic characterization of regional climate	USGS	2	06-01-88
8.3.1.5.1.2	Study: Paleoclimate study: lake, playa, marsh deposits 8.3.1.5.1.2.1 Activity: Paleontologic analyses 8.3.1.5.1.2.2 Activity: Analysis of the stratigraphy-sedimentology of marsh lacustrine and playa desposits 8.3.1.5.1.2.3 Activity: Geochemical analyses of lake, marsh, and playa deposits 8.3.1.5.1.2.4 Activity: Chronologic analyses of lake playa and marsh deposits	USGS	2	12-14-87
8.3.1.5.1.3	Study: Climatic implications of terrestrial paleoecology 8.3.1.5.1.3.1 Activity: Analysis of pack rat middens 8.3.1.5.1.3.2 Activity: Analysis of pollen samples 8.3.1.5.1.3.3 Activity: Determination of vegetable-climate relationships	USGS	2	12-14-87
8.3.1.5.1.4	Study: Analysis of the paleoenvironmental history of the Yucca Mountain region 8.3.1.5.1.4.1 Activity: Modeling of soil properties in the Yucca Mountain region 8.3.1.5.1.4.2 Activity: Soil moisture analog study 8.3.1.5.1.4.3 Activity: Surficial desposits mapping of the Yucca Mountain area 8.3.1.5.1.4.4 Activity: Eolian history of the Yucca Mountain region	USGS	4	01-01-88
8.3.1.5.1.5	Study: Paleoclimate-paleoenvironmental synthesis 8.3.1.5.1.5.1 Activity: Paleoclimate-paleoenvironmental synthesis	USGS	3	07-01-88
8.3.1.5.1.6	Study: Characterization of the future regional climate and environments 8.3.1.5.1.6.1 Activity: Global climate modeling 8.3.1.5.1.6.2 Activity: Regional climate modeling 8.3.1.5.1.6.3 Activity: Linked global-regional climate modeling 8.3.1.5.1.6.4 Activity: Empirical climate modeling	USGS	3	09-01-89
8.3.1.5.2.1	Study: Characterization of the Quaternary regional hydrology 8.3.1.5.2.1.1 Activity: Regional paleoflood evaluation 8.3.1.5.2.1.2 Activity: Quaternary unsaturated zone hydrochemical analysis 8.3.1.5.2.1.3 Evaluation of Past Discharge Areas 8.3.1.5.2.1.4 Activity: Analog recharge studies 8.3.1.5.2.1.5 Activity: Studies of calcite and opaline silica vein deposits	USGS	4	12-04-87
8.3.1.5.2.2	Study: Characterization of the future regional hydrology due to climate changes 8.3.1.5.2.2.1 Activity: Analysis of future surface hydrology due to climate changes	USGS	3	11-01-89

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8.3.1.5 CLIMATE PROGRAM

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.5.2.2.2	Activity: Analysis of future unsaturated zone hydrology due to climate changes			
8.3.1.5.2.2.3	Activity: Synthesis of effects of possible future recharge due to climate changes on hydrologic characteristics of the Yucca Mountain saturated zone			

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.6.1.1	Study: Distribution and characteristics of present and past erosion 8.3.1.6.1.1.1 Activity: Development of a geomorphic map of Yucca Mountain 8.3.1.6.1.1.2 activity: Analysis of the downcutting history of Fortymile Wash and its tributaries 8.3.1.6.1.1.3 Activity: An analysis of hillslope erosion at Yucca Mountain	USGS	3	10-01-89
8.3.1.6.2.1	Study: Influence of future climatic conditions or locations and rates of erosion 8.3.1.6.2.1.1 Activity: Synthesis and data evaluation of impact of future climatic conditions on locations and rates of erosion	USGS	3	10-01-89
8.3.1.6.3.1	Study: Evaluation of the effects of future tectonic activity on erosion at Yucca Mountain 8.3.1.6.3.1.1 Activity: Synthesis and data evaluation of the impact of future uplift or subsidence and faulting on erosion at Yucca Mountain and vicinity	USGS	3	11-01-89
8.3.1.6.4.1	Study: Development of a topical report to address the effects of erosion on the hydrologic, geochemical, and rock characteristics at Yucca Mountain	USGS	3	12-01-89

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8.3.1.8 TECTONICS PROGRAM (POSTCLOSURE)

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.8.1.1	Study: Probability of a volcanic eruption penetrating the repository 8.3.1.8.1.1.1 Activity: Location and timing of volcanic events 8.3.1.8.1.1.2 Activity: Evaluation of the structural controls of basaltic volcanic activity 8.3.1.8.1.1.3 Activity: Presence of magma bodies in the vicinity of the site 8.3.1.8.1.1.4 Activity: Probability calculations and assessment	LANL	4	12-19-87
8.3.1.8.1.2	Study: Effects of a volcanic eruption penetrating the repository 8.3.1.8.1.2.1 Activity: Effects of strombolian eruptions 8.3.1.8.1.2.2 Activity: Effects of hydrovolcanic eruptions	LANL	4	12-19-87
8.3.1.8.2.1	Study: Analysis of waste package rupture due to tectonic processes and events 8.3.1.8.2.1.1 Activity: Assessment of waste package rupture due to igneous intrusion 8.3.1.8.2.1.2 Activity: Calculation of the number of waste packages intersected by a fault 8.3.1.8.2.1.3 Activity: Probability and rate of faulting 8.3.1.8.2.1.4 Activity: Assessment of waste package rupture due to faulting 8.3.1.8.2.1.5 Activity: Assessment of postclosure groundmotion in the subsurface 8.3.1.8.2.1.6 Activity: Nature, age, and rate of folding and deformation in the repository horizon 8.3.1.8.2.1.7 Activity: Assessment of waste package rupture due to folding and deformation	SAIC	3	TBD
8.3.1.8.3.1	Study: Analysis of the effects of tectonic processes events on average percolation flux rates over the repository 8.3.1.8.3.1.1 Activity: Annual probability of volcanic or igneous events in the controlled area 8.3.1.8.3.1.2 Activity: Assessment of the effects of igneous intrusions and volcanic events on flux rates 8.3.1.8.3.1.3 Activity: Faulting rates, recurrence intervals, and probable cumulative offset in 10,000 years 8.3.1.8.3.1.4 Activity: Effects of faulting on average flux rates 8.3.1.8.3.1.5 Activity: Assessment of the effects of faulting on flux rates 8.3.1.8.3.1.6 Activity: Uplift rates in the controlled area 8.3.1.8.3.1.7 Activity: Assessment of the effects of folding, uplift, and subsidence on flux rates	SAIC	3	TBD
8.3.1.8.3.2	Study: Analysis of the effect of tectonic processes and events on changes in water-table elevation 8.3.1.8.3.2.1 Activity: Thermal and barrier-to-follow effects of igneous intrusions on water-table elevation 8.3.1.8.3.2.2 Activity: Assessment of the effects of igneous intrusions on water-table levels	SAIC	3	TBD

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
	8.3.1.8.3.2.3 Activity: Assessment of the effect of strain changes on water-table elevation			
	8.3.1.8.3.2.4 Activity: Assessment of the effect of folding, uplift, or subsidence on water-table elevation			
	8.3.1.8.3.2.5 Activity: Effects of faulting on water-table elevation			
	8.3.1.8.3.2.6 Activity: Assessment of the effects of faulting on water-table elevation			
8.3.1.8.3.3	Study: Analysis of the effects of tectonic processes and events on local fracture permeability and effective porosity	SAIC	3	TBD
	8.3.1.8.3.3.1 Activity: Assessment of the effects of igneous intrusions on local fracture permeability and effective porosities			
	8.3.1.8.3.3.2 Activity: Assessment of the effects of faulting on local fracture permeability and effective porosities			
	8.3.1.8.3.3.3 Activity: Assessment of the effects of stress or strain on hydrologic properties of the rock mass			
8.3.1.8.4.1	Study: Analysis of the effects of tectonic processes and events on rock geochemical properties	SAIC	3	TBD
	8.3.1.8.4.1.1 Activity: Assessment of the change in rock geochemical properties due to igneous intrusions			
	8.3.1.8.4.1.2 Activity: Assessment of the degree of mineral change along fault zones in 10,000 years			
	8.3.1.8.4.1.3 Activity: Assessment of the effects of fault offset on travel pathway			
	8.3.1.8.4.1.4 Activity: Assessment of the degree of mineral change in the controlled area resulting from tectonically induced change in water-table levels			
8.3.1.8.5.1	Study: Characterization of volcanic features	LANL	4	12-19-87
	8.3.1.8.5.1.1 Activity: Volcanism drillholes			
	8.3.1.8.5.1.2 Activity: Geochronology studies			
	8.3.1.8.5.1.3 Activity: Field geologic studies			
	8.3.1.8.5.1.4 Activity: Geochemistry of scoria sequences			
	8.3.1.8.5.1.5 Activity: Geochemical cycles of basaltic volcanic fields			
8.3.1.8.5.2	Study: Characterization of igneous intrusive features	USGS	3	08-01-88
	8.3.1.8.5.2.1 Activity: Evaluation of depth of curie temperature isotherm			
	8.3.1.8.5.2.2 Activity: Chemical and physical changes around dikes			
	8.3.1.8.5.2.3 Activity: Heat flow at Yucca Mountain and evaluation of regional ambient heat flow and local heat flow anomalies			
8.3.1.8.5.3	Study: Investigation of folds in Miocene and younger rocks of region	USGS	3	01-01-90
	8.3.1.8.5.3.1 Activity: Evaluation of folds in Neogene rocks of the region			

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.9.1.1	Study: An evaluation of natural processes that could affect the long-term survivability of the surface marker system at Yucca Mountain	SAIC	3	03-01-88
8.3.1.9.1.1.1	Activity: Synthesis of tectonic, seismic, and volcanic hazards data from other site characterization activities			
8.3.1.9.1.1.2	Activity: Synthesis: Evaluation of the effects of future erosion and deposition on the survivability of the marker system at Yucca Mountain			
8.3.1.9.2.1	Study: Natural resource assessment of Yucca Mountain, Nye County, Nevada	SAIC	2	03-01-88
8.3.1.9.2.1.1	Activity: Geochemical assessment of Yucca Mountain in relation to the potential for mineralization			
8.3.1.9.2.1.2	Activity: Geophysical/geologic appraisal of the site relative to mineral resources			
8.3.1.9.2.1.3	Activity: Assessment of the potential for geothermal energy at Yucca Mountain, Nevada			
8.3.1.9.2.1.4	Activity: Assessment of hydrocarbon resources at and near the site			
8.3.1.9.2.1.5	Activity: Mineral and energy assessment of the site, comparison to known mineralized areas, and the potential for undiscovered resources and future exploration			
8.3.1.9.2.2	Study: Water resource assessment of Yucca Mountain, Nevada	SAIC	2	01-15-88
8.3.1.9.2.2.1	Activity: Projected trends in local and regional ground-water development, and estimated withdrawal rates in southern Nevada, proximal to Yucca Mountain			
8.3.1.9.3.1	Study: Evaluation of data needed to support an assessment of the likelihood of future inadvertent human intrusion at Yucca Mountain as a result of exploration and/or extraction of natural resources	SAIC	3	06-01-88
8.3.1.9.3.1.1	Activity: Compilation of data to support the assessment of calculation of the potential for inadvertent human intrusion at Yucca Mountain			
8.3.1.9.3.2	Study: An evaluation of the potential effects of exploration for or extraction of natural resources on the hydrologic characteristics at Yucca Mountain	SAIC	3	06-01-88
8.3.1.9.3.2.1	Activity: An analysis of the potential effects of future ground-water withdrawals on the hydrologic system in the vicinity of Yucca Mountain			
8.3.1.9.3.2.2	Activity: Assessment of initiating events related to human interference that are considered to be sufficiently credible or significant to warrant further investigation			

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8.3.1.12 METEOROLOGICAL PROGRAM

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.12.2.1	Study: Meteorological data collection at the Yucca Mountain site	SAIC	4	01-29-88
	8.3.1.12.2.1.1 Activity: Site meteorological monitoring program			
	8.3.1.12.2.1.2 Activity: Data summary for input to dose assessments			

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8.3.1.14 SURFACE CHARACTERISTICS PROGRAM

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.14.2.1	Study: Exploration program 8.3.1.14.2.1.1 Activity: Site reconnaissance 8.3.1.14.2.1.2 Activity: Preliminary exploration 8.3.1.14.2.1.3 Activity: Detailed exploration	SNL	3	07-31-88
8.3.1.14.2.2	Study: Laboratory tests and material property measurements 8.3.1.14.2.2.1 Activity: Physical property and index laboratory tests 8.3.1.14.2.2.2 Activity: Mechanical and dynamic laboratory property tests	SNL	3	07-31-88
8.3.1.14.2.3	Study: Field tests and characterization measurements 8.3.1.14.2.3.1 Activity: Physical property field tests and characterization measurements 8.3.1.14.2.3.2 Activity: Mechanical property field tests 8.3.1.14.2.3.3 Activity: Geophysical field measurements	SNL	3	07-31-88



Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.15.1.1	Study: Laboratory thermal properties 8.3.1.15.1.1.1 Activity: Density and porosity characterization 8.3.1.15.1.1.2 Activity: Volumetric heat capacity characterization 8.3.1.15.1.1.3 Activity: Thermal conductivity characterization	SNL	2	12-07-87
8.3.1.15.1.2	Study: Laboratory thermal expansion testing 8.3.1.15.1.2.1 Activity: Thermal expansion characterization	SNL	2	01-25-88
8.3.1.15.1.3	Study: Laboratory determination of mechanical properties of intact rock 8.3.1.15.1.3.1 Activity: Compressive mechanical properties of intact rock at baseline experiment conditions 8.3.1.15.1.3.2 Activity: Effects of variable environmental conditions on compressive mechanical properties 8.3.1.15.1.3.3 Activity: Tensile strength of unit TSw2	SNL	4	12-01-87
8.3.1.15.1.4	Study: Laboratory determination of the mechanical properties of fractures 8.3.1.15.1.4.1 Activity: Mechanical properties of fractures at baseline experiment conditions 8.3.1.15.1.4.2 Activity: Effects of variable environmental conditions on mechanical properties of fractures	SNL	2	12-01-87
8.3.1.15.1.5	Study: Excavation Investigations 8.3.1.15.1.5.1 Activity: Shaft convergence 8.3.1.15.1.5.2 Activity: Demonstration breakout rooms 8.3.1.15.1.5.3 Activity: Sequential drift mining	SNL	1	05-01-87 (IN REVIEW)
8.3.1.15.1.6	Study: In situ thermomechanical properties 8.3.1.15.1.6.1 Activity: Heater experiment in unit TSw1 8.3.1.15.1.6.2 Activity: Canister-scale heater experiment 8.3.1.15.1.6.3 Activity: Yucca Mountain heated block 8.3.1.15.1.6.4 Activity: Thermal stress measurements 8.3.1.15.1.6.5 Activity: Heated room experiment	SNL	3	06-01-88
8.3.1.15.1.7	Study: In situ mechanical properties 8.3.1.15.1.7.1 Activity: Plate loading tests 8.3.1.15.1.7.2 Activity: Rock-mass strength experiment	SNL	3	06-01-88
8.3.1.15.1.8	Study: In situ design verification 8.3.1.15.1.8.1 Activity: Mining methods 8.3.1.15.1.8.2 Activity: Monitoring ground-support systems 8.3.1.15.1.8.3 Activity: Monitoring drift stability 8.3.1.15.1.8.4 Activity: Air quality and ventilation experiment	SNL	3	03-15-88
8.3.1.15.2.1	Study: Characterization of the site ambient stress conditions 8.3.1.15.2.1.1 Activity: Anelastic strain recovery experiments in core holes 8.3.1.15.2.1.2 Activity: Overcore stress experiments in the exploratory shaft facility	USGS	1	09-24-87 (IN REVIEW)

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8.3.1.15 NWWSI SCP Study Plan Report  
ROCK CHARACTERISTICS PROGRAM (PRECLOSURE)

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.15.2.2	Study: Characterization of the site ambient thermal conditions	USGS	2	09-01-88
	8.3.1.15.2.2.1 Activity: Surface-based evaluation of ambient thermal conditions			

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.16.1.1	Study: Characterization of flood potential of the Yucca Mountain site	USGS	4	08-01-88
8.3.1.16.2.1	Study: Location of adequate water supply for construction, operation, closure, and decommissioning of a mined geologic disposal system at Yucca Mountain, Nevada	SAIC	2	01-15-88
8.3.1.16.2.1.1	Activity: Assessment of the cost, feasibility, and adequacy of wells J-12 and J-13 for use as the alternate water supply for a mined geologic disposal system at Yucca Mountain, Nevada			
8.3.1.16.2.1.2	Activity: Location of a primary water supply for a mined geologic disposal system at Yucca Mountain, Nevada			
8.3.1.16.2.1.3	Activity: Location of alternative water supplies for a mined geologic disposal system at Yucca Mountain, Nevada			
8.3.1.16.2.1.4	Activity: Identification and evaluation of potential effects of repository related withdrawals on the local flow system at Yucca Mountain, Nevada			
8.3.1.16.3.1	Study: Determination of the preclosure hydrologic conditions of the unsaturated zone at Yucca Mountain, Nevada	USGS	3	01-01-90
8.3.1.16.3.1.1	Activity: Synthesis of data from Issue 8.3.1.2 to determine the preclosure hydrologic characteristics of the unsaturated zone at Yucca Mountain, Nevada			

Study Plan/Sec Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.17.1.1	Study: Potential for ash fall at the site 8.3.1.17.1.1.1 Activity: Survey literature regarding Quaternary silicic volcanic centers in the western Great Basin 8.3.1.17.1.1.2 Activity: Assess potential ash-fall thickness at the site 8.3.1.17.1.1.3 Activity: Assess potential particle density and size distribution of ash fall at the site	LANL	2	TBD
8.3.1.17.2.1	Study: Faulting potential at the site 8.3.1.17.2.1.1 Activity: Assess the potential for surface faulting at prospective sites of surface facilities that are important to safety 8.3.1.17.2.1.2 Activity: Assess the potential for displacement on faults that intersect underground facilities	SNL	?	TBD
8.3.1.17.3.1	Study: Relevant earthquake sources 8.3.1.17.3.1.1 Activity: Identify relevant earthquake sources 8.3.1.17.3.1.2 Activity: Characterize exceptional earthquakes for relevant seismogenic sources	USGS	2	TBD
8.3.1.17.3.2	Study: Underground nuclear explosions sources 8.3.1.17.3.2.1 Activity: Determine the range of UNE sources 8.3.1.17.3.2.2 Activity: Determine maximum underground nuclear explosion source(s)	SNL	4	TBD
8.3.1.17.3.3	Study: Ground motion from regional earthquakes and underground nuclear explosions 8.3.1.17.3.3.1 Activity: Select or develop empirical models for earthquake ground motions 8.3.1.17.3.3.2 Activity: Select or develop empirical models for underground nuclear explosions	USGS	3	12-01-88
8.3.1.17.3.4	Study: Effects of local site geology on surface and subsurface motions 8.3.1.17.3.4.1 Determine Site Effects from Ground Motion Recordings 8.3.1.17.3.4.2 Activity: Model site effects using the wave properties of local geology	USGS	2	01-01-89
8.3.1.17.3.5	Study: Ground motion at the site from controlling seismic events 8.3.1.17.3.5.1 Activity: Identify controlling seismic events 8.3.1.17.3.5.2 Activity: Characterize ground motion from the controlling seismic events	USGS	2	02-01-89
8.3.1.17.3.6	Study: Probabilistic seismic hazards analyses 8.3.1.17.3.6.1 Activity: Evaluate earthquake sources 8.3.1.17.3.6.2 Activity: Evaluate ground motion probabilities	SNL	3	12-01-88
8.3.1.17.4.1	Study: Historical and current seismicity 8.3.1.17.4.1.1 Activity: Compile historical earthquake record	USGS	4	TBD

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
	8.3.1.17.4.1.2 Activity: Monitor current seismicity			
	8.3.1.17.4.1.3 Activity: Evaluate potential for induced seismicity at the site			
8.3.1.17.4.2	Study: Location and recency of faulting potential near prospective surface facilities	SNL	2	08-01-88
	8.3.1.17.4.2.1 Activity: Identify appropriate trench locations in Midway Valley			
	8.3.1.17.4.2.2 Activity: Conduct exploratory trenching in Midway Valley			
8.3.1.17.4.3	Study: Quaternary faulting within 100 km of Yucca Mountain, including the Walker Zone	USGS	2	02-01-88
	8.3.1.17.4.3.1 Activity: Evaluate crustal structure and subsurface expression of Quaternary faults in an east-west transect crossing the Furnace Creek fault zone, Yucca Mountain, and the Walker Lane			
	8.3.1.17.4.3.2 Activity: Evaluate Quaternary faults within 100 km of Yucca Mountain			
	8.3.1.17.4.3.3 Activity: Evaluate the Cedar Mountain earthquake of 1932 and its bearing on wrench tectonics of the Walker Lane within 100 km of the site			
	8.3.1.17.4.3.4 Activity: Evaluate the Bare Mountain fault zone			
	8.3.1.17.4.3.5 Activity: Evaluate structural domains and characterize the Yucca Mountain region with respect to regional patterns of faults and fractures			
8.3.1.17.4.4	Study: Quaternary faulting proximal to the site within northeast-trending fault zones	USGS	2	04-01-89
	8.3.1.17.4.4.1 Activity: Evaluate the Rock Valley fault system			
	8.3.1.17.4.4.2 Activity: Evaluate the Mine Mountain fault system			
	8.3.1.17.4.4.3 Activity: Evaluate the Stagecoach Road fault zone			
	8.3.1.17.4.4.4 Activity: Evaluate the Cone Spring Fault system			
8.3.1.17.4.5	Study: Detachment faults at or proximal to Yucca Mountain	USGS	2	05-01-89
	8.3.1.17.4.5.1 Activity: Evaluate the significance of the Miocene-Paleozoic contact in the Calico Hills area to detachment faulting within the site area			
	8.3.1.17.4.5.2 Activity: Evaluate postulated detachment faults in the Beatty-Bare Mountain area			
	8.3.1.17.4.5.3 Activity: Evaluate the potential relationship of megabreccia within and south of Crater Flat to detachment faulting			
	8.3.1.17.4.5.4 Activity: Evaluate postulated detachment faults in the Specter Range and Camp Desert Rock areas			
	8.3.1.17.4.5.5 Activity: Evaluate the age of detachment faults using radiometric ages			
8.3.1.17.4.6	Study: Quaternary faulting within the site area	USGS	4	07-01-89
	8.3.1.17.4.6.1 Activity: Evaluate Quaternary geology and potential Quaternary faults at Yucca Mountain			

NMWSI SCP Study Plan Report  
8.3.1.17 TECTONICS PROGRAM (PRECLOSURE)

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
	8.3.1.17.4.6.2 Activity: Evaluate age and recurrence of movement on suspected and known Quaternary faults			
8.3.1.17.4.7	Study: Subsurface geometry and concealed extensions of Quaternary faults at Yucca Mountain	USGS	2	08-01-89
	8.3.1.17.4.7.1 Activity: Evaluate intermediate depth (2 to 3 km) reflection and refraction methods and plan potential application of these methods within the site area			
	8.3.1.17.4.7.2 Activity: Detailed gravity survey of the site area			
	8.3.1.17.4.7.3 Activity: Detailed aeromagnetic survey of the site area			
	8.3.1.17.4.7.4 Activity: Detailed ground magnetic survey of specific features within the site area			
	8.3.1.17.4.7.5 Activity: Evaluate surface geoelectric methods and plan potential applications of these methods within the site area			
	8.3.1.17.4.7.6 Activity: Evaluate methods to detect buried faults using gamma-ray measurements, and plan potential applications of these methods within the site area			
	8.3.1.17.4.7.7 Activity: Evaluate thermal infrared methods and plan potential applications of these methods within the site area			
	8.3.1.17.4.7.8 Activity: Evaluate shallow seismic reflection (mini-sosie) methods and, if appropriate, conduct surveys of selected structures at and proximal to the site area			
8.3.1.17.4.8	Study: Stress field within and proximal to the site area	USGS	2	09-01-89
	8.3.1.17.4.8.1 Activity: Evaluate present stress field within the site area			
	8.3.1.17.4.8.2 Activity: Evaluate and test shallow borehole hydrofrac and triaxial strain recovery methods for the determination of in situ stress, and if appropriate, plan potential application of these methods within and proximal to the site			
	8.3.1.17.4.8.3 Activity: Evaluate published and unpublished distributions data on paleostress orientation at and proximal to the site and assess the relevance of these data to quaternary tectonics			
	8.3.1.17.4.8.4 Activity: Evaluate theoretical stress distributions associated with potential tectonic settings (wrench fault, normal fault, detachment fault setting, etc.) of the site			
8.3.1.17.4.9	Study: Tectonic geomorphology of the Yucca Mountain region	USGS	2	10-01-89
	8.3.1.17.4.9.1 Activity: Evaluate age and extent of tectonically stable areas at and near Yucca Mountain			
	8.3.1.17.4.9.2 Activity: Evaluate extent of areas of Quaternary uplift and subsidence at and near Yucca Mountain			
	8.3.1.17.4.9.3 Activity: Evaluate variations in the nature and intensity of Quaternary faulting within 100 km of Yucca Mountain through morphometric and morphologic analysis			

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NMWSI SCP Study Plan Report  
8.3.1.17 TECTONICS PROGRAM (PRECLOSURE)

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.1.17.4.10	Study: Geodetic leveling 8.3.1.17.4.10.1 Activity: Relevel base-station network, Yucca Mountain and vicinity 8.3.1.17.4.10.2 Activity: Survey selected base stations, Yucca Mountain and vicinity, using global positioning satellite 8.3.1.17.4.10.3 Activity: Analyze existing releveling data, Yucca Mountain and vicinity	USGS	4	03-01-88
8.3.1.17.4.11	Study: Analyze existing releveling data, Yucca Mountain and vicinity 8.3.1.17.4.11.1 Activity: Analyze lateral component of crustal movement based on historic faulting, seismicity, and trilateration surveys	USGS	2	10-01-89
8.3.1.17.4.12	Study: Tectonic models and synthesis 8.3.1.17.4.12.1 Activity: Evaluate tectonic processes and tectonic stability at the site 8.3.1.17.4.12.2 Activity: Evaluate tectonic models 8.3.1.17.4.12.3 Activity: Evaluate tectonic disruption sequences	USGS	3	01-01-90

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8.3.3.2 SHAFT AND BOREHOLE SEALS CHARACTERISTICS

Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.3.2.2.1	Study 1.12.2.1: Seal material properties development	SNL	3	03-01-88
8.3.3.2.2.1.1	Activity 1.12.2.1.1: Detailed property determination of cementitious-based and earthen materials			
8.3.3.2.2.1.2	Activity 1.12.2.1.2: Hydraulic conductivity and consolidation testing of crushed tuff			



Study Plan/Scp Section	Title of Studies and Activities	Participant	Priority	Schedule
8.3.4.2.4.1	Study 1.10.4.1: Characterize chemical and mineralogical changes in the postemplacement environment	LLNL	4	11-13-87
8.3.4.2.4.1.1	Activity 1.10.4.1.1: Rock-water interactions at elevated temperatures			
8.3.4.2.4.1.2	Activity 1.10.4.1.2: Effect of grout, concrete, and other repository materials on water composition			
8.3.4.2.4.1.3	Activity 1.10.4.1.3: Composition of vadose water from the waste package environment			
8.3.4.2.4.1.4	Activity 1.10.4.1.4: Dissolution of phases in the waste package environment			
8.3.4.2.4.1.5	Activity 1.10.4.1.5: Effects of radiation on water chemistry			
8.3.4.2.4.1.6	Activity 1.10.4.1.6: Effects of container and borehole liner corrosion products on water chemistry			
8.3.4.2.4.1.7	Activity 1.10.4.1.7: Numerical analysis and modeling of rock-water interaction			
8.3.4.2.4.2	Study 1.10.4.2: Hydrologic properties of waste package environment	LLNL	4	12-15-87
8.3.4.2.4.2.1	Activity 1.10.4.2.1: Single fluid phase system properties			
8.3.4.2.4.2.2	Activity 1.10.4.2.2: Two-phase fluid system properties			
8.3.4.2.4.2.3	Activity 1.10.4.2.3: Numerical analysis of flow and transport in laboratory systems			
8.3.4.2.4.3	Study 1.10.4.3: Thermal and mechanical attributes of the waste package environment	LLNL	4	12-15-87
8.3.4.2.4.3.1	Activity 1.10.4.3.1: Waste package environment temperature field analysis			
8.3.4.2.4.3.2	Activity 1.10.4.3.2: Waste package environment stress field analysis			
8.3.4.2.4.4	Study 1.10.4.4: Engineered barrier system field tests	LLNL	3	TBD
8.3.4.2.4.4.1	Activity 1.10.4.4.1: Repository horizon near-field hydrologic properties			
8.3.4.2.4.4.2	Activity 1.10.4.4.2: Repository horizon rock-water interaction			
8.3.4.2.4.4.3	Activity 1.10.4.4.3: Numerical analysis of fluid flow and transport in the repository horizon near-field environment			

## STUDY PLAN STATUS

- o 8.3.1.15.1.5 EXCAVATION INVESTIGATIONS

PROPOSED RESOLUTIONS TO OGRS SECOND ROUND  
OF COMMENTS WILL BE DISCUSSED WITH OGR  
12/03/87

- o 8.3.1.2.2.4 PERCOLATION IN THE UNSATURATED ZONE - ESF

REVISIONS TO RESOLVE OGR COMMENTS NEAR  
COMPLETION

- o 8.3.1.4.2.2 STRUCTURAL FEATURES

EXTENSIVE REVISIONS TO RESOLVE OGR COMMENTS  
IN PROGRESS

- o 8.3.1.2.2.2 CHLORINE 36

MINOR REVISIONS TO RESOLVE OGR COMMENTS IN  
PROGRESS

## STUDY PLAN STATUS (CONTINUED)

- o 8.3.1.15.2.1 AMBIENT STRESS

OGR COMMENTS RECEIVED 11/19/87  
COMMENT RESOLUTION MEETING 12/03/87 -  
12/04/87

- o 8.3.4.2.4.1 CHEMICAL/MINERALOGICAL CHANGES -  
POSTEMPLACEMENT  
MINOR REVISIONS NECESSARY BEFORE SUBMITTAL  
TO OGR FOR REVIEW

# LOS ALAMOS STUDY PLAN SCHEDULE

<u>Number</u>	<u>Title</u>	<u>Category</u> <sup>1</sup>	<u>Date</u>
8.3.1.3.2.1	Three-Dimensional Mineral Distributions at Yucca Mountain	4	12/21/87
8.3.1.3.2.2	History of Mineralogic and Geochemical Alteration at Yucca Mountain	4	12/21/87
8.3.1.3.3.2	Kinetics and Thermodynamics of Mineral Evolution	4	12/20/87
8.3.1.3.3.3	Conceptual Model of Mineral Evolution	4	12/20/87
8.3.1.3.4.2	Biological Sorption and Transport	4	12/11/87
8.3.1.3.4.3	Development of Sorption Models	4	12/30/87
8.3.1.3.5.1	Dissolved Species Concentration Limits	4	12/30/87
8.3.1.3.5.2	Colloid Behavior	4	12/30/87
8.3.1.3.6.1	Dynamic Transport Column Experiments	4	12/30/87
8.3.1.3.6.2	Diffusion	4	12/30/87
8.3.1.3.7.1	Retardation Sensitivity Analysis	4	01/15/88
8.3.1.8.1.1	Probability of Volcanic Eruption	4	12/19/87
8.3.1.8.1.2	Effects of Volcanic Eruption	4	12/19/87
8.3.1.8.5.1	Characterization of Volcanic Features	4	12/19/87

<sup>1</sup> Category 4 represents ongoing work

TPO MEETING

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# USGS STUDY PLAN SCHEDULE

<u>Number</u>	<u>Title</u>	<u>Category</u> <sup>1</sup>	<u>Date</u>
8.3.1.5.2.1	Characterization of Quaternary Regional Hydrology	4	12/04/87
8.3.1.2.1.2	Characterization of Runoff and Streamflow	4	01/04/88
8.3.1.2.1.3	Characterization of Groundwater Flow System	4	12/14/87
8.3.1.2.2.3	Characterization of Percolation in the UZ: Surface Studies	4	12/11/87
8.3.1.2.2.7	Characterization of Gaseous Phase Movement in the UZ	4	12/18/87
8.3.1.2.2.1	Characterization of UZ Infiltration	4	12/04/87
8.3.1.7.4.1	Historical and Current Seismicity	4	12/87?

<sup>1</sup> Category 4 represents ongoing work

### LLNL STUDY PLAN SCHEDULE

<u>Number</u>	<u>Title</u>	<u>Category</u> <sup>1</sup>	<u>Date</u>
8.3.4.2.4.2	Hydrologic Properties of WP Environment the Postemplacement Environment	4	12/15/87
8.3.4.2.4.3	Thermal Mechanical Attributes of WP	4	12/15/87

### SNL STUDY PLAN SCHEDULE

<u>Number</u>	<u>Title</u>	<u>Category</u> <sup>1</sup>	<u>Date</u>
8.3.1.15.1.3	Laboratory Determination of Mechanical Properties of Intact Rock	4	12/01/87
8.3.1.15.1.4	Laboratory Determination of the Mechanical Properties of Fractures	2	12/15/87?
8.3.1.15.1.1	Laboratory Thermal Properties	2	12/15/87?
8.3.1.15.1.2	Laboratory Thermal Expansion Testing	2	01/25/88

<sup>1</sup> Category 4 represents ongoing work; category 2 represents studies to be initiated in the first year of site characterization.

## SAIC STUDY PLANS

<u>Number</u>	<u>Title</u>	<u>Category</u> <sup>1</sup>	<u>Date</u>
8.3.1.12.2.1	Meteorological Data	4	01/29/88
8.3.1.9.2.2	Water Resource Assessment	2	01/15/88
8.3.1.16.2.1	Location of Adequate Water Supply	2	01/15/88

<sup>1</sup> Category 4 represents ongoing work; category 2 represents studies to be initiated in the first year of site characterization.

TPO MEETING  
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11/23/87

## STUDY PLANS/WORK AUTHORIZATION

- o RETURN WORK AUTHORIZATION TO PROJECT LEVEL FOR ONGOING WORK

- REVIEWS ARE UNLIKELY TO RESULT IN MAJOR CHANGES IN THE SCOPE OF WORK
- SAVE TIME AND MONEY
- EXTENSIVE REVIEW AT THE PROJECT LEVEL

PARTICIPANT INTERNAL TECHNICAL REVIEWS  
WMPO ACCEPTABILITY REVIEW - TECHNICAL/FORMAL  
PROJECT REVIEW



## **SCP STATUS**

- **CONCURRENCE COPY OF THE CONSULTATION DRAFT SCP**
  - **DISTRIBUTED TO HQ FOR CONCURRENCE 11/21/87**
  - **DISTRIBUTED TO NVO FOR CONCURRENCE 11/23/87 AND TO TPOS**
- **OGR SCP BRIEFING 11/24/87**
- **OGR CONCURRENCE BY 11/30/87**
- **FINAL REVISIONS AND PRODUCTION BY 12/19/87**
- **GPO PRINTING 12/19/87 - 01/07/88**
- **DISTRIBUTION OF CONSULTATION DRAFT SCP 01/11/88**

**TPO MEETING  
PAGE ONE  
11/23/87**

## **SCP CONSULTATION PROCESS**

- o 11/16/87 MEETING WITH HQ TO DISCUSS PLENARY AND CONSULTATION WORKSHOPS
- o PLENARY WORKSHOP WITH NRC, STATES AND TRIBES 01/28/88 - 01/29/88 IN DENVER, CO
  - OVERALL CONSULTATION PROCESS CHAIRED BY HQ  
NRC, STATES, AND TRIBES: PLANNED REVIEW STRATEGIES
  - SITE-SPECIFIC DISCUSSIONS CHAIRED BY PROJECT OFFICES  
SCHEDULE A MAXIMUM OF 3 WORKSHOPS  
REACH AGREEMENT ON AGENDA FOR CONSULTATION WORKSHOPS
- o CONSULTATION PERIOD CONTINUES THROUGH MARCH, 1988

## **SCP CONSULTATION PROCESS [CONTINUED]**

### **o CONSULTATION WORKSHOPS**

- LIMITED TO 3 WORKSHOPS DURING FEBRUARY - MARCH, 1988 IN RENO/CARSON CITY AREA**
- MAXIMUM OF 1 WEEK PER WORKSHOP**
- PLAN A MAXIMUM OF 3 TECHNICAL TOPICS PER WORKSHOP**

### **o GOALS OF SCP CONSULTATION WORKSHOPS**

- DEMONSTRATE DOE HAS ADDRESSED KEY TECHNICAL ISSUES**
- IDENTIFY TECHNICAL CONCERNS OF STATE, NRC AND TRIBE**
- BRIEF REVIEWERS TO FACILITATE THEIR SCP REVIEW**
- DOCUMENT MEETINGS WITH WRITTEN OBSERVATIONS AND AGREEMENTS SIGNED BY PARTICIPANT REPRESENTATIVES**

11/6/87

Prestholt Briefing

Proposed "Agenda"

1. P. Prestholt Briefly outline interests
2. M. Blanchard WMPO concept of T&MSS responsibilities in integration, regulatory, & field program area
3. W. Macnabb SAIC perception of impact from contract scope change, e.g., integration; SAIC management/organization structure
4. M. Voegele Project Technical Integration, Analysis & Evaluation and Regulatory Compliance Departments (Supported by Dave Jorgenson, J. Younker, M. Glora)
5. M. Foley Project Operations Department responsibilities and plans including core library

11/4/87

Informal Input

Paul Prestholt has requested an informal briefing on the "T&MSS responsibilities under the new contract with emphasis on the integration approach. It is hoped that no more than 30 minutes will be needed. Paul requested the briefing solely for his own information so that he can answer questions from NRC/HQ.

He is primarily interested in:

- (1) What the integration approach will be & what increased responsibilities are involved.
- (2) What is current staffing/available "expertise," and what are expansion plans.

Although he is most interested in the integration function of T&MSS, Operations and Regulatory Compliance should also be represented to give a complete picture. A generalized "agenda" is attached. We should keep Paul's interests in mind as we address our individual organizations.

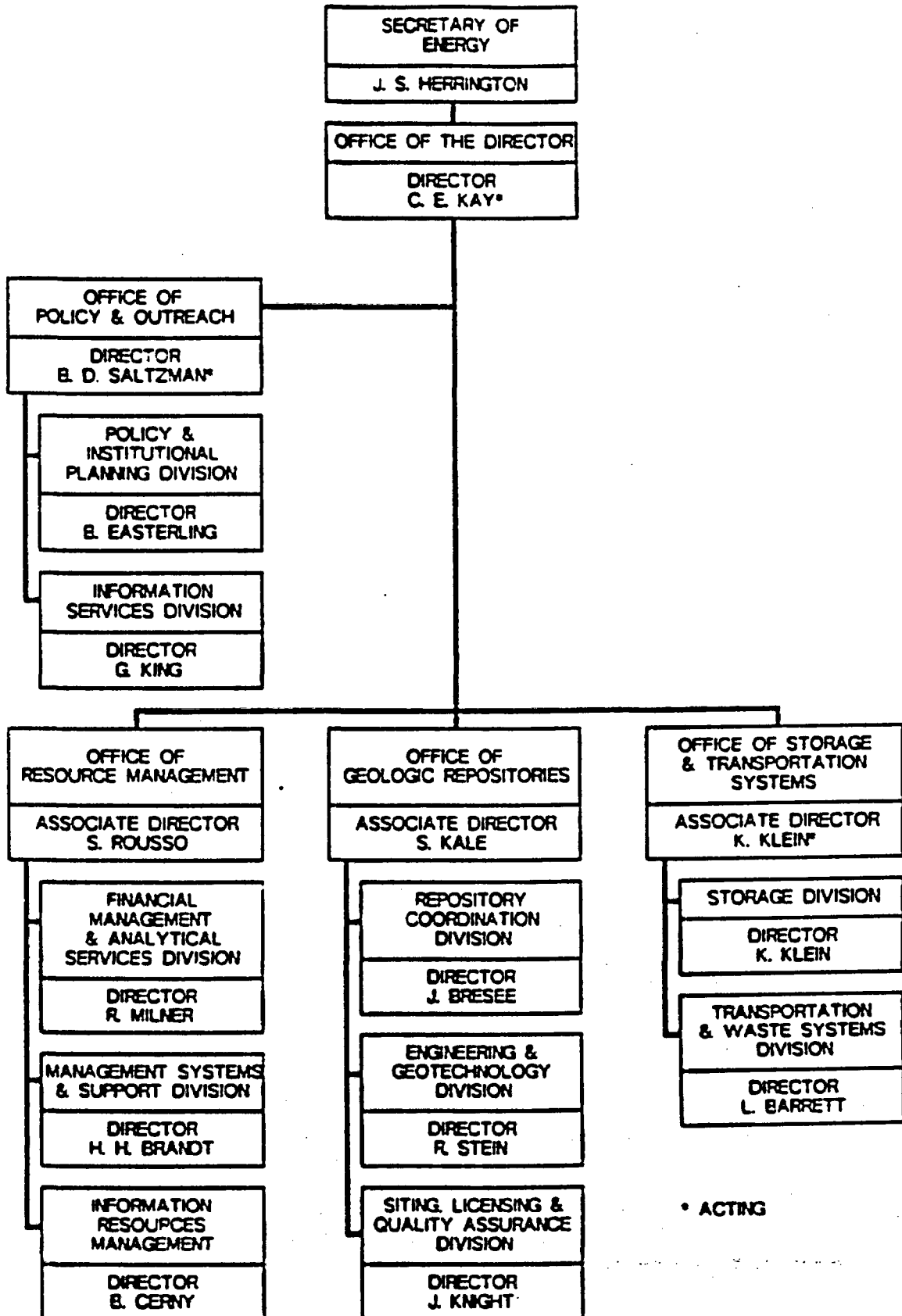
We are hoping to keep the briefing as informal as possible with minimal preparation necessary. It may be most efficient to speak from the T&MSS organizational charts (I have made viewgraphs), and verbally expand on them as necessary to cover Paul's points. The briefing is currently scheduled for 3:30 p.m. in Room 203 - today 11/6.

M. Glora

Distribution:

W. Macnabb  
M. Voegele  
M. Foley  
J. Younker  
D. Jorgenson

# OCRWM ORGANIZATION

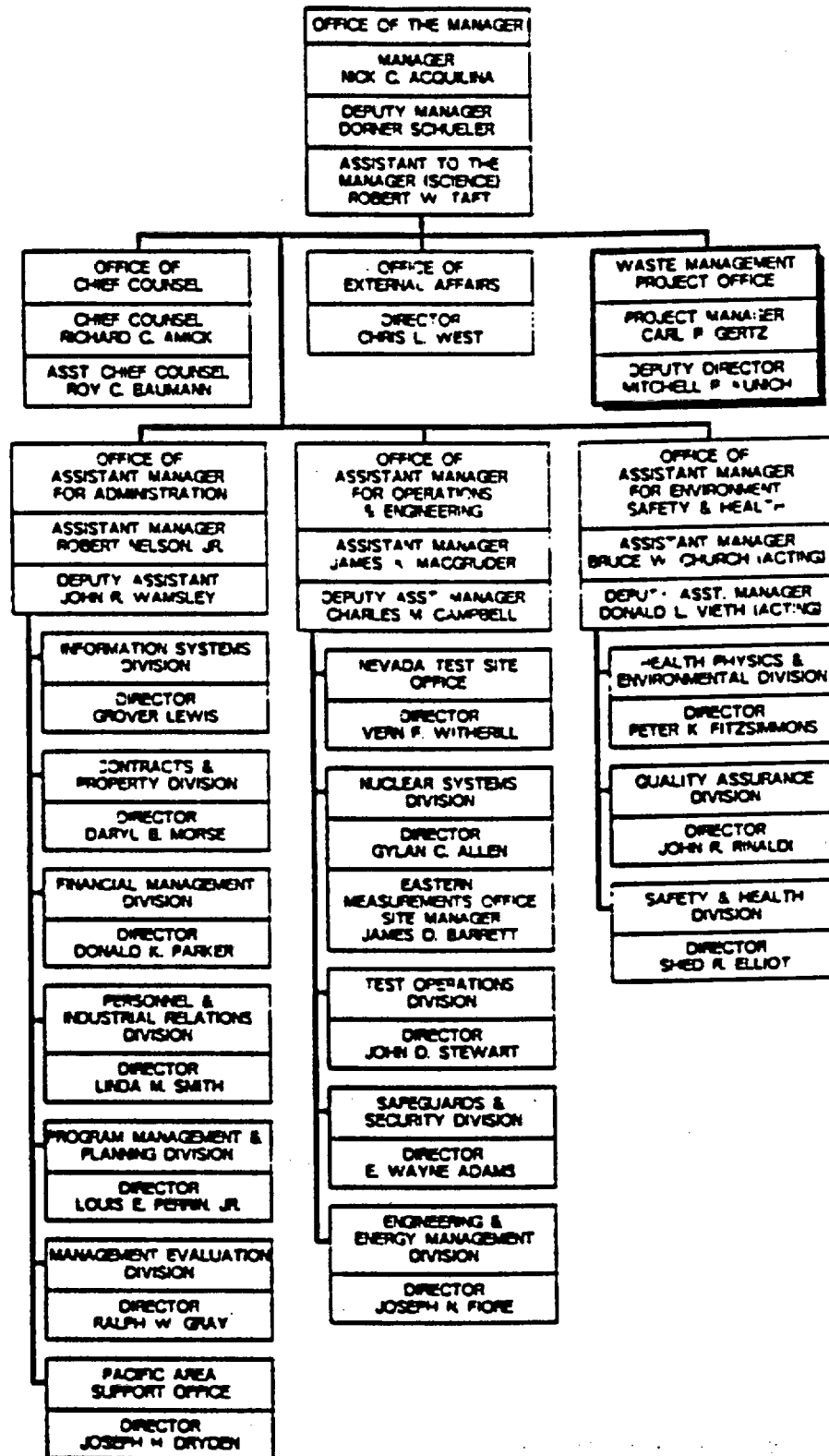


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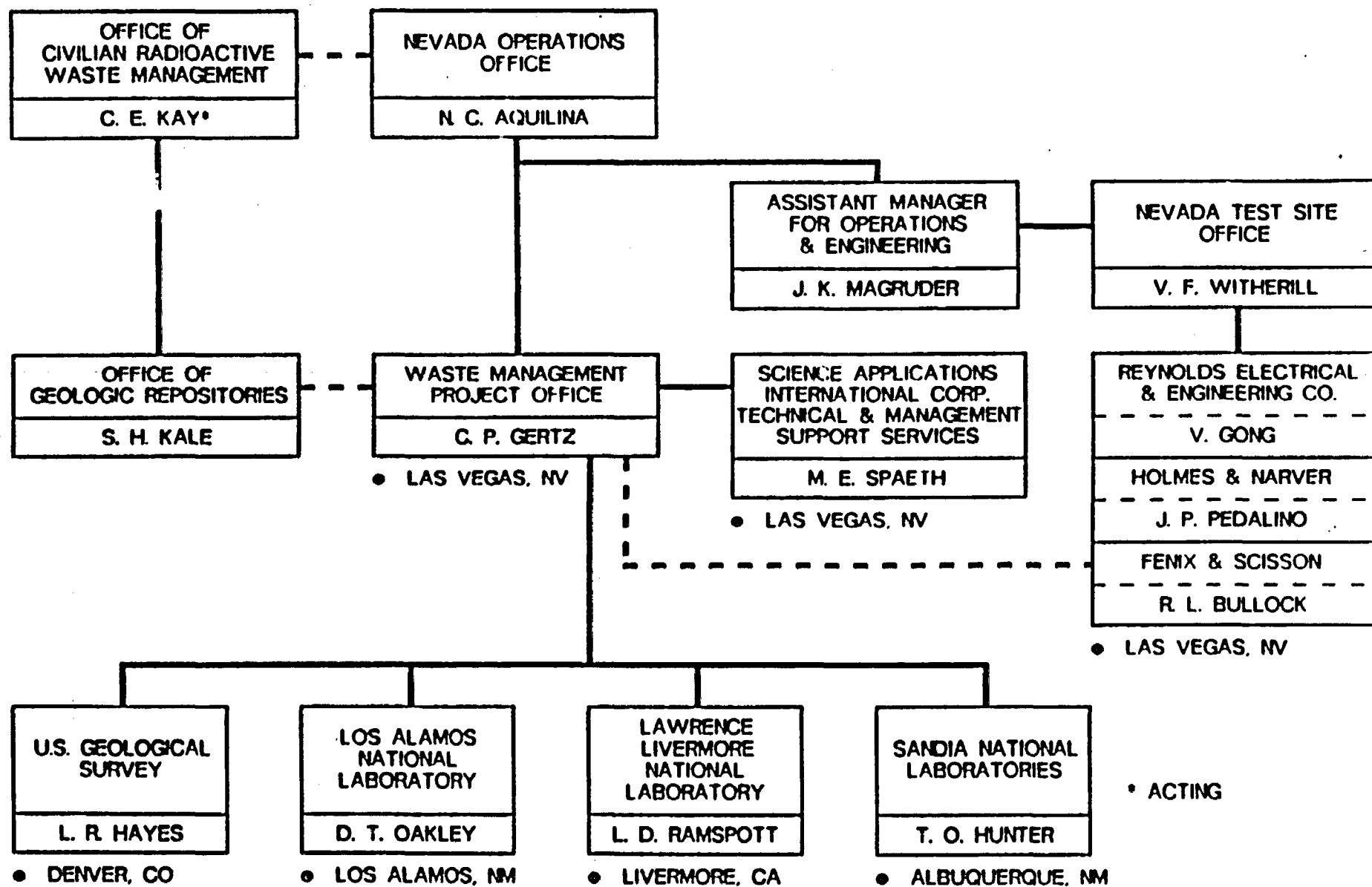
Office of Civilian Radioactive Waste Management

NWWSI PROJECT 10/27/87

# U.S. DOE/NV ORGANIZATION



# **NNWSI PROJECT ORGANIZATION**



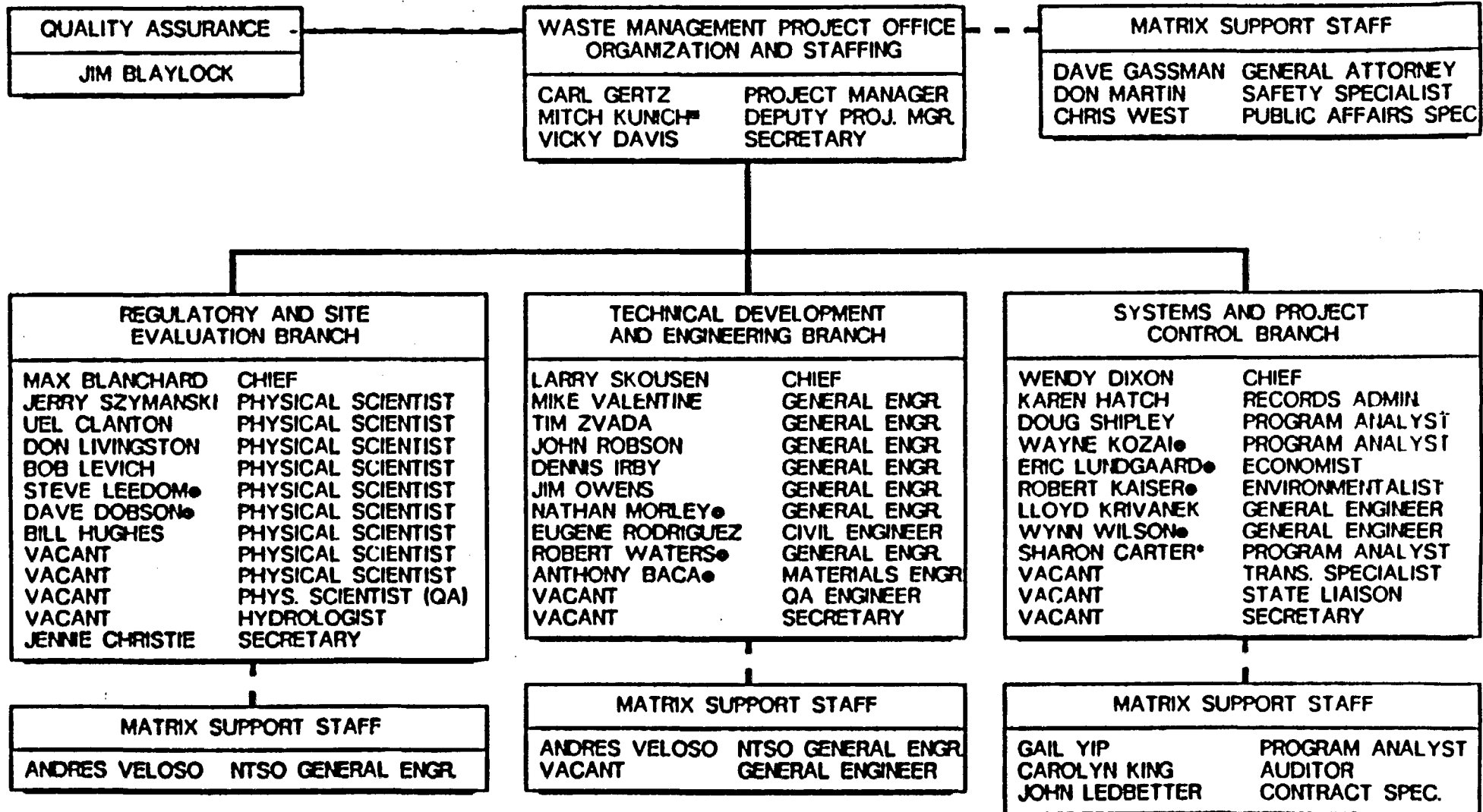
Nevada Nuclear Waste Storage Investigations Project

10/27/87

[NNWSI ORG.]



# WMPO ORGANIZATION

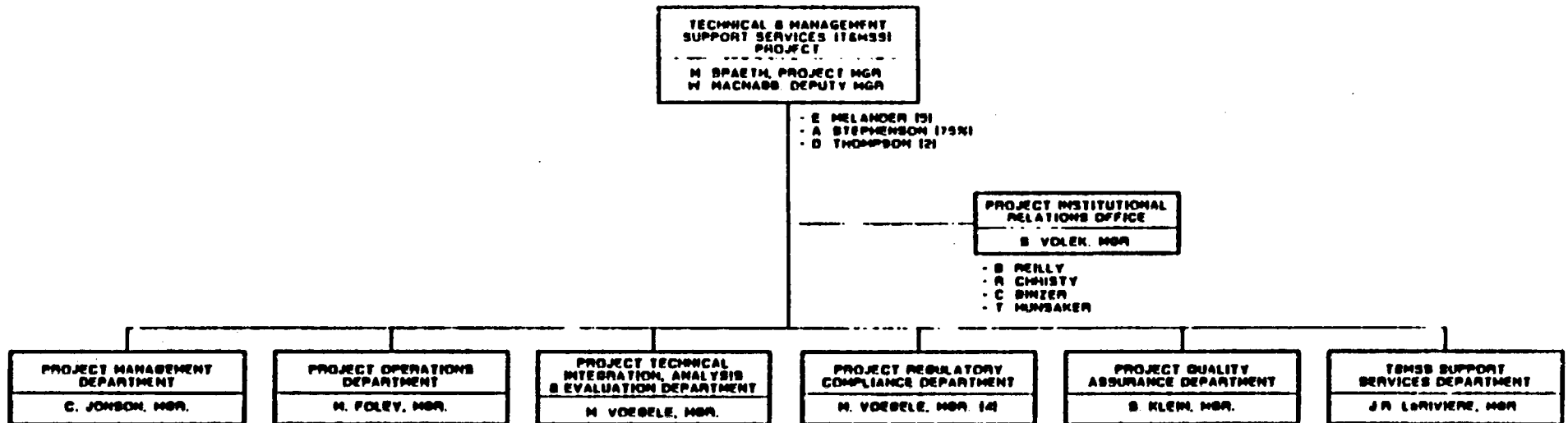


- DIRECT REPORTING
- - - MATRIX REPORTING
- TRAINEE
- PEOPLE ON BOARD SINCE AUGUST 1, 1986
- ACCEPTED POSITION PENDING SECURITY WAIVER
- ACTING

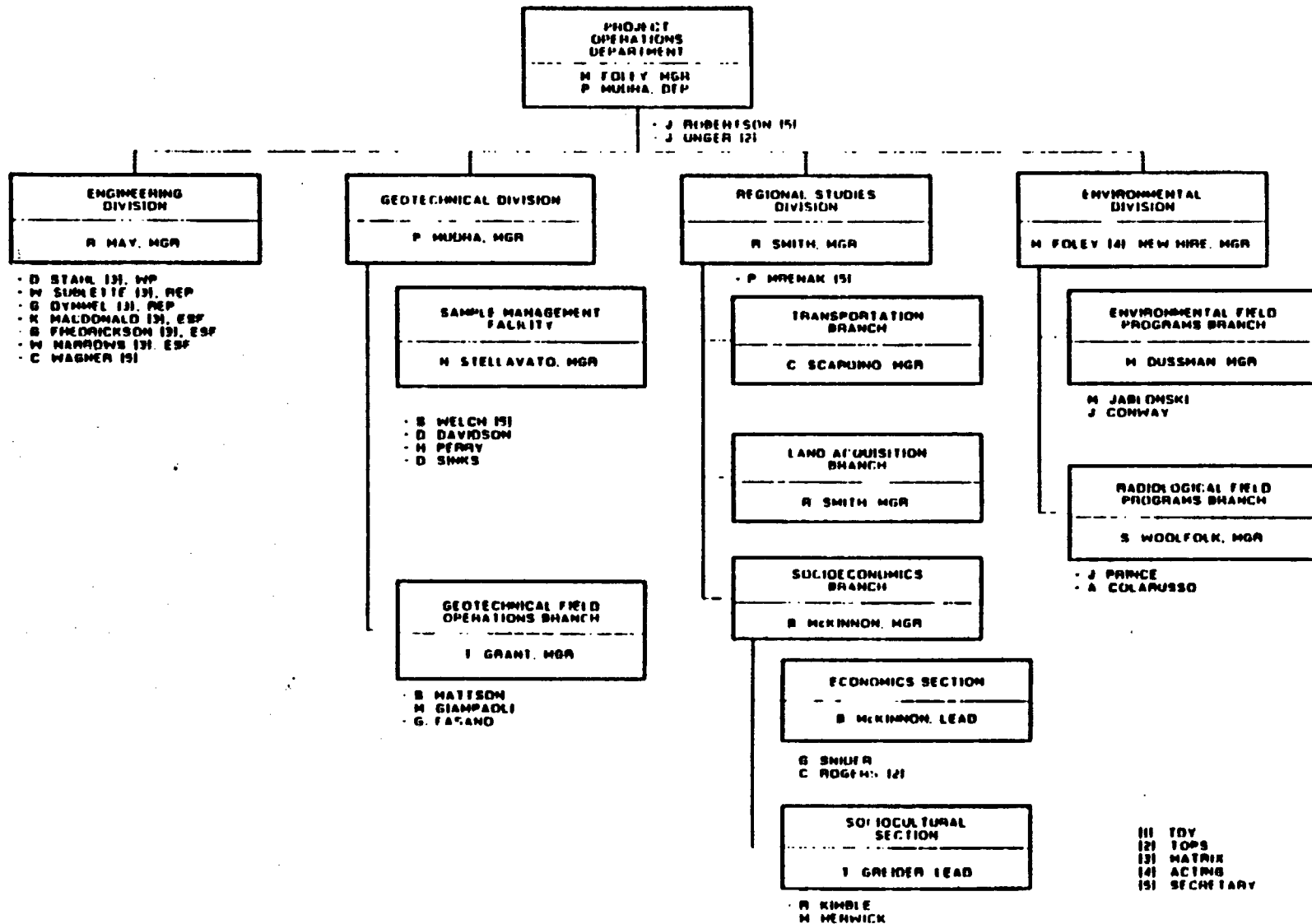
Waste Management Project Office

NNWSI PROJECT FY 1987

**Science Applications International Corporation**  
**NNWSI PROJECT 7/22/87**

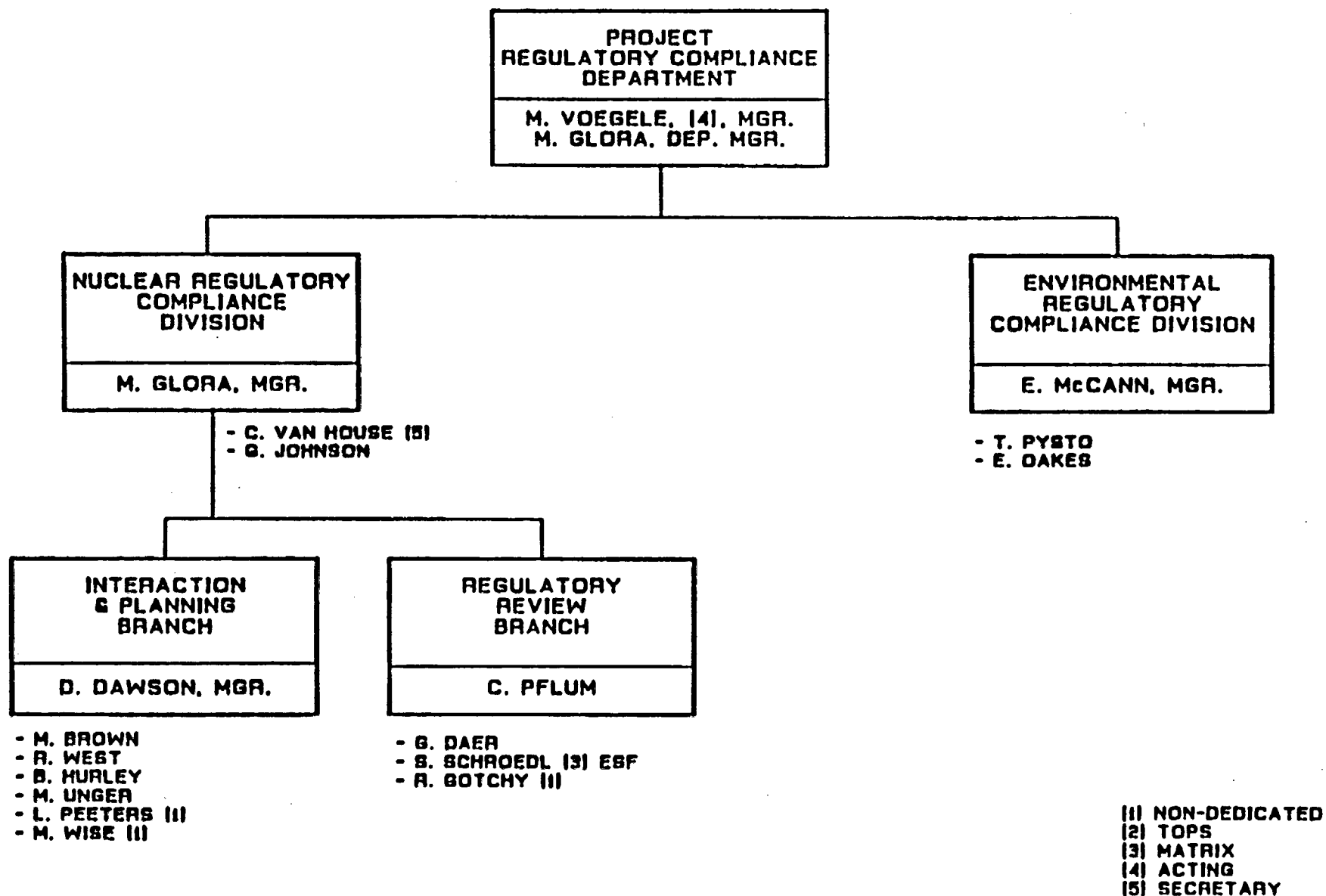


END OF 3/88 STAFFING/TCMSSPM-VA/7/22/87



END OF 3/88 STAFFING ORRD-B-7/22/87

Science Applications International Corporation  
NNWSI PROJECT 7/22/87



END OF 3/88 STAFFING/RCDORGPB/7-22-87

Science Applications International Corporation  
NWSI PROJECT 7/22/87

PROJECT TECHNICAL  
INTEGRATION, ANALYSIS  
& EVALUATION DEPARTMENT  
M VOEGELE MGR  
J SHALER, DEP

• S PHILLIPS  
• P THOMPSON ISI  
• K WETZEL ISI

TECHNICAL INTEGRATION  
& SUPPORT DIVISION  
D JOHNSON, MGR  
R BAHORICH, DEPUTY

TECHNICAL EVALUATION  
& ANALYSIS DIVISION  
J YOUNKER, MGR

• S PLUMLEY ISI

SYSTEMS  
INTEGRATION  
BRANCH

R BAHORICH, MGR  
W DOKUZOSUZ, DEP

• W ANDREWS  
• R BARKER  
• M BRAKE III, ESF  
• B HILLAND  
• W ESTAL  
• A STEPHENSON (25%)  
• J REISER III, ESF  
• I STEWART  
• R ZIMMERMAN  
• A CARR ISI

WASTE  
PACKAGE  
INTEGRATION  
BRANCH

R MORRISSETTE, MGR

• U. PARK III (40%)

SITE  
INTEGRATION  
BRANCH

D EPPLER, MGR

• D CHESNUT  
• E HADWIN (50%)  
• P. RAIPHS  
• P. SCRUGGINS ISI

REPOSITORY  
INTEGRATION  
BRANCH

P CONROY, MGR

REGULATORY &  
INSTITUTIONAL  
INTEGRATION  
BRANCH

D DAWSON, MGR

EXPLORATORY  
SHAFT & TEST  
FACILITIES  
INTEGRATION  
BRANCH

R REUST, MGR

• P STENECK  
• S NORM ISI

SCP  
BRANCH

M. PENOLETON, MGR

• C BIDDISON  
• J DANNA  
• D GOINGS  
• L HOFFMAN  
• E HUGHES  
• S. JENSEN  
• S. SALTZEN  
• C. STEWART  
• E ZIEBLER ISI

TECH REVIEW  
BRANCH

J KING, MGR

• J CULLEN  
• E HADWIN (50%)  
• R MATTHESEN  
• M TEUSNER  
• S FRAZIER III  
• U. PARK III (50%)

III NON-DEDICATED  
ISI TOPS  
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IAC ACTING  
ISI SECRETARY

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Science Applications International Corporation  
NNWSI PROJECT 7/22/87



*Glenda Lutzger 11-3*

AGENCY FOR NUCLEAR PROJECTS  
NUCLEAR WASTE PROJECT OFFICE

Capitol Complex  
Carson City, Nevada 89710  
(702) 885-3744

November 3, 1987

Mr. Carl P. Gertz, Director  
Waste Management Project Office  
U.S. Department of Energy  
Nevada Operations Office  
Phase 2, Suite 200  
101 Convention Center Drive  
Las Vegas, NV 89109

Dear Mr. Gertz:

This letter is in response to your requests regarding the State's input into the development and implementation of workshops or other forums related to the Department of Energy's (DOE) consultative draft of the Site Characterization Plan (SCP) for Yucca Mountain. As I have indicated to you previously, the ability of the State of Nevada to participate in these DOE meetings is conditioned in a couple of ways. First, that the State receives all SCP-related plans, programs, studies and the like prior to the commencement of these workshops. I envision that this will include not only the SCP, but all of the technical field study plans, the environmental program plan, environmental regulatory compliance plan, environmental field study plan, the environmental monitoring and mitigation plan, the socioeconomic field study plan and the socioeconomic monitoring and mitigation plans. Next, that the technical staff of the Nuclear Regulatory Commission be present at and be a participant in these aforementioned workshops.

Proposed below is an outline of the type of consultative draft workshops that this Office believes would be important for the DOE to undertake in order to describe what it knows about the site currently and for the DOE to demonstrate an understanding of what information needs to be obtained not only to prepare for a license application, but also for an environmental impact statement.

### RECOMMENDED WORKSHOP OUTLINE

1st The first workshop should be a management overview of the Site Characterization Plan and site characterization activities that I envision as a generic introductory session on the entire subject. This workshop should be conducted somewhere around four weeks after the release of the consultative draft. In addition to providing a general overview, it should clearly demonstrate the linkages between the SCP and the technical study plans, the complete environmental program, and the complete socioeconomic program. Based upon a successful demonstration of these important linkages, the Department then should proceed to the second tier.

2nd A series of technical topics workshops should be held that review the individual technical topics described in Chapters 1-7 of the draft SCP. These workshops should focus on demonstrating a thorough and complete understanding of the existing conditions at the site and the data that support the Department's understanding of those conditions. In short, DOE should describe everything it knows about the site, and should continue to pay special attention to the need to demonstrate linkages between all of the related sub-plans and activities including socioeconomics and the environment and how they relate to the other aspects of the program. A discussion of historic activities in these areas should be included.

3rd The Department should conduct a workshop or workshops specifically and exclusively related to topics treated in Chapter 8. Again, the focus of this series of workshops should be for the Department to demonstrate not only what information and data need to be collected and why, but how the comprehensive program strategy incorporates the individual study and data collection efforts with, once again, linkages being clearly described regarding the impact of such activities on the environment and the social and economic fabric of the area.

4th The DOE should conduct a wrap-up-type workshop which should clearly demonstrate how the Site Characterization Plan is coordinated and integrated leading toward the submission of a license application to the Nuclear Regulatory Commission as well as the preparation of an environmental impact statement.

I hope that you find this proposal concerning conduct of these workshops useful. Of course, it is our requirement that

all of these workshops be available to any interested party on an observer status in addition to any public workshops which may be planned. Additionally, we have not as yet reviewed this recommended workshop outline with the affected local governments. As I anticipate consulting with them in the very near future, this recommended outline should be considered tentative until such input is received.

I would be happy to work with you in planning the actual logistics for conducting these workshops. Should you have any questions, please do not hesitate to contact me.

Sincerely,



Robert R. Loux  
Executive Director

RL/gjb

bcc: Nevada Commission on Nuclear Projects  
Nevada Legislature's High-Level Radioactive Waste  
Committee  
Terry Husseman  
Mal Murphy  
Nevada Local Government Representatives  
Bob Fulkerson  
Robert Browning, Nuclear Regulatory Commission





**AGENCY FOR NUCLEAR PROJECTS  
NUCLEAR WASTE PROJECT OFFICE**

Capitol Complex  
Carson City, Nevada 89710  
(702) 885-3744

November 23, 1987

Mr. Carl P. Gertz, Project Manager  
Waste Management Project Office  
U.S. Department of Energy  
Nevada Operations Office  
P.O. Box 98518  
Las Vegas, NV 89193-8518

Dear Mr. Gertz:

In response to your recent request that the Nevada Nuclear Waste Project Office (NWPO) prepare a schedule of workshops for review and discussion of a preliminary draft of the Yucca Mountain Site Characterization Plan, we have developed the attached plan of proposed meetings with your office and technical staff.

As you are aware, our proposed schedule is contingent upon certain conditions being met by the Office of Civilian Radioactive Waste Management. These conditions are as follows:

1. The preliminary drafts of three SCP's - Deaf Smith County, Hanford, and Yucca Mountain - are released for review on or about January 8, 1988;
2. All agreed DOE documents accompanying the preliminary draft SCP, including Environmental and Socioeconomic Monitoring and Mitigation Plan, Environmental Regulatory Compliance Plan, Environmental Program Plan, all cited references, and all available draft work plans and activity plans for at least a 1-year period of field work will be provided to the Nevada NWPO on or before the announced January, 1988, release date;
3. The official state point of contact for all workshop planning, receipt and distribution of documents, and agenda review continues to be the Nevada NWPO, and DOE staff should not make any individual arrangements with Nevada State agencies and contractors on matters related to review of the subject documents;

4. The workshops will be held open to any interested observers;
5. U.S. Nuclear Regulatory Commission staff will be invited to participate in all scheduled workshops with the Nevada NWPO relating to the preliminary draft SCP and accompanying documents;
6. Nevada NWPO representatives will be invited to participate in any meetings or workshops scheduled for interaction between the DOE and NRC, and other federal agency staffs relating to the subject documents; and
7. All workshops will include presentation and discussion of relevant Environmental and Socioeconomic Plans and documents.

You will note that our proposed schedule includes an initial plenary session, to be held in Nevada, for State program personnel, and, following the proposed topical workshops, a general concluding workshop. The schedule proposal also sets out two dates for public workshops to be held by DOE in Nevada for presentation, discussion and public comment on the DOE's preliminary draft SCP and other plans and related documents.

As the workshop plans and schedules are further developed, we will be pleased to discuss the locations of the planned workshops with your office.

I appreciate your invitation to provide a schedule for these workshops that I believe will be effective and efficient in meeting the desires of DOE and the needs of the NWPO and affected public in Nevada. If you have any further questions regarding these proposed interactions, please do not hesitate to contact me.

Sincerely,



Robert R. Loux  
Executive Director

RRL:njc

cc: Nevada Commission on Nuclear Projects  
Nevada Legislative Study Committee on  
High-Level Radioactive Waste

Attachments

NEVADA NUCLEAR WASTE PROJECTS' OFFICE

Proposed Schedule for Preliminary Draft Site  
Characterization Plan Workshops and  
Public Review and Comment

JANUARY 28-29, 1988 (Thursday - Friday)

-Denver Plenary Session for Program Managers

Nevada NWPO and Observers Topical Workshops

FEBRUARY 3 (Wednesday)

-Nevada NWPO Plenary - Overview of SCP and Environmental  
Socioeconomic Planning Documents

FEBRUARY 11 (Thursday)

-Climatology and Meteorology (Chapter 5 and Chapter 8 Plans) and  
Surface Hydrology (Chapter 3 and Chapter 8 Plans)

FEBRUARY 16 (Tuesday)

-Quality Assurance (Chapter 8.6), Including Plans for  
Environmental and Socioeconomic Analyses

FEBRUARY 24-25 (Wednesday-Thursday)

-Geology (Chapter 1 and Chapter 8 Plans)

MARCH 7-8 (Monday-Tuesday)

-Hydrology (Chapter 3 and Chapter 8 Plans)

MARCH 9 (Wednesday)

-Geochemistry and Geoengineering (Chapters 2, 4 and Chapter 8  
Plans)

MARCH 10 (Thursday)

-Waste Package (Chapter 7 and Chapter 8 Plans)

MARCH 16 (Wednesday)

-Exploratory Shaft and Facility Plans (Chapter 8)

MARCH 17 (Thursday)

-Repository Conceptual Design (Chapter 6)

MARCH 29-30 (Tuesday-Wednesday)

-Issue Resolution and Performance Assessment (Chapter 8)

MARCH 31 (Thursday)

-Wrap-Up - Integration of Program Plans, to Include  
Decontamination and Decommissioning Plans

Total workshop days - 14 with Nevada NWPO

NOTE: All presentation and discussion of plans to  
include relevant environmental and  
socioeconomic plans and documents.

General Public Workshops

FEBRUARY 4, 1988 (Thursday - afternoon and evening)

-Plenary Discussion and Public Comment

MARCH 24 (Thursday - afternoon and evening)

-Issue Resolution, Performance Assessment, Wrap-Up Discussion and  
Public Comment

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