

To: John Linahan / Paul Hildenbrand  
MS 623 SS HLOB

**STUDY PLAN BRIEFING**  
**DEPARTMENT OF ENERGY**  
**WASHINGTON, D.C.**

JUL 13 AIO:08

WM Record File  
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WM Project 10  
Docket No. \_\_\_\_\_  
PDR   
xLPDR  (le)

Distribution:  
Linahan still  
Hildenbrand  
(return to WM, 623-SS)

**BASALT WASTE ISOLATION PROJECT** TO: Linahan An. Code

**JOHN KOVACS**  
**DAVID DAHLEM**

7/8/87  
BSB CSK

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PDR WASTE  
WM-10 PDR

# INTRODUCTION

- \* INITIAL STATUS AS OF JUNE 10, 1987 -  
71 STUDY PLANS
- \* AS OF JULY 7, 1987 - 66 STUDY PLANS
- \* DEPARTURE FROM HQ STUDY PLAN REVIEW  
PROCEDURE REFLECTED IN ANTONEN TO  
STEIN LETTER OF JUNE 10, 1987
- \* BWIP STUDY PLANS:

STATUS

ISSUE DATES

INTERNAL REVIEW PROCEDURE

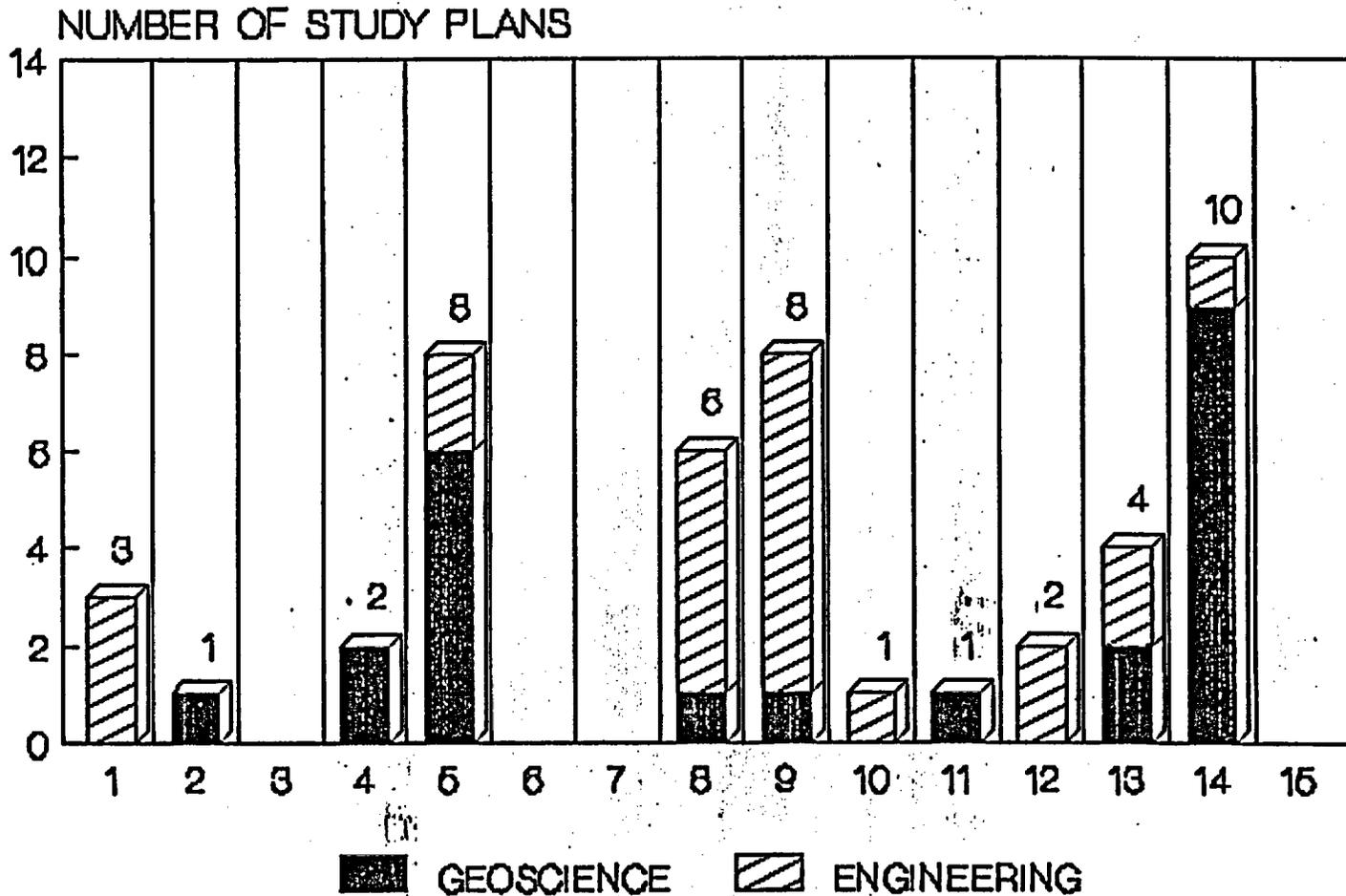
PROBLEM AREAS

# PRESENTATION OUTLINE

## BASALT WASTE ISOLATION PROJECT

- \* PRODUCTION SCHEDULE AND STATUS
- \* DOE - RL REVIEW
- \* PERSONNEL NEEDS
- \* PROBLEM AREAS
- \* RECOMMENDATIONS

# STUDY PLANS SCHEDULED RELEASE



WEEK FROM 8/29 TO 10/5

STUDY PLAN OVERVIEW  
BASALT WASTE ISOLATION PROJ.

*STATUS*

STUDY PLANS - ENGINEERING & DESIGN & SITE DEPARTMENTS

REPOSITORY D&D

Coupled Interactions - Thermomechanical-Chemical (TMC) Interactions -- Work will commence after SCP issuance plus 12 months.

Coupled Interactions - Thermohydronechanical (THM) Interactions -- Work will commence after SCP issuance plus 12 months.

Coupled Interactions - Thermohydronechanical - Chemical (THMC) Interactions -- Work will commence after SCP issuance plus 12 months.

Host Rock Environment - Mechanical Properties Determinations - (-007) (83) -- A draft copy has been issued for review, commented on internally by Westinghouse, and comments have been dispositioned. The study plan is on schedule for issuance on July 31, 1987.

REPOSITORY SEALS D&D

Optimization of Reference Seals Materials (-026)(38) -- Engineering responsibility.

Effects of Elevated Temps on Physical Properties of Ref Seals Mds (-027)(30) -- This study plan is complete and issued. The strategy has been developed, but the test specifications are under the stop work order, and are incomplete.

Characterization of Reference Seals Materials (-045) -- This study plan is complete and issued. The strategy has been developed, but the test specifications are under the stop work order, and are incomplete.

Interface Properties of Reference Seals Materials (-046) -- Engineering responsibility.

Exploratory Shaft Grout Development (-056)(50) -- Engineering responsibility.

Long Term Stability of Reference Seals Materials (-028) -- This study plan is still in preparation, and is expected to be issued by the end of July, 1987. The strategy is complete, but the test specifications are under the stop work order, and are incomplete.

Demonstration of Subsurface Borehole Seals Performance -- Work will commence after SCP issuance plus 12 months.

Demonstration of Surface Borehole Seals Installation and Performance -- Work will commence after SCP issuance plus 12 months.

Demonstration of Drift Seals Performance -- Work will commence after SCP issuance plus 12 months.

Demonstration of Shaft Seals Installation and Performance -- Work will commence after SCP issuance plus 12 months.

Characterization of Damaged Rock Zone Sealing -- Work will commence after SCP issuance plus 12 months.

Demonstration of Subsurface Borehole Seals Installation -- The Contractor has reported that no technical problems exist for delivering the study plan written by the Site Department as scheduled. Personal communications with T. A. Curran with K. M. Thompson, A. K. Knepp. Resources and working with issues not in final form may impact the schedule however.

Demonstration of Drift Seals Installation -- Work will commence after SCP issuance plus 12 months.

WASTE PACKAGE D&D

Container Corrosion Qualification Testing (-017)(16) -- Work will commence after SCP issuance plus 12 months.

Packing Saturation Qualification Testing (-018)(32) -- Work will commence after SCP issuance plus 12 months.

Waste Package In-Situ Testing -- Work will commence after SCP issuance plus 12 months.

Monolith Container Development (-012)(29) -- Work will commence after SCP issuance plus 12 months.

Pressure Vessel Container Development (-011)(32) -- Engineering responsibility.

Container Handling and Safety Testing (-013)(10) -- Engineering responsibility.

Waste Acceptance Specifications (-010)(32) -- Engineering responsibility.

Nonmetallic Container Development -- Work will commence after SCP issuance plus 12 months.

Packing Fabrication (-014)(37) -- Engineering responsibility.

Packing Nondestructive Examination (-015)(26) -- Engineering responsibility.

Packing Handling and Emplacement (-016)(24) -- Engineering responsibility.

Container Settlement Testing (-019)(29) - Engineering responsibility.

**MATERIALS CHARACTERIZATION**

Container Materials Testing: General Corrosion (-020)(20) -- Engineering responsibility.

Waste Form/Filler Materials Interactions (-009)(21) -- Engineering responsibility.

Waste Package Metallic Artifacts (-025)(6) -- Work will commence after SCP issuance plus 12 months.

Container Materials Testing: Environmentally Assisted Cracking (-023)(21) -- Engineering responsibility.

Container Materials Testing: Mechanical and Physical Properties (-024)(15) -- Work will commence after SCP issuance plus 12 months.

Container Materials Testing: Pitting Corrosion (-021)(22) -- Engineering responsibility.

Container Materials Testing: Crevice Corrosion (-022)(25) -- Engineering responsibility.

Waste/Barrier/Rock Interactions: Spent Fuel Release Testing (-040)(75) -- The preparation of this study plan is on schedule, with the test specifications and strategies established. Preparation is showing reasonable internal interfacing with related activities.

Waste/Barrier/Rock Interactions: Borosilicate Glass Release (-041)(50) -- Preparation of this study plan has not been started; development of test specifications and strategies have not been completed. Some logistical problems remain with transfer of equipment to PNL; facilities needed to conduct the work are not now set up.

Waste Form Materials (-008)(21) -- A draft of this study plan is under revision to match changes made in the SCP. The waste-form selection strategy is being developed by a DOE committee, and is still under development. Specifications to characterize the waste form are contained in the characterization plan, which is now complete. This study plan has interfaced with the study plans dealing with the waste/barrier/rock study plans.

Waste Package Natural Analogs (-002)(25) -- A draft has been completed and is under review. The draft is considered to be substantially complete, but may be subject to some "philosophical" changes if some definitions change, as for example "... substantially complete containment..." This study plan has been internally interfaced with two other study plans.

Waste/Barrier/Rock Interactions: Other Waste Forms Testing ( )() -- This is a contingency study plan, that will be activated, if a waste form other than those currently under consideration, is proposed. This decision will probably not take place until 1988 or 1989, at which time the disposition of this study plan will be decided upon.

Waste Package Environment: Geochemical Environment Analysis (-003)(29) -- The first draft has been completed and is now under review. The strategy development has been completed, but test specifications have not been defined. There has been interfacing with related activities.

Waste Package Environment: Basalt/Groundwater Interactions (-042)(50) -- The first draft has been completed and is now under review. The strategy development has been completed, but test specifications have not been defined. Study plan development has interfaced with related activities.

Packing Materials Testing: Chemical Stability (-037)(75) -- The study plan is in preparation. The strategy is still under development, and the test specifications are not yet defined.

Packing Materials Testing: Physical Properties and Processes (-038)(75) -- The study plan is in preparation. The strategy is still under development, and the test specifications are not yet defined.

Radionuclide Solubility/Sorption and Speciation Behavior (-039)(60) -- The study plan is in preparation. The strategy and test specifications are not yet defined.

REPOSITORY D&D

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Host Rock Environment-Evaluation of Opening Performance/Stability (-004)(140)  
-- A draft copy has been issued for review and commented on. Comments have been resolved and the study plan is on schedule for issuance on July 31, 1987.

Host Rock Environment-Thermal/Thermomech. Properties Determinations (-006)(80)  
-- The draft study plan was issued for comments, comments were dispositioned, and the study is on schedule for issuance on July 31, 1987.

Host Rock Environment-In Situ Stress Determinations (-005)(100) -- A draft copy has been issued for review, comments have been dispositioned and the study plan is on schedule to be issued on July 31, 1987.

Coupled Interactions - HYDROMECHANICAL (HM) Interactions -- Work will commence after SCP issuance plus 12 months.

SITE DEPARTMENT

Mineral, Hydrocarbon, & Geothermal Resource Potential (-044)(35) -- The draft is about 70% complete. Technical problems have been worked out and strategies decided on. Still some linking up with other studies needed.

Tectonic Model Development (-052)(60) -- The draft is about 75% complete. Some technical items and strategies still need to be worked out and these are mainly related to performance assessment. Link-ups with other study plans are substantially set but some details need to be worked out.

Intraflow Structures (-036)(60) -- The draft is complete and through Westinghouse review cycles. Copies are being distributed to the State and Affected Tribes. Issued as Draft-D for DC-24/25 Expedited Special Case. No known technical, strategy, or link-up problems remaining.

Constitutive Model Development (-047)(60) -- A draft of this study plan has been reviewed, comments have been dispositioned, and the study plan is on schedule to be issued July 31, 1987.

Constitutive Model Validation (-048)( ) -- Work will commence after SCP issuance plus 12 months.

Regional Groundwater (-053)(150) -- The Contractor has reported that no technical problems exist for delivering the study plan written by the Site Department as scheduled. Personal communication: T. A. Curran with K. M. Thompson, A. K. Knepp. Resources and working with issues not in final form may impact the schedule however.

Groundwater Flow System Hydrochemistry (-032)(104) -- Technical specifications and strategy are in place. Preparation of the study plan is on schedule. The major problem is involved with the drilling schedule, where final decisions have not been made that would allow access to necessary boreholes to complete this study plan schedule.

Groundwater Redox (-001)(43) -- Technical specifications and strategy are in place. Preparation of the study plan is on schedule. The major problem is involved with the drilling schedule, where final decisions have not been made that would allow access to necessary boreholes to complete this study plan schedule.

Water Resource Potential (-051)(19) -- The draft is complete and Westinghouse review cycle has been initiated. Coordination with other study plans, especially the Regional Groundwater and Surface Water Study Plans, has been taken into account. No technical, strategy, or link-up problems remain.

Site Goundwater (057)(150) -- The Contractor has reported that no technical problems exist for delivering the study plan written by the Site Department as scheduled. Personal communication: T. A. Curran with K. M. Thompson, A. K. Knepp. Resources and working with issues not in final form may impact the schedule however.

Minerologic & Petrologic Characterization (-030)(50) -- A draft of this study plan has been completed. The technical specifications and strategy are in place, but further coordination is still necessary with the drilling schedule and the laboratories

Surface Water System (-034)(101) -- The Contractor has reported that no technical problems exist for delivering the study plan written by the Site Department as scheduled. Personal communication: T. A. Curran with K. M. Thompson, A. K. Knepp. Resources and working with issues not in final form may impact the schedule however.

Site Flooding (-033)(28) -- The Contractor has reported that no technical problems exist for delivering the study plan written by the Site Department as scheduled. Personal communication: T. A. Curran with K. M. Thompson, A. K. Knepp. Resources and working with issues not in final form may impact the schedule however.

Stratigraphy (-035)(75) -- The draft is complete and through Westinghouse review cycle. Copies are being distributed to the State and Affected Tribes. Issued as Draft-C for DC-24/25 Expedited Special Case.

Cooling Joint Characteristics (-043)(55) -- The draft is about 75% complete. Just pulling the information together. No technical problems remain or strategies needing to be resolved. Tie-ins with other study plans OK.

Structural Geology (-054)(105) -- The draft was completed last November but they are now having to add more justification and logics so that at this time the draft is only 80% complete. Technical items and strategy are complete. Link-up and integration with other study plans remain to be completed.

Paleoclimate (-050)(68) -- The study plan is on schedule to be issued for (68) -- The st. review on August 7, 1987.

Future Climate (-049)(50) -- This study plan is on schedule to be issued for review on August 7, 1987. An integration problem with this study plan is that the planning for Global Modelling work will be done by PNL (PASS Program) which is controlled by HQ. It is not known if the global portion will be ready for inclusion in this study plan.

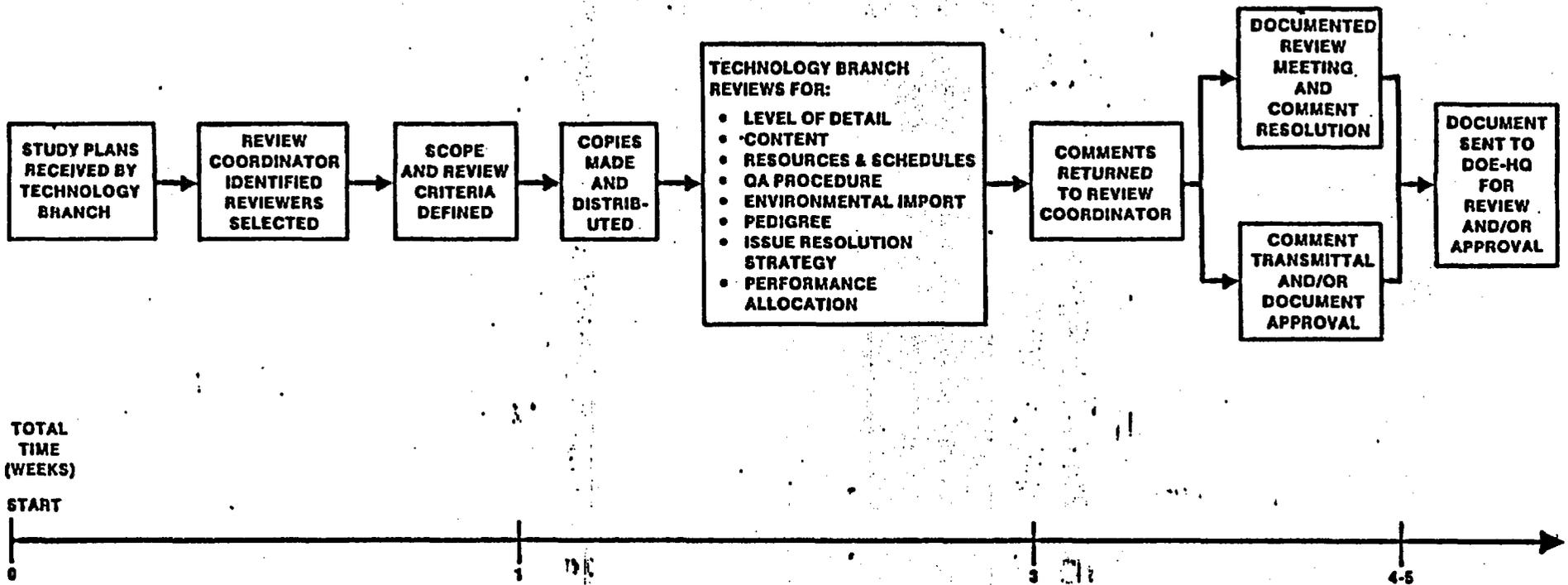
Deformation (-055)(35) -- The draft is complete and ready for the Westinghouse review. Chapter 8 of the SCP is being revised so that it is consistent with this study plan. No technical problems remain and strategies are firmed up. Link-up problems with other study plans are minimal because this study is predominantly analysis.

Earthquake Seismology (-031)(90) -- The draft is complete. Supervisor's approval will be needed before the Westinghouse review is initiated. No technical problems remain and strategies have been worked out. Links with other geology/hydrology study plans are complete. Links with design/performance assessment study plans still depend on issues which are as yet incompletely resolved.

Radionuclide Reactivity (-029)(140) -- Technical specifications and strategy are in place. Preparation of the study plan is on schedule. The major problem is involved with the drilling schedule, where final decisions have not been made that would allow access to necessary boreholes to complete this study plan schedule.

Stratigraphy & Structural Model (not on 6/1/87 list) -- Not yet started. Just writing that section of the SCP which referces this study plan. No technical/strategies/link-up problems anticipated.

# REVIEW AND APPROVAL OF EXTERNAL DOCUMENTS



# PARTICIPANT RESPONSIBILITIES

## DOE - RL - BP 6.3

### BRANCH CHIEF

- Selects Review Coordinator
- Monitors

### REVIEW COORDINATOR

- Determines participating organizations
- Coordinates Reviews
- Checks that comments are resolved and documented

### REVIEWERS

- Comment
- Evaluate proposed resolution

### AMC

- Approve Documents

STUDY PLAN REVIEW  
BASALT WASTE ISOLATION PROJ.

*CHECKLIST*

REFERENCES FOR STUDY PLAN REVIEW

BP 6.3 REVIEW AND APPROVAL OF EXTERNAL DOCUMENTS.

REVISION 2, MARCH 18, 1987

ATTACHMENT B, DOE LETTER, STEIN TO ANTTONEN ON MAY 7 & 8, 1986

MEETING WITH NRC

ATTACHMENT A, DOE MEMORANDUM, STEIN TO ANTTONEN, ON FINAL PROCEDURES

FOR HQ APPROVAL OF STUDY PLANS SUPPORTING THE SITE

CHARACTERIZATION PLANS (SCP)

*ppp 3-11*

## STUDY PLAN REVIEW CHECKLIST

Each study plan should be evaluated for incorporation of those DOE-HQ requirements applicable to the particular study.

### REQUIREMENTS

#### I. Purpose and Objectives:

- o How will information be obtained and used?
- o Is the rationale and justification for the information to be obtained provided?
  - Performance goal/Confidence level
  - Design goal/Confidence level
  - Regulatory requirements.

#### II. Rationale for Selected Study:

- o Is the rationale and justification (including alternative tests and analytical methods) provided?
- o Is the rationale for number, location, duration and timing of tests (including reasonable alternatives and sources of uncertainty) described?
- o Are the study constraints described?
  - Impact on the site from testing
  - Need to simulate repository conditions
  - Required accuracy and precision
  - Limits of analytical methods
  - Capability of analytical methods to support the study
  - Time required/time availability
  - Scale of phenomena; limitations of equipment; applicability of studies conducted in the laboratory to the scale of the phenomena in the field
  - Interrelationships of tests
  - Interrelationships of significant interference among tests and exploratory shaft facility design and construction.

### III. Tests and Analyses

o Do tests provide for each of the following:

- General approach used in the test; key parameters to be measured; experimental conditions; number of tests and their locations
- Test methods, standard or modified (full descriptions); level of quality assurance (reference specific QA requirements)
- Tolerance, accuracy and precision
- Range of expected results
- Required equipment
- Data reduction techniques and analysis of results
- Representativeness of test; indicate limitations
- Illustrations to show locations and schematic layouts
- Relationship of test to set performance goals and confidence levels.

o Do the analyses provide for each of the following:

- Purpose, conditions or environments
- Relationship to set performance goals and confidence levels
- Methods, analytical expressions and numerical models
- Technical procedures document
- Level of quality assurance and rationale
- Data input requirements
- Expected output and accuracy
- Representativeness of analytical approach and limitations/uncertainties.

**IV. Results**

- o Are the application of results discussed?
  - Performance assessment analyses
  - Design uses
  - Characterization uses.

**V. Schedule and Milestones:**

- o Are the durations and interrelationships of principal activities and key milestones provided?
- o Is the timing relative to other studies and impacts discussed?
- o Are dates for activities or milestones referencing the master or activities or schedules provided?

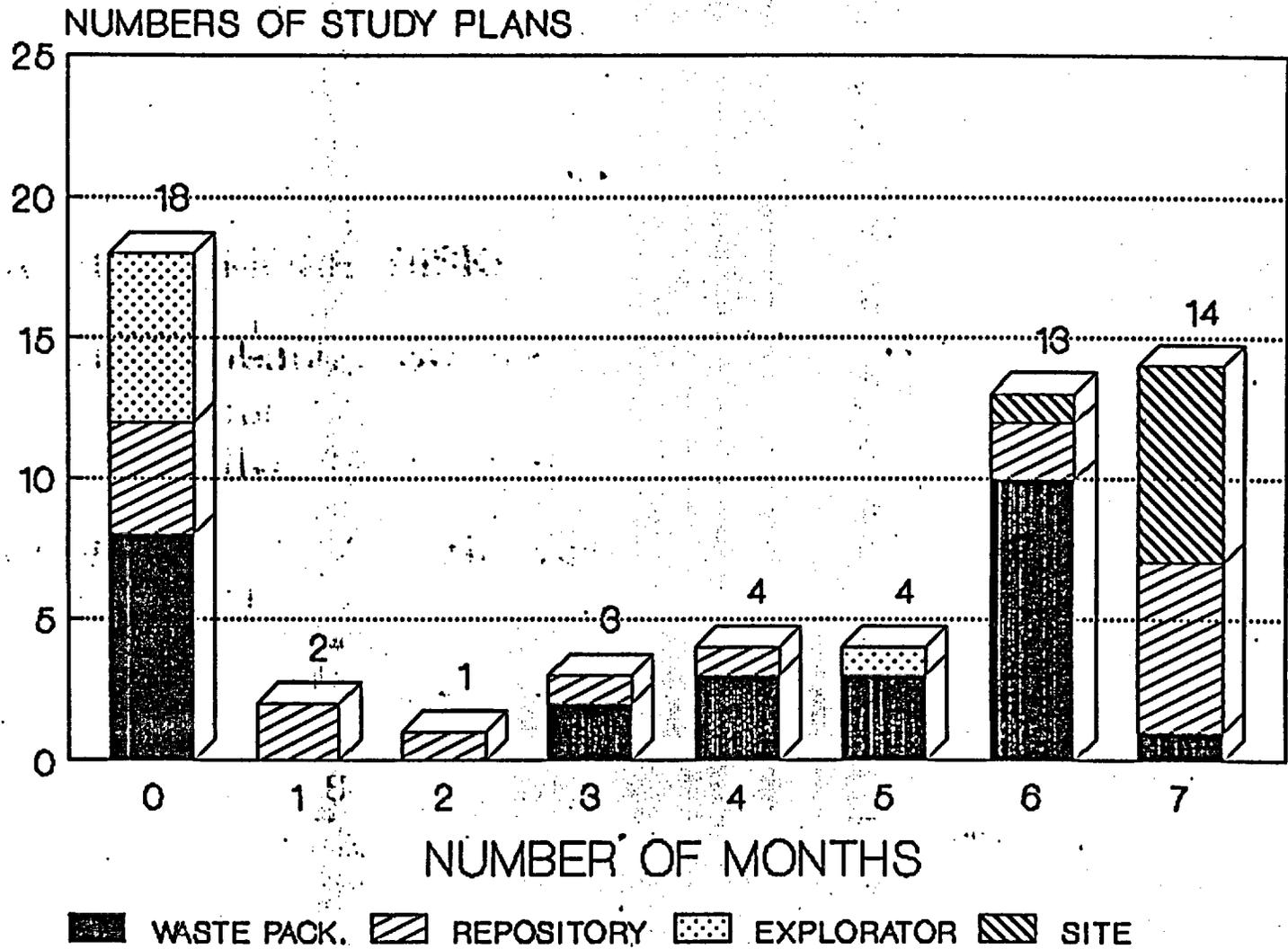
# PERSONNEL NEEDS FOR STUDY PLAN REVIEW

STUDY PLANS	ENGINEERING & CONSTRUCTION				GEOSCIENCE & TECHNOLOGY				LICENSING, ENVIRON. SAFETY			QUALITY SYSTEMS		PROJECT MANAGEMENT			REVIEW FOCUS T TECHNICAL S STRATEGY P PROGRAMMATIC I INTEGRATION C CONSISTENCY	
	MINING ENGINEER	REPOSITORY ENGINEER	MECHANICAL ENGINEER	SYSTEM ENGINEER	HYDROLOGIST	GEOLOGIST	GEOCHEMIST	GEOPHYSICIST	ENVIRONMENTAL SCIENTIST	LICENSING ENGINEER	INSTITUTIONAL SPEC.	SAFETY ENGINEER	QUAL. SYS. ENGINEER	QUAL. TECH. SPECIALIST	CONTRACT OFFICER	SCHEDULING		PLAN & BASELINE
PALEOCLIMATE					T	T			T	S			P	C				
FUTURE CLIMATE					T	T			T	S			P	P	C	C		P
REGIONAL GROUNDWATER					T	T	C	T	I	S			P	P	C	C		P
SITE GROUNDWATER	I				T	C	T			S			P	P	C	C		P
STRATIGRAPHY	I				C	T	T	T		S		I	P	P	C	C		P
INTRAFLOW STRUCTURES		I			T	T		C		S			P	P	C	C		P
STRUCTURAL GEOLOGY					C	T		T		S			P	P	C	C		P
EARTHQUAKE SEISMOLOGY	T	T						T		S			P	P	C	C		P
TECTONIC MODEL DEVELOP.	T	I						T		S		I	P	P	C	C		P
CONSTITUTIVE MODEL DEVELOP.	T	T		I	I					S			P	P	C	C		P
WASTE PKG. ENVIRON. BASALT	T	T	C		I		T			S			P	P	C	C		P
WASTE PKG. ENVIRON. GEOCHEM.	T	T				T	T			S			P	P	C	C		P
WASTE PKG. IN SITU TESTING	T	T		T	I		I			S			P	P	C	C		P
CONTAINER HNDLG. & SAFETY TSTG.	T	T	C	T					S	T	T		P	C				P

# HEADQUARTERS REVIEW PROCESS

- \* Attempts to minimize management risk
- \* Acceptance level too removed from implementation level
- \* Poorly recognizes "change"
- \* Duration too long to conduct a program
- \* Will delay program
- \* Clarify Definition of Study Plan

# POTENTIAL PROJECT DELAYS



# RECOMMENDATIONS

1. ASSUME MORE RISK:
  - Begin testing 30 days after NRC  
submittal  
(positive respond from NRC)
2. CONDUCT DOE - RL AND HEADQUARTERS IN  
PARALLEL
3. FINAL ACCEPTANCE BY PROJECT OFFICE  
WITH HEADQUARTERS CONCURRENCE
4. PROJECT OFFICE PRINTS AND SUBMITS  
DOCUMENTS
5. ELIMINATE ENGINEERING DEVELOPMENT  
PLANS FROM STUDY PLANS