

# Viability Assessment Design and Review Plan

# Civilian Radioactive Waste Management System

# Management & Operating Contractor

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# Civilian Radioactive Waste Management System Management and Operating Contractor

Viability Assessment Design and Review Plan

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August 11, 1997

### Prepared for:

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# Viability Assessment Design and Review Plan

# **CHANGE HISTORY**

REV	ICN	DATE	DESCRIPTION
00		12/19/96	Initial Issue
01		3/14/97	Revised Subsection 3.3 to clarify the expected design progress toward the VA milestone. Revised Appendix B to expand and clarify all Issue Resolution Plans. Modified Appendix G to clarify the expected accomplishments for the Phase I Design. Added program interfaces to Section 6.0 and Appendix L.
01	1	5/22/97	Corrected errors in Issue Resolution Plan numbers 4 and 10.
01	2	08/11/97	Update the Resolution Plan for Issue #10, contained in Appendix B, to reflect the interim DOE guidance of July 14, 1997, on the Repository performance standard.

## Civilian Radioactive Waste Management System Management and Operating Contractor

Viability Assessment Design and Review Plan

B00000000-01717-4600-00070 REV 01, ICN 2

August 11, 1997

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#### 1. INTRODUCTION

#### 1.1 PURPOSE

This Viability Assessment (VA) Design and Review Plan (Plan) will identify and discuss the organizations and tools (schedules, processes, plans, etc.) that will be used to direct, control, and monitor progress toward the timely and successful development of design and systems engineering components of the VA package. It will address the activities and products of the Civilian Radioactive Waste Management System Management and Operating (M&O) Contractor's Engineering and Integration (E&I) Operations area, which has responsibility for the design and systems engineering of the repository and engineered barrier system, and for interfacing with other M&O Operations areas. The creation of this Plan will facilitate the identification and organization of the E&I activities and products required to support the VA milestone.

#### 1.2 SCOPE

As required by the fiscal year (FY) 1997 Energy and Water Appropriations Act, the VA package will include four components:

- "(1) the preliminary design concept for the critical elements for the repository and waste package;
- (2) a total system performance assessment, based upon the design concept and the scientific data and analysis available by September 30, 1998, describing the probable behavior of the repository in the Yucca Mountain geological setting relative to the overall system performance standards;
- (3) a plan and cost estimate for the remaining work required to complete a license application; and
- (4) an estimate of the costs to construct and operate the repository in accordance with the design concept."

This Plan will address the scope of the Design and Systems Engineering activities and products required to support the development of these four components. The VA milestone support addressed in this Plan will focus on those aspects of waste package and repository design that are important to post-closure criticality control, and to post-closure waste containment and isolation performance. The Design and Systems Engineering activities will both support and be supported by the total system performance assessment for the VA milestone. This Plan will also address those aspects of repository surface and subsurface operations, and of waste package and repository design required to support the cost estimates and License Application (LA) planning. The results of these activities will be documented in a VA package to be developed in accordance with the Viability Assessment Monitoring Plan (VA Monitoring Plan) (in development).

Those Design and Systems Engineering activities and products required to support the VA milestone are a subset of the total set of activities to be performed in FY 97/98. For example, FY 97/98

activities and products that will not be included in this Plan or in the VA package are those related to planning, the National Environmental Protection Act (NEPA), operational safety, construction methods, maintenance, and operations not affecting the repository performance.

#### 1.3 OBJECTIVES

Many of the objectives of this Plan will be accomplished by the act of creating and delivering the Plan. That is, it is the forcing function for organizing the E&I activities required to support the VA milestone and for developing the management tools required to direct, control, and monitor those activities. An additional objective is to provide a general understanding of the relationship between the E&I activities and products and the VA management tools. This Plan will provide guidance on remaining current on the revisions and evolution of VA management tools, and information on how to access those tools to obtain the current status of the E&I activities and planning which support the VA milestone.

Because the VA management tools exist as "living" entities outside of this Plan, there is no intention of updating this Plan once it has been delivered. One of the primary VA management tools will be the VA Monitoring Plan, which is described in Subsection 1.2. In addition, there will be a sequel to this Plan which will address those Design and Systems Engineering related topics and issues that are important to the Site Recommendation (SR) milestone and to the preparation of an LA. This draft LA Plan is scheduled to be delivered in September of 1997.

#### 2. BACKGROUND

#### 2.1 ACTIVITIES LEADING TO LA

In response to Congressional guidance from the 1996 fiscal year appropriation, and the additional policy decisions made by the U.S. Department of Energy (DOE) during development of the President's 1997 fiscal year budget request, the path forward for completing the Yucca Mountain Site Characterization Project (YMP) has been revised. This revision rescheduled the completion of major YMP milestones of the Environmental Impact Statement (EIS), SR, and LA to maintain the DOE's long-term objective of beginning repository operations in the year 2010. This revised YMP schedule was provided in the Civilian Radioactive Waste Management Program Plan, Revision 1, dated May 1996.

Based on the knowledge the DOE has gained through scientific investigations and engineering design activities conducted to date, as well as streamlining and focusing both technical and regulatory elements of the YMP, the Yucca Mountain Site Characterization Office (YMSCO) has defined the following three near-term objectives:

- complete an update to the YMP regulatory framework (DOE's siting guidelines in 10 CFR 960, General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories.) in 1997;
- 2) complete the VA milestone in 1998;
- 3) complete the remaining statutory milestones to issue an EIS in 2000, recommend the repository site to the President in 2001, and submit an LA to the Nuclear Regulatory Commission (NRC) in 2002.

This Plan addresses the E&I activities and products which support the near-term VA milestone objective.

#### 2.2 COMPONENTS OF THE VA MILESTONE

The four components of the VA package, as identified in Subsection 1.2, address the design, total system performance assessment (TSPA), LA planning, and the Mined Geologic Disposal System (MGDS) cost estimate.

The first component of the VA package will address those design elements that are critical to determining the feasibility and performance of the repository and the engineered barrier system. This effort will evaluate the technological feasibility of the designs but will not yet contain the detail needed for licensing. The designs will build on existing design work documented in the 1996 MGDS Advanced Conceptual Design Report, with emphasis placed on the key technical questions that affect licenseability, criticality control, waste containment and isolation, handling and packaging of waste, performance, and cost. These questions revolve around design of waste packages, surface and subsurface facilities, thermal management of the waste-generated heat, corrosion of waste packages, the role of supplemental engineered barriers, degradation of waste forms, and transport of

radionuclides. In addition, the effort will address concepts for waste retrieval operations, performance confirmation requirements, safety systems, and other factors that could significantly affect repository costs.

The second component of the VA package will be a TSPA based on an updated design and the analyses of available site and engineering data. The primary objective of the TSPA is to evaluate the probable behavior of the potential repository. An additional objective is to further refine the evaluations of repository performance under a range of normal conditions and an initial evaluation under a selected set of conditions imposed by potentially disruptive events, such as tectonic movements along geologic faults. The TSPA will also evaluate the possible change in performance as a consequence of the uncertainty in key factors such as groundwater flow, thermal effects, and corrosion.

The third component of the VA package is the LA Plan, which, among other functions, will identify the remaining scientific investigations, engineering information, and estimated costs required to complete an LA. The preparation of the LA Plan will provide an opportunity to assess the adequacy of the revised approach to site characterization and design, and the effectiveness of updates to the Office of Civilian Radioactive Waste Management (OCRWM) Program's regulatory framework.

The fourth component of the VA package provides cost estimates for the repository system. The cost estimates are not for the total system life-cycle costs (TSLCC), but will address all relevant costs for the MGDS. It will provide information for policy decisions regarding the feasibility and rationale for continuing with licensing and construction of a geologic repository at Yucca Mountain.

#### 2.3 DESIGN AND SYSTEMS ENGINEERING ROLE

The E&I Operations area of the M&O is responsible for the Design and Systems Engineering organizations' activities which will directly support the first and fourth VA package components on design and cost estimates. The E&I Operations area will also be responsible for providing accurate and timely information required to develop the second and third VA package components on TSPA and LA planning. This Plan will discuss the role of the E&I organization and its activities and products. Other organizations, activities and products that are dependent on the products of the E&I Operations area, and which support the VA milestones, are discussed in the VA Monitoring Plan.

## 2.4 QUALITY ASSURANCE (QA)

Based on an evaluation in accordance with QAP-2-0, Conduct of Activities, this Plan was determined to be a non-Q product.

The quality affecting aspects of the Design and Systems Engineering products required to support the VA milestone will be determined in accordance with applicable procedures.

#### 3. ENGINEERING ACTIVITIES

#### 3.1 VA CONCERNS

A list of the Design and Systems Engineering related concerns important to the VA milestone has been developed and is provided in Appendix A. These concerns are areas of work with relatively higher risk. Consequently, the concerns list will be used to focus the planning and performance of activities leading to the VA milestone.

#### . 3.2 VA ISSUES

A list of the Design and Systems Engineering related issues important to the VA milestone has been developed and is provided in Appendix B. These issues are related to trade-offs or decisions with significant, potential impacts for the OCRWM Program. Consequently, the planning for issue resolution will help provide timely answers to significant questions and will help manage risk leading to the VA milestone. The method for resolving the issues and keeping the list current is also provided in the appendix.

## 3.3 VA DESIGN AND SYSTEMS ENGINEERING PRODUCTS

The Design and Systems Engineering products developed in preparation for the VA milestone are of two basic types. Some consist of information passed along to other YMP organizations to support their activities leading to the VA milestone (see Section 6 for a detailed discussion of YMP integration). Other products consist of the components which make up the MGDS design. Examples of such components are requirements documents, analysis documents, drawings, technical reports, etc. The current lists of the specific E&I products are provided in the following appendices:

- Waste Package Development and Materials Products (Appendix C)
- Repository Surface and Subsurface Products (Appendix D)
- Systems Engineering Products (Appendix E)

Descriptions for these products are provided in the M&O earned value guidelines documents that have been developed by the E&I Operations Area and coordinated with the DOE. These descriptions provide the standards for the stages of completion for each type of document. The FY97/98 schedules (Appendices I, J and K) identify when the products are expected to be completed. By comparing the contents and timing of each product with the stage of completion standards contained in the earned value documents and the timing standards contained in the schedules, management is able to evaluate the progress accomplished toward the VA milestone. Engineering documents will represent the most important systems, structures, and components as determined by the binning process. Those systems which are most important to licensing and capital cost are being given priority in the planning. Studies, reports, and requirements documents, when delivered in compliance with the earned value guidelines and the planning schedules, will illustrate that timely decisions are being made on important issues, and that assumptions are being made as necessary to facilitate progress in completing engineering for the MGDS.

#### 4. DESIGN REVIEWS

The products to support the VA milestone need not be completed to a level suitable for construction release. The level of completion for each product will be as required to support defined objectives of the VA milestone in accordance with the VA Monitoring Plan..

The process for reviewing the design throughout its development has been proposed by the M&O to include the following:

- 1) reviews of each product or deliverable during the design process and in accordance with applicable QA procedures;
- 2) informal, in-process product status reviews;
- 3) formal administrative status reviews of cost, schedule, earned value, and deliverables; and
- 4) formal high-level management system design reviews.

Together, these reviews provide a comprehensive means for assessing progress and ensuring customer confidence throughout the design development.

#### 4.1 QA REVIEWS

When each design product (drawings, analyses, specifications, reports) has been developed to a point suitable to support the VA milestone, it will be released. The product will be reviewed and released in accordance with the appropriate M&O QA procedures. The following are examples of some of those procedures:

QAP-3-5, Development of Technical Documents

QAP-3-8, Specifications

QAP-3-9, Design Analysis

QAP-3-10, Engineering Drawings

At this stage of the preliminary design, nearly all the engineering documents will present concepts that will be carried forward to LA design. These documents represent decisions affecting layout of the Yucca Mountain Site and the various facilities, design of the most important systems, structures and components, and plans for design at a more detailed level. As such, all of these engineering documents will be distributed to the DOE for review. Documents prepared in accordance with QA procedures will be submitted during the design review process, thus giving the DOE an opportunity to comment. Documents that are *not* prepared in accordance with QA procedures will be provided to the DOE concurrent with the M&O internal review process. This phase of the design will establish the direction for all subsequent phases of design development. For this reason, the DOE must be given the opportunity to participate in the process. A copy of all products both before and after the M&O review, will be distributed to the DOE.

#### 4.2 IN-PROCESS REVIEWS

In-process status reviews are key to maintaining an on-going communication between the M&O engineers and their DOE counterparts throughout the development process. This ongoing interaction is typically informal, but is frequent and regular. Several forums have been established to facilitate these interactions in which the progress on products or product sets, or briefings for upcoming reviews, are discussed. The reviews which address Work Breakdown Structure (WBS) unique topics are facilitated and controlled by the DOE and M&O WBS Managers. The reviews which address topics common to two or more WBS areas are facilitated by the M&O's MGDS Project Engineering Office.

#### 4.3 ADMINISTRATIVE STATUS REVIEWS

A less frequent but regularly scheduled review of cost, schedules, earned value, and deliverable status has also been established. This more formal, higher level management review provides an assessment of how efficiently and timely the design is being developed and provides an opportunity to identify problems or to pursue specific issues. This review is controlled by the E&I Manager and DOE counterparts, and is facilitated by the M&O's MGDS Project Engineering Office.

#### 4.4 MANAGEMENT REVIEWS

The purpose of the management reviews is to provide a high-level review of how all elements of the design work together to complete the overall mission of safely disposing radioactive waste. During these reviews, design information provided to other YMP organizations is validated, course corrections are made, and an assessment performed on the soundness of the overall design. A series of three management reviews are planned en route to the VA milestone: the June Design Review, the Phase I Design Review, and the MGDS VA Review. These reviews will be structured, where appropriate, to also meet the VA monitoring requirements as identified in the VA Monitoring Plan.

#### 4.4.1 June Design Review

The purpose of this June 1997 review is to assess the overall engineering approach and obtain high-level management concurrence. It will address the major issues, topics, risks, concerns and progress within the E&I area of responsibility. It will not get into a review of the design details nor the contents of the information being provided to the other YMP organizations to support their VA milestone activities. These topics will be covered in the Phase I Design Review. A discussion of this review and a description of the planning for this review are provided in Appendix F.

#### 4.4.2 Phase I Design Review

The purpose of the Phase I Design Review is two-fold. The first purpose is to review all the information exchanged between Design and Systems Engineering and the interface organizations such as Performance Assessment (PA), Site, NEPA, etc., to ensure completion. The second purpose is to compare those activities completed to date, with the planned progress of activities in order to identify and refocus efforts toward a successful VA milestone. It will be a review of the design and operational concepts at a more detailed level than covered at the June Design Review. A discussion

of the Phase I Design Review and a description of the planning for this review are provided in Appendix G.

#### 4.4.3 MGDS VA Review

The focus of the MGDS VA Review is to ensure that all relevant design information has been completed and summarized in VA supporting documentation or in the Project Integrated Safety Assessment. A discussion of this review and a description of the planning for this review are provided in Appendix H.

#### 5. SCHEDULES

The FY 97/98 schedules are being developed as part of the current planning activity. Planning is continuing and the schedules are expected to be completed in March 1997. The current versions of the E&I schedules are:

- Systems Engineering Schedule (Appendix I)
- Waste Package Development and Materials Schedule (Appendix J)
- Repository Surface and Subsurface Schedule (Appendix K)

All activities identified in the schedules support the VA milestone except those that are completely outside the scope of the VA package (see Subsection 1.2). These schedules are used with the other management tools identified in this Plan to allocated resources and monitor progress toward the VA milestone.

#### 6. INTERFACES

The interfaces of the Design and Systems Engineering organizations with other YMP and OCRWM areas involve both data needs (input) and data deliveries (products). These data needs and deliveries and their associated dates are captured in the schedules listed in Section 5. These schedules were used to create a point of departure checklist of the interactions and exchanges of information planned between the E&I Operations area and other YMP and Program areas both within the M&O and external to it. This checklist is provided in Appendix L. Some anticipated interfaces are not yet funded and included in the planning; however, it is expected that when funding and guidance is provided, the planning will address these Program level interfaces. Specifically, these Program interfaces will include DOE/EM for the DOE-SNF and other waste, RSAs for waste receipt characteristics, and potential interfaces for co-located, government directed, federal receiving facilities. Additionally, there are plans for various organizations to provide support to E&I activities, with budget provided for that support. These interactions with other organizations are captured within the Basis of Estimates for these specific activities. Numerous organizations are invited to participate during review of E&I documents. Some participation is required by procedures, but most of the participation is administratively controlled in the review process.

The design organization will request qualified input in accordance with the QA process. When qualified input is not available, unqualified input will be used and will be labeled as such.

Design and engineering products (i.e., functional and design analyses, drawings, specifications, etc.) that address major features and parameters of the developed design and operations will be provided to support the TSPA-VA and the planning to the LA. Some of this output may be preliminary or be considered a work in progress (i.e., some products may not be fully reviewed and approved). Such engineering products will be identified as preliminary and released for a specific purpose.

#### 7. SUMMARY OF M&O VA MANAGEMENT TOOLS

The M&O VA management tools identified and discussed in this Plan are summarized in the following Table. A brief description is provided, along with a reference to the corresponding Appendix which provides a version of the tool that was available at the time this Plan was developed. These tools are kept current and controlled by the individuals identified in the Table.

#### **Summary Table - M&O VA Management Tools**

Title	Description	M&O Controller	M&O Keeper	Appen- dix
VA Concerns	A list of concerns used to focus the planning and performance of activities leading to the VA milestone.	J. Bailey	C. Hastings	A
VA Issues	Issues are identified and the plans to resolve them are provided. The resolutions of these issues are used to provide direction and manage risk leading to the VA milestone.	J. Bailey	C. Hastings	В
Waste Package Development and Materials Products	A list of products to be developed by the Waste Package Development and Materials group in FY 97.	A. Segrest	C. Chagnon	С
Repository Surface and Subsurface Products	A list of products to be developed by the Repository Surface and Subsurface group in FY 97.	A. Segrest	B. Stanley	D
Systems Engineering Products	A list of products to be developed by the Systems Engineering group in FY 97.	A. Segrest	F. VanDerLaan	E
June Design Review	Description and planning for the June Review used to integrate the E&I activities required to support the review.	R. Snell	M. Sellers	F
Phase I Design Review	Description and planning for the Phase I Review used to integrate the E&I activities required to support the review.	R. Snell	J. Clouet	G

Title Description		M&O Controller	M&O Keeper	Appen- dix
MGDS VA Review	Description and planning for the MGDS VA Review used to integrate the E&I activities required to support the review.	R. Snell	J. Clouet	Н
Systems Engineering Schedule	FY 97/98 schedule of Systems Engineering tasks and milestones used to monitor and control its activities and products.	R. Wagner	F. VanDerLaan	I
Waste Package Development and Materials Schedule	FY 97/98 schedule of Waste Package Development and Materials tasks and milestones used to monitor and control its activities and products.	A. Segrest	C. Chagnon	J
Repository Surface and Subsurface Schedule	FY 97/98 schedule of Repository Surface and Subsurface tasks and milestones used to monitor and control its activities and products.	A. Segrest	B. Stanley	K
E&I Interfaces	A point of departure checklist of the FY 97/98 Planning summary accounts which involve interfaces with other YMP and Program areas.	R. Wagner	M. Sellers	L

#### APPENDIX A

#### **VA CONCERNS**

The data contained in this appendix reflects the status of the Yucca Mountain Site Characterization Project as of 12/16/96. Because of the evolving conditions of the Yucca Mountain Site Characterization Project, data in this appendix is changed or updated as necessary. However, this VA Design and Review Plan will not be revised or reissued as a result of data updates. For a current status of the data in this appendix and/or a copy of the current version, contact C. Hastings. For suggested changes to the contents, contact J. Bailey.

#### **VA CONCERNS**

A list of concerns has been developed to help focus the planning and performance of the E&I activities leading to a successful VA milestone. The list includes a title and the organization that is primarily responsible for addressing the concern in their planning. Sometimes, a short description of the concern is provided with the title.

#### APPENDIX B

#### **VA ISSUES**

The data contained in this appendix reflects the status of the Yucca Mountain Site Characterization Project as of 3/7/97. Because of the evolving conditions of the Yucca Mountain Site Characterization Project, data in this appendix is changed or updated as necessary. However, this VA Design and Review Plan will not be revised or reissued as a result of data updates. For a current status of the data in this appendix and/or a copy of the current version, contact C. Hastings. For suggested changes to the contents, contact J. Bailey.

#### Viability Assessment Design Concerns

No		1
Z		
Concern		
8		
6		E&I Org. of Primary
	\.ODC###   DD#	Responsibility
C-1	Weste parkage emplecement concept for thermal management (point load vs line load)	MGDS PE
	Subsurface ventilation concept feasibility & operation (continuous emplacement drift, preclosure ventilation vs during emplacement only)	
C-2	(concents for dust control): includes subsurface ventilation redundancy	Repository Design
	Wasta maskaga materials	Waste Package Development
C-4	Mosts street shoresteristing and throughput requirements from receipt to emplacement	Systems Engineering
	I street concelly requirements and concept	Systems Engineering
	Indeted O liet	Systems Engineering
C-0	Closure & decommissioning concepts for equipment, facilities & operations procedures	Repository Design
	Remote welding and NDE of loaded disposal containers	Repository Design
C-8	Determine the appropriate and necessary levels of geologic fault characterization	Repository Design
C-9	Identify constraints (standards) from EPA & NRC on waste package loading relative to normal and off-normal operations	Repository Design
C-10	Identity constraints (standards) from EPA & NRC on waste package loading relative to normal and of the standards	Systems Engineering
C-11	List of prohibited and limited use materials	Waste Package Development
C-12	Waste package fabrication method	Waste Package Development
	LA strategy for DOE SNF	Waste Package Development
C-14	Design basis waste characteristics	Systems Engineering
	Safeguards and security requirements and concepts; includes IAEA inspection requirements and concepts.	Waste Package Development
C-16	SNF burnup measurement requirements and concepts	Repository Design
C-17	Surface facilities requirements and concepts	Systems Engineering
C-18	Restricted area requirements and concepts	Repository Design
C-19	Selsmic design requirements	Repository Design
C-20	Subsurface fault standoff requirements	Systems Engineering
C-21	OSHA and MSHA code compliance requirements	Repository Design
C-22	Design basis rock fall characteristics - Post Closure	Waste Package Development
C-23	Waste package containment requirements	Repository Design
C-24	Near field environment design basis	System Engineering
C-25	Nevada transportation routes and modes	Repository Design
C-26	Off site utility requirements and concepts	Repository Design
C-27	Subsurface drainage requirements and concepts	Waste Package Development
C-28	Number of HLW glass canisters per disposal container	Trace t delings a store in
	Design development of engineered features that demonstrate licensability of unprecedented systems, structures, components or activities	MGDS Development
C-29	(SSCA)	INODO DEVELOPITOR
	Design development of engineered features that while using existing technology are unique to the MGDS operations and have little or no	MGDS Development
C-30	declar procedures	INIGDO Development
	Design development of engineered features that have significant impact on cost and schedule estimates for MGDS construction, operation,	MACDO Davelerment
C-31	and closure	MGDS Development
<u> </u>		

#### **VA ISSUES**

A list of key VA issues has been developed, the resolution of which will provide direction and reduce risk to the Program. The following steps will be used to track progress of resolving the issues and for updating the list as required:

- An M&O and a DOE Responsible Individual (RI) is identified for each key VA issue as given in the table below.
- For each key VA issue, the M&O RI will prepare a resolution plan in accordance with the guidance given in attachment 1.
- Each resolution plan will be coordinated within M&O and DOE.
- Each resolution plan will be implemented and tracked to the conclusion of the key VA issue.
- On a regular basis, the list of key VA issues and the resolution plans will be reviewed and updated as required.

The latest version of these resolution plans are provided in Attachment 2. Status of activities addressed in these resolution plans will be monitored in accordance with the VA Monitoring Plan. E&I management will direct remedial actions and provide necessary resources if progress toward resolution is not in accordance with the resolution plan.

# **Attachment 1 - Resolution Plan Form and Instructions**

# Viability Assessment Design Issues

ne No		VA Issue POC - DOE	VA Issue POC - M&O
lssue	Issue Title	Harrington	Blink
1	Thermal loading range (high, medium, low) (reference values)	Haught	Balady
	EBS performance enhancements (backfill, drlp shields, etc.) Criticality control: NRC strategy (probabilistic vs. deterministic) and concepts (filler, control rods, partially filled WP, use		Benton
3	of DU) (assuming burn up credit)	Gonzalez	Nolting
4	Emplacement drift ground support concept (steel vs cast in place concrete vs precast concrete)	Boyle	Memory
5	Performance Confirmation concept (monitoring system, sampling approach, sampling rate, etc.)	Harrington	Saunders
6	Retrievability concept (instant & continuous vs develop when required)	Verna	Meyers
17	Confirmation of high volume and long period waste handling capability and DBE consequences (dry vs pool)	Verna	Memory
8	Disposal of site generated waste (on site vs off site)	Boyle	Memory
9	Strategy for mapping repository subsurface	Van Luik	Kalla
10	Post closure performance standards	Harrington	McAffee
11	Viability of underground, remote control concepts	Russell	P. Hastings
	Burnup credit limits (none vs principal isotopes)		Memory
13	Repository seals requirements and concepts	Harrington	Mentory

Ω	pescribe the steps in a process that the project will use to bring closure on this issue
ο.	Describe the arebaing brocess that the broless was as a series

No.	Title	Description	Summary Account #
1	Assign Tasks		
2	Gather Data		
3	Document Resolution		·
4	Report Conclusions		<u> </u>

9. Provide a rough schedule of when this issue will be resolved for VA

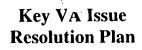
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- 10. Describe a process that will be used to measure performance towards closure. Performance will be measured in accordance with the process documented in the VA Monitoring Plan.
- 11. Describe how status will be reported during the process of closing this issue. Status will be reported in accordance with the process documented in the VA Monitoring Plan.

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DOE Manager:	M&O Manager:

Responsible Individuals: DOE: Phone: Phone: Phone: Describe the current status and the significance of the issue.  Describe the current status and the significance of the issue.  Indicate its importance and what effects it will have on a VA.  Describe how the issue ties to the TSPA, MGDS cost estimate, and LA planning.  Describe the strategy and criteria for achieving a degree of closure sufficient for VA.		Date:	Rev. #
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(Continued on next page)



# **Continuation Page for Paragraph 8**

No.	Title	Description	Summary Account
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# **Continuation Page for Paragraphs 4 through 7**

Continuation for Paragraph Number \_\_\_:

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#### Guidance

Issue Title:

Taken from list of Key VA Issues.

Date:

Date the form was completed sans the coordination signatures.

Rev. #:

1st version submitted for coordination signature is Rev. # 00.

After all coordination signatures on Rev. # 00, the 1st modified version submitted for coordination signatures is Rev. #

01. Etc. for other modified versions.

**Issue Description:** 

A description of the issue including scope, constraints and specific examples.

Responsible Individuals: Taken from list of Key VA Issues.

For Paragraphs 4 - 7, confine oration to the space provided on the form. However, if additional space is necessary to communicate the full extent of the planning, use the appropriate continuation page.

Paragraph 4:

Address what has been done and what is currently being done. Describe the work scope(s) that it is a part of. Identify groups outside of E&I that are key players. Discuss why it is significant for the OCRWM Program.

Paragraph 5:

Address the importance to VA design of resolving this issue. Identify the impact if it is not resolved by VA.

Paragraph 6:

Describe the products and their contents (if any) that will be used to communicate the resolution of this issue to those working on TSPA-VA, VA cost estimate, and/or LA planning.

Paragraph 7:

Describe the VA closure criteria for this issue and the general strategy for achieving closure.

6

Paragraph 8:

Identify and describe the major tasks required to resolve the issue. Type over the examples given in the form. Try to confine the description to the space provided on the form. Use the appropriate continuation page for additional space for the region tasks and for any sub-tasks.

for the major tasks and for any sub-tasks.

Paragraph 9:

For each of the major tasks of paragraph 8, provide the point of contact (POC), dates and schedule notation. Type over the examples given in the form. Use the appropriate continuation page for additional space for major tasks and for any sub-tasks.

# **Continuation Page for Paragraph 9**

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## Attachment 2 - Resolution Plans for Key VA Issues

The following resolution plans for the VA issues have been reviewed by E&I management, but have not yet been coordinated with the DOE. The M&O is currently working to complete the coordination with the DOE.

The resolution plans will be updated as necessary during progress toward the VA milestone. C. Hastings is responsible for maintaining the plans based on input from the DOE and M&O Responsible Individuals. J. Bailey is responsible for controlling the content of the plans. Any changes to the plans will require rolling the "Rev" number and obtaining the appropriate DOE and M&O coordination signatures.

#### **Plan Coordination Procedure**

The M&O RI shall complete the plan and obtain the required coordination signatures in accordance with the following procedure:

- 1. Complete Paragraphs 1 through 7.
- 2. Submit the partially completed form to your supervisor for a verbal concurrence and direction to proceed with completing the form. Continue to rework these paragraphs as necessary until verbal direction is received.
- 3. Complete Paragraphs 8 and 9, and sign the form as the M&O RI.
- 4. Submit the draft form to your supervisor for a verbal concurrence from your supervisor, E&I OM signature, and direction to proceed with the DOE coordination process. Continue to rework the form as necessary until the M&O Manager's signature is obtained.
- 5. Review the contents of the form with your DOE RI counterpart, and obtain his coordination signature. Continue to rework the form as necessary until the DOE RI counterpart signature is received. If non-editorial, technical changes are required, repeat step 4 before obtaining the DOE RI signature.
- 6. Request assistance from your DOE RI counterpart in obtaining the appropriate DOE Manager's signature. Continue to rework the form as necessary until the DOE Manager's signature is received. If non-editorial, technical changes are required, repeat steps 4 and 5 before obtaining the DOE Manager's signature.
- 7. Insure that copies of the completed form have been delivered to the following distribution:

Your Supervisor

E&I OM

DOE RI

**DOE** Coordinating Manager

E&I Assistant Manager

MGDS PE Office Manager

M&O Systems Engineering Manager

M&O Design Engineering Manager

Others as Appropriate

1. Issue #1: Thermal Management

March 10, 1997

Rev. #01

2. Assigned to:

M&O Responsible Individual: Jim Blink

DOE Contact: Paul Harrington

**Phone:** 5-4371 **Phone:** 5-5415

M&O Responsible Individual

3. Issue Description:

Determine thermal management techniques that will be used for VA design (and others that will be reconsidered for LA design), and then develop design solutions to implement them. Candidate techniques include overall areal mass loading, line vs. point loading, edge loading, active ventilation, passive ventilation, the use of backfill or other EBS components, WP sequencing within the repository, SNF assembly sequencing within individual WPs, and the degree of lag storage required to implement WP or SNF assembly sequencing. Evaluations to select thermal management techniques will use as criteria the existing thermal goals stated in the CDA for protection of cladding, limiting the drift wall mechanical loading, protection of zeolites, limitation of surface temperature rise and uplift, and shear of the TSw/PTn interface. The evaluations will also consider additional goal(s) to limit the exposure of WPs to moisture and high humidity (for high AML), to limit temperaturedependent corrosion for low AML, and to allow drainage of mobilized water through the repository pillars (for high and low AML). Performance assessment types of criteria, including WP failure history, EBS radionuclide release rate, and accessible environment dose rate will also be used. This issue is related to issues 2 (EBS Performance Enhancements), 3 & 12 (Criticality), and 7 (Surface Facility Waste Handling); resolution of these five issues will require coordination and integration. This issue is also related to issue 18 (Design Basis Modeling) and will be a subset of the design options modeled in that issue.

4. Describe the current status and the significance of the issue:

The VA design will use a specific AML within the 80-100 MTU/acre range. The VA design is currently using point loading at 83 MTU/acre, but may adjust the AML during VA design. The FY96 Thermal Systems Study recommended reducing the upper bound to 90 MTU/acre, but that recommendation was not accepted by management because of insufficient evidence, and certainty of the evidence, to support making a change in requirements. Point loading will be used as the reference case for VA design, but line loading will continue to be evaluated as a PA sensitivity analysis during VA. Edge loading, active and passive ventilation, and the use of backfill will not be considered for the VA design, but may be reconsidered for the LA design. The current design does not consider WP or SNF assembly sequencing, but that situation may need to change, depending on the additional thermal goal(s). The current design is limited by the zeolite temperature goal, with the drift wall temperature goal and the cladding temperature goal being nearly limiting for some of the WPs. The current design (point loading, no WP or SNF assembly sequencing) may not meet the additional goal(s) to limit exposure of WPs to moisture and high humidity. Ultimately, the overall design will be evaluated to regulatory requirements (substantially complete containment, controlled release from the EBS, releases to the accessible environment, criticality control, etc.). TSPA will be the tool to

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make such evaluations, and aspects of the TSPA tool will be refined using process model improvements and data from ongoing laboratory and field testing of thermal processes. If the TSPA evaluations show the current design does not meet the regulatory requirements, the design organization is retaining flexibility to go toward a low AML as an alternative. Interfaces for this issue are Subsurface Design, Surface Design, WPD, WP Materials, Systems, PA, SPO, and the EIS process.

- 5. Indicate its importance and what effects it will have on a VA:
  - The performance of the repository and its cost are dependent on thermal management decisions and associated design solutions. Not making the appropriate design decisions for VA could lead to an unacceptable performance in the TSPA for VA. To date, the TSPA calculations have not had enough fidelity to be used as a tool to easily select thermal management options; the ability of PA to make such sensitivity analyses has improved considerably in the past few years and is expected to improve much more as part of the TSPA-VA abstraction process.
- 6. Describe how the issue ties to the TSPA, MGDS cost estimate, and LA planning:

  The products of resolving this issue will be decisions on thermal management options to be implemented in the VA and LA designs, and the design solutions implementing these decisions. The design solutions will be incorporated in cost estimates and the TSPA. It will be important for the TSPA abstraction process to include the selected thermal options. For thermal management techniques not used in the VA design, we will need to plan how to evaluate them, and decide whether to incorporate them, in the LA design; this planning will need to be part of the LA planning which is one of the four components of the VA.
- 7. Describe the strategy and criteria for achieving a degree of closure sufficient for VA:

  The near term focus will be on the line vs. point loading issue and determining the overall AML. For the intermediate time frame, the additional thermal goal(s) will be formulated and applied to the VA design; this should be of use to the PA effort as well. It is anticipated that the new thermal goal(s) will result in some constraints on the WP and SNF assembly sequencing, and thus on the design and operational concept.

Closure of this issue will be documented by inclusion of the selected thermal design techniques in the Controlled Design Assumptions document. Closure for VA will be for a limited subset of thermal management techniques; the issue will not be fully resolved for VA.

# 8. Describe the steps in a process that the project will use to bring closure on this issue:

No.	Title	Description	Summary Account #
1	Line Load Evaluation	Phase 1: Follow up to 96 Thermal Loading Study; reconcile three analysts' results; plan VA activity in area. (2/18 - 5/19/97)	TR11FB2
		Phase 2: Use temperature & humidity histories in WP degradation PA models, predict WP failure time distribution for LL vs. PL and for AMLs in	TR11FB2
		the 80-100 MTU/acre range (5/20 - 6/23/97).  Phase 3: Use WP failure time distribution & NF water flux to predict total	TR11FB2
		system performance (6/24 - 7/21/97) (provide feedback to management).  Phase 4: Compare point and line load from Engineering, SCC, and TSPA perspectives; evaluate margin and uncertainty; develop T/RH goals to gain	TR11FB2
		margin and reduce uncertainty (7/22 - 10/13/97).  Phase 5: Apply T/RH goals to simulations of various WP sequences; develop WP sequence operational rules (10/1 - 12/5/97).	TR11FB2
		Phase 6: Add T/RH goals and WP sequence operational rules to CDA (12/6/97 - 4/3/98).	TR11FB2, TR12FB2
2	TSPA-VA	VA scenario development	TR541FB1; SL105AM3, 9/30/97; SL105E12, 1/28/98
		TSPA-VA (PISA Chapter 8), total system calculations	TR541FB3; SL230GM3, 1/30/98; SL230KM3, 6/12/98; SL230M3, 8/20/98
		Peer review, and process model improvement due to the review	TR541FB8, TR57FB3, TR57GB3, TR57GB5, TR57GB6, TR57GB7, TR57GB8; SLSR500M, 6/20/97
		TSPA abstraction process. Four of the ten workshops have a strong link to thermal issues. They are:	
		WP Degradation (workshop Jan 8-10, 1997) (also, expert elicitation)	TR542FB2, TR57FB4; SL208DM, 2/24/97; SL5X4E1M, 6/30/97; SL208J9, 1/30/98 TR543FB3, TR543GB2, TR57FB2;
		Thermal Hydrology (workshop Jan 21-23, 1997) (also, expert elicitation)	SLX09M, 3/18/97; SL5X41CM, 9/30/97; SLX09M3, 1/30/98; SLX10M3, 4/14/99 TR542FB1, TR542FB3, TR542GB1,
		Waste Form Degradation/Mobilization (workshop Feb 19-21, 1997) (also, expert elicitation)	TR542FB1, TR542FB3, TR542GB1, TR57GB1; SL210DM, 5/15/97; SL204FX, 6/30/97; SL204S3, 12/19/97; SL210M3, 2/27/98; SL206M3, 5/10/99 TR543FB2, TR543GB1; SLX07MM,
		Near Field Environment (workshop Mar 5-7, 1997)	6/30/97; SLX07M3, 4/2/98, SLX08M3, 7/19/99

No.	Title	Description	Summary Account #
3	Corrosion Testing and Modeling	Tests and models to determine the critical humidity for candidate materials and possible conditions (such as salt on surface). Tests to determine corrosion rates as a function of environment.  Model development, and abstraction for TSPA Long term corrosion tests (large tanks with multiple samples)  Short term thermogravimetric apparatus tests Long tern relative humidity chamber corrosion tests Crack growth tests MIC tests: 2 abiotic and 4 biotic MIC tests, CR: 3/31/97. Screening electrochemical potential tests Long-term controlled electrochemical potential tests Short term electrochemical tests of galvanic corrosion Long term galvanic corrosion tests  Thermal stability (aging) measurements Issue EMCR, Rev. 1. Ceramic testing and modeling	TR251FBE, TR251FA2 TR251FBG; WB 60116, 7/8/97; WP 60118, 7/8/97 (don't know why 2A and 2B tanks have same date) TR251FB5 TR251FBH; WP61607, 1/13/97 TR251FBC; WP60703A, 1/16/97 TR251FB1; WP26708, 1/16/97 TR251FB4 TR251FBA; WP26402, 2/10/97 TR251FB7 TR251FBB; WP60801A, 2/28/97 (7/30/97 in 97AP); WP60121, 9/11/97 TR251FBK TR251FBB; WP015A3, 2/28/97 TR256FB1, TR256FB2; WP60315A, 6/13/97
4	Waste Isolation Requirements Study	Analyses to determine importance of features and components to waste isolation. Includes resolution of locations of zeolites and performance allocation. Performance allocation will be addressed. This study will follow up on the FY96 evaluation of backfill and other engineered barrier components such as drip shields. These components influence thermal performance.	TR15FB1, TR541FA3; SE440M3, 3/31/97 (4/1 in 97AP?)
5	Performance Confirmation Follow- on Work	Analyses to determine performance confirmation methodology and consequent requirements imposed on design. The deliverable report will include drafts of the PC baseline and PC program plan.	TR15FB1; SE050BM3, 9/30/97
6	WP Size Study	This study will develop the rationale for the WP size used in VA and LA design. WP size is a key factor in thermal performance. The current rationale is based on an MPC baseline.	TR15FB1; SE460M3, 9/30/97

No.	Title	Description	Summary Account #
7	Waste Quantity, Mix, & Throughput Study	This study will add definition to expected waste streams and surface facility requirements. Its results will be used to develop WP and SFA sequencing scenarios for thermal analyses. Its deliverable will recommend a consistent approach for utilization of the waste stream, for use in surface, subsurface, and WP design. Will address temporary storage requirements driven by thermal loading and/or surges in shipment rate.	TR15FB2; SE200M3, 3/31/97
8	Retrievability Study	Analyses to determine constraints placed on design by the regulatory retrievability design. This could influence thermal performance, depending on the constraints.	TR15FB3; SE502M3, 4/30/97
9	MGDS CONOPS	Develop CONOPS in support of VA. Document in PISA Chapter 11. The milestone is a review draft	TR12FB3; TR142GB1, TR12GB5; SE400BM3, 9/30/97
10	Test & Evaluation Plan	Develop the Test and Evaluation Plan (T&EP) to support the VA to integrate Project testing. Emphasis will be on developing test requirements; identifying test architecture; and allocating requirements to the identified tests.	TR13FB1; SE418M3, 9/30/97
11	MGDS RD	MGDS Requirements Document, Rev. 3; includes "in-situ environment requirements" and "operational requirements"	TR12FB2, TR541FA4, TR12GB2; SE422M3, 3/3/97

No.	Title	Description	Summary Account #
12	Subsurface EBS Design	Subsurface design is key to thermal performance. The AML will be determined by evaluating (using ANSYS with initial water vaporization energy included) temperature at the surface, drift wall, and zeolite layer (170 m below the repository horizon). The zeolite temperature is thought to be controlling. Without backfill, the drift wall temperature is more controlling than the cladding temperature.  Support requirements development Prepare VA and LA Design and Review plans  Support system studies (activities 4-8, 10) SDD Development Evaluate NFE impacts on Subsurface Design Drift stability design Subsurface layout  Emplaçement system design Radiological design Ventilation design Retrieval design Backfill, invert, and WP support design Performance Confirmation design	TR42FA3 TR42FA6; RP120MG1, 12/31/96; RP120MG2, 9/30/97 TR42FB4 TR42FB5; RP120M3H, 9/30/97 TR47FB2 TR47FB3; RP120M3C, 9/30/97 TR47FB5; RP120M3, 7/31/97; RP120M3A, 7/31/97; RP120M3B, 9/30/97 TR47FB6; RP502M3, 9/30/97 TR47FB7 TR47FB7 TR47FB7 TR47FB1; RP120M3E, 3/31/97 TR47FB1; RP120M3E, 3/31/97 TR47FB1; RP120M3F, 4/1/97
13	Surface Design	General arrangements and operating concept of the surface facilities. The first deliverable is the establishment of the number of operating trains and capacity of in-process staging areas for waste handling operations. The second is waste handling and cask flow diagrams. The third are the general arrangements. Two other deliverables (not listed) concern HVAC and secondary waste.  Radiological safety design	TR46FB2, TR46FB5; RP243AMA, 1/30/97; RP243AMB, 5/30/97; RP243AME, 9/30/97; RP243CM, 9/30/97 TR46FB3; RP242AM, 9/30/97
14	WP Design	Develop waste stream scenarios to define the Design Basis WP. Evaluate internal WP temp. for various WP sequencing scenarios. Evaluate criticality (flooded WP, flooded degraded WP, and external) to develop design basis WP constraints. Evaluate NFE impacts on WP performance Evaluate DOE-Owned SNF impacts on WP design Analyze additional Engineered Barriers such as drip shields	TR231FA1 TR233FB7 TR233FBE, TR233FB2; WP233755, 09/16/97 TR22FB5 TR233FA1 TR233FB5

No.	Title	Description	Summary Account #
No. 15	Title  Site Characterization	3-D Mineralogy Model, including locations of zeolitic zones Mineralogic & Hydrologic Characteristics of the PTn Coupling Between Mineralogic & Hydro. Char. of the PTn Thermal Properties of Repository Horizon samples Percolation Flux at the Repository Horizon Unsaturated Zone Synthesis & Modeling, incl UZ site flow model Modeling the influence of heat on UZ Hydrologic Flow 3-D Integ Site Model Ver 2.0  Mineral changes & formation of flow barriers in the Altered Zone Near-field geochemistry and hydrology  Near-field thermal-mechanical behavior Effects of introduced materials on the chemical composition of water contacting WPs & Waste Near Field and Altered Zone Report, Vol. 1; and summary reports on models and processes  Large Block Test  Single Heater Test	TR32111FBB TR32112FB4 TR32112FB5 TR32711FB1 TR33129FBG; SP24BM3, 6/16/97 TR33129FBH TR395FA1, TR395FB1; SP23BM3, 2/28/97 TR3A1FB1, TR3A2FB2, TR3A2FB6 TR3C1FB1, TR3C2FB2, TR3C2FB3, TR3C2FB4, TR3C2FB5, TR3C2FB6, TR3C2FB7, TR3C2FBC TR3C3FB8 TR3C5FB54, TR3C5FB9, TR3C5FBA4; SP3000M3, 8/19/97; SP3100M3, 11/17/97 TR3E1FB1, TR3E1FB2, TR3E1FB3; SP9901C3, 1/27/97; SP9903M3, 8/29/97 TR3E2FB1, TR3E2FB2, TR3E2FB3, TR3E2FB4; SP9200M3, 5/23/97;
		Drift Scale Test	SP23RM3, 8/29/97 TR3E2FB13, TR3E2FB23, TR3E2FB33, TR3E2FB43; SP3305M3, 7/16/97; SP3308M3, 8/4/9 8/4/97; SP3320C3, 12/8/97

### 9. Provide a rough schedule of when this issue will be resolved for VA:

				FY97									FY98													
No	POC (Name/Phone)	Date	0	N	D	J	F	м	Α	М	J	J	Α	s	0	N	D	J	F	М	Α	М	J	J	Α	s
1	Jim Blink/5-4371	02/18/97 - 04/13/98																								
2	Bob Andrews/5-5549	10/01/96 - 99+				 																-				
3	Dave Stahl/5-4383	10/01/96 - 99+			i .						: 															
4	Steve Saterlie/5-4026	10/01/96 - 04/01/97																								
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6	Ovadia Lev/5-4029	04/01/97 - 09/30/97																						<u> </u>		_
7	Rick Memory/5-3938	10/01/96 - 03/31/97						il					_					<u> </u>								_
8	Rick Memory/5-3938	10/01/96 - 04/30/97																								
9	Richard Wagner/5-3935	10/01/96 - 09/30/98															ř.									
10	Mark Balady/5-4032	10/01/96 - 09/30/97	_							#				<b>,</b>												
11	Sam Rindskopf/5-3943	10/01/96 - 01/04/99												***												
12	Dan McKenzie/5-4393	10/01/96 - 99+				٠				Ì																
13	Steve Meyers/5-4392	10/01/96 - 99+																			;					
14	Hugh Benton/5-4389	10/01/96 - 99+			ļ. 								ĺ									1				
15	Larry Hayes/5-5152	10/01/96 - 99+																-			2					

- 10. Describe a process that will be used to measure performance towards closure:

  Performance will be measured in accordance with the process documented in the VA Monitoring
  Plan.
- 11. Describe how status will be reported during the process of closing this issue.

  Status will be reported in accordance with the process documented in the VA Monitoring Plan.

### Key VA Issue Resolution Plan

1. Issue #2: EBS Performance Enhancements (Backfill, Drip Shields, etc.)

February 3, 1997

Rev. #01A

2. Assigned to:

M&O Responsible Individual: Mark Balady

Phone: 5-4032

**DOE Contact:** David Haught

Phone: 4-5474

Manager Manager

M&O Responsible Individual

3. Issue Description:

The long-term performance of the potential repository must be calculated to be compliant with a long-term performance standard. Given the possibility that the Performance Assessment "reference case" results scheduled to be completed in 1/98 may demonstrate that the potential repository modeled without EBS performance enhancements has insufficient performance margin, what EBS performance-related work should have already been conducted and subsequently incorporated into the MGDS design to support VA? Also, given the possibility that the 1/98 PA results will show sufficient calculated compliance with the performance standard, what EBS performance-related work should nevertheless have been conducted in support of VA?

4. Describe the current status and the significance of the issue:

A FY 1996 system study entitled "Engineered Barrier System Performance Requirements Systems Study" was conducted and determined that, based on the information available at the time of the study, there is no need to impose a requirement to use backfill, drip shields, or any other EBS performance enhancements outside the waste package. However, since this assessment was based on, among other things, an assumed post-closure performance standard and an infiltration rate to the repository horizon that may be of significantly less magnitude than we currently believe to be the case, the study concluded that we should not preclude the option to backfill at a later time if deemed necessary. Currently, work is ongoing in Subsurface Design (Summary Account TR47FBI, "Subsurface EB Segment Design") to establish that the emplacement system design can accommodate the use of emplacement drift backfill. This is scheduled to be completed by 4/97. The issue of postclosure performance standards (Issue #10) has also been identified as a Key VA design issue, and must be tracked by this issue.

### Interfaces:

The Performance Assessment department is a key interface because it is their assessment of total system performance compared against the assumed performance standard that serves as the technical basis for stating the current lack of need for additional EBS performance barriers. Scientific Program Operations is also a key interface since it will be their ongoing characterization of the mountain, and corresponding abstractions by Performance Assessment, that may cause us to re-evaluate the need for additional EBS performance barriers. Also important will be any further modeling of the near-field environment, especially regarding flow and transport through and around the emplacement drifts as well as through emplacement drift backfill and the invert. Finally, Regulatory Operations is a key

interface as their support will be required to develop a regulatory compliance strategy for this issue as part of the overall license strategy conducted in support of VA.

- 5. Indicate its importance and what effects it will have on a VA:
  - If we find in the 1/98 time frame that the calculated long-term performance of the potential repository modeled without any EBS performance enhancements has insufficient performance margin relative to a long-term performance standard, then not resolving this issue will result in a VA that reflects insufficient long-term repository performance. This could result in a determination that the site is not viable.
- 6. Describe how the issue ties to the TSPA, MGDS cost estimate, and LA planning:
  Resolution of this issue is only possible with input from TSPA. An assessment of whether additional EBS performance barriers are required will be possible only when the performance assessment results of 1/98 are produced. Given the short time remaining to VA once the PA results are available, it is clear that the TSPA should include long-term performance sensitivities that reflect the use of emplacement drift backfill and/or a chemically conditioned invert, if appropriate. If it is determined that these additional EBS performance enhancements are necessary, then there will be an impact to the MGDS cost estimate. For this reason, cost estimates for emplacement drift backfill and/or a chemically conditioned invert (if appropriate) should be included as contingencies in the MGDS cost estimate. With regard to LA planning, it must be emphasized that even if the PA results of 1/98 reflect satisfactory long-term repository performance without the use of EBS performance enhancements, there is still the possibility that information obtained subsequent to VA (i.e., during the performance confirmation period) may require a reassessment of repository performance. For this reason a regulatory compliance strategy for this issue should be adopted in support of LA planning.
- 7. Describe the strategy and criteria for achieving a degree of closure sufficient for VA:

  The overall goal of this strategy is to achieve the performance required from the EBS such that the repository is calculated to meet long-term performance requirements. An integral element of this strategy is to identify those key assumptions that must be made in order that this issue can be resolved. Once identified, these key assumptions should be placed into the Controlled Design Assumptions document. In support of VA, a part of this strategy is to determine no later than 1/98 whether EBS performance enhancements are required to achieve the long-term performance criteria. A table depicting the performance enhancements, their calculated benefit to total system performance, and their associated costs, will be employed to aid in determining which enhancements, if any, should be incorporated into the VA design.

Closure sufficient for VA will be achieved when the following criteria are satisfied for each potential EBS enhancement being addressed:

a preliminary assessment of the total system performance benefits of the EBS enhancement is determined

design concept is developed that depicts incorporation of the EBS enhancement into the repository design

a cost estimate is developed for the potential EBS enhancement concept

# 8. Describe the steps in a process that the project will use to bring closure on this issue:

No.	Title	Description	Summary Account #
1	Repository Performance Assessment	Determine whether the reference case long-term repository performance assessment shows sufficient performance margin without additional EBS barriers	TR541FB3
2	Infiltration rate determination	Determine the net infiltration rate to be used for the TSPA - VA	TR543FB2
3	Backfill Thermohydrology	Determine the thermohydrological benefits of backfill at fluxes higher than those examined in TSPA-1995	TR47FB1
4	Viability of Backfilling	Establish the viability of backfilling emplacement drifts given the current emplacement drift envelope	TR255FB1, TR255FB2
5	Material Interaction of Backfill	Determine the long-range material interaction effects of backfill on waste packages	TR255FB1, TR255FB2
6	EBS Enhancements Study	Conduct a study that addresses the total system performance benefits of EBS enhancements (backfill, chemically treated invert) at higher fluxes	TR15GB4
7	EBS Enhancements Decision	Use the previous activity as part of the basis for deciding whether additional EBS performance barriers should be incorporated in the VA Design	milestone associated with previous activity
8	Incorporation of EBS Enhancements	Incorporate the recommended additional EBS enhancements, if any, into the VA Design	TR47GBD, TR46FB5
9	`Regulatory Compliance Strategy	Develop a regulatory compliance strategy for this issue as part of the overall license strategy conducted in support of VA	TR524FB5, TR524GA5
10	Integration and Facilitation of Key VA Design Issue	Status individual activities identified to help resolve this issue; identify with a plan to resolve any developing problems that may endanger resolution of this issue	preliminary unfunded
11	Waste Isolation System Study	As part of this study, establish the feasibility of conditioning the emplacement drift invert with sedimentary apatite ore by determining the amount necessary under a waste package to sorb the <sup>237</sup> Np in a waste package	TR15FB1
12	Key Assumptions Identification	Develop and document those key assumptions that must be made in order for this issue to be resolved	preliminary unfunded
13	Waste Package Support/Invert Design	Address the possibility of chemical additives (sedimentary apatite or) in the invert	TR233FB6, TR233GB1

# 9. Provide a rough schedule of when this issue will be resolved for VA:

						•	F	<b>Y</b> 97	7			·								FY	98		••••			
No	POC (Name/Phone)	Date	О	N	D	J	F	М	A	М	J	j	Α	S	0	N	D	J	F	М	Α	М	J	J	Α	s
1	R. Andrews/5-5549	10/01/96 - 01/30/98															-									
2	M. Pendleton/5-5550	12/01/96 - 05/30/97									Г															
3	R. Andrews/5-5549	10/01/96 - 01/30/98																					_			
4	D. McKenzie/4-1863	10/01/96 - 03/31/97		:															-		-					П
5	D. Stahl/4-7778	10/01/96- 08/29/97																					-			
6	R. Memory/4-7247	10/01/97 - 04/30/98																								
7	DOE/M&O Management	02/27/98																								
8	A. Segrest/4-1924	10/01/96 - 09/30/98																								
9	K. Ashe/5-5563	10/01/96 - 09/29/97 02/03/98 - 08/12/98																								
10	M. Balady/5-4032	10/01/96 - 09/30/98																								
11	S. Saterlie/5-4026	10/01/96 - 04/01/97								كسيب								,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								
12	M. Balady/5-4032	10/01/96 - 03/17/97																					, , , , , , , , , , , , , , , , , , ,			
13	T. Doering/5-4382	10/01/96 - 08/15/98		a de la companya de l																						

- 10. Describe a process that will be used to measure performance towards closure:

  Performance will be measured in accordance with the process documented in the VA Monitoring
  Plan.
- 11. Describe how status will be reported during the process of closing this issue.

  Status will be reported in accordance with the process documented in the VA Monitoring Plan.

### Key VA Issue Resolution Plan

1. **Issue #3:** Criticality Control

February, 13, 1997

Rev. # 01A

2. Assigned to:

3.

M&O Responsible Individual: Hugh Benton

**DOE Contact:** Paige Russell

Phone: 5-4389

**Phone:** 4-1315

Issue Description:

Demonstrating to the satisfaction of the NRC that criticality will be controlled during pre- and postclosure over the time period of regulatory concern (assumed to be at least 10,000 years) is one of the most important issues in the development of a viable MGDS design. The current 10 CFR 60.131(H) regulation does not recognize a probabilistic risk methodology.

4. Describe the current status and the significance of the issue:

Criticality control has a major impact on waste package and engineered barrier segment designs and their licensing. Criticality considerations govern many aspects of design including waste package capacity for some fuels, basket design, and amount and type of neutron absorbing material. The methods of validating the codes and models used in predicting long-term performance as it impacts the probabilities of criticality involve major interdisciplinary effort. Interfaces include: Scientific Programs, for the environmental conditions; LLNL, for the material confirmation tests; Performance Assessment, for the consequence evaluation process; Scientific studies, for the data reduction of the environment. Validating and justifying the amount of credit for burnup of the commercial spent fuel is an integral part of the overall development and documentation of criticality analysis methodology. Information on the methodology and the probabilistic approach have been presented to the NRC staff in the Disposal Criticality Analysis Methodology Technical Report along with examples of the design controls. Changes to the current deterministic regulations have been proposed, but not yet incorporated by the NRC.

5. Indicate its importance and what effects it will have on a VA:

The means of providing and demonstrating disposal criticality control will have important impacts on the engineered barrier segment and repository designs. The "Disposal Criticality Analysis Methodology" is being developed to be submitted to the NRC for review in late 1998. In support of VA, the methodology used for analysis of PWR and BWR SNF needs to be developed sufficiently to provide an understanding of the general and detailed processes that make up the methodology, including: PWR and BWR Commercial Reactor Criticals; available chemical assay data evaluation; risk based processes. This methodology will be used to show the applicability of the waste packages/engineered barrier segment design concepts.

6. Describe how the issue ties to the TSPA, MGDS cost estimate, and LA planning:

Demonstrating the validity of the criticality control measures incorporated into the designs and the probabilistic approach will make the MGDS cost estimate significantly lower than it would be otherwise. Although the issue cannot be fully resolved prior to VA, proceeding as far as time and budget will allow will reduce the uncertainties attendant to the license application. Evaluations to date indicate that a small number of criticality events over extended time periods will have little impact on TSPA. The Disposal Criticality Analysis Methodology Technical and Topical Reports will

be used to communicate the status of the disposal criticality analysis methodology. Evaluations using the methodology will provide the status of the design and control features.

- 7. Describe the strategy and criteria for achieving a degree of closure sufficient for VA:

  Complete the draft Topical Report by the time of the viability assessment. Resolution of this issue also requires meeting with the NRC staff to discuss the important details of the methodology and the design features that are planned to provide criticality control. Specifically:
  - 1) Keeping the NRC staff informed about the planned disposal criticality analysis methodology,
  - 2) Seeking feedback from the NRC staff on the acceptability of the methodology
  - 3) Showing the NRC staff preliminary results using the methodology to analyze the designs.

The specific criteria for determining the sufficiency of the methodology for viability assessment is:

- 1) NRC staff has not identified any major technical topic that would preclude acceptance of the methodology, including risk-based approach.
- 2) NRC does not indicate that burnup credit is infeasible.

### H

# 8. Describe the steps in a process that the project will use to bring closure on this issue:

No.	Title	Description	Summary Account #
1	Meetings with NRC staff	Technical exchanges and Appendix 7 meetings are being planned to discuss the issue	TR233FB9
2	Technical Report, Rev. 1	Disposal Criticality Analysis Methodology Technical Report, Revision 1	TR233FB9
3	Criticality Analyses	Ongoing analytical work demonstrating the disposal criticality control work with the analysis methodology	TR233FB2, TR233EB005, TR233FBE
4	Topical Report	Disposal Criticality Analysis Methodology Draft Topical Report	TR233GBD
5	Topical Report, SER	Safety Analysis Report for the Disposal Criticality Analysis Methodology Topical report from the NRC	TR233GB8
6	Criticality Design for LA	Criticality control design to be licensed evaluated using the disposal criticality analysis methodology	TR233(TBD)

## 9. Provide a rough schedule of when this issue will be resolved for VA:

				FY97								FY98														
No	POC (Namc/Phone)	Date	0	N	D	J	F	М	Α	М	J	J	A	s	0	N	D	J	F	М	Α	М	J	J	A	s
1	Mike Scott/5-4885	11/01/96 - 10/01/98				!	i																			
2	Hugh Benton/4-1891	10/01/96 - 09/04/97																								
3	Hugh Benton/4-1891	10/01/96 - 2000+																								
4	Hugh Benton/4-1891	- 10/01/97 - 09/30/98																								
5	Hugh Benton/4-1891	2000+																								
6	Hugh Benton/4-1891	2000 +																								

- 10. Describe a process that will be used to measure performance towards closure:

  Performance will be measured in accordance with the process documented in the VA Monitoring
  Plan.
- 11. Describe how status will be reported during the process of closing this issue:
  Status will be reported in accordance with the process documented in the VA Monitoring Plan.

### Key VA Issue Resolution Plan

1. Issue #4: Emplacement Drift Ground Support Concept

April 21, 1997

Rev. # 02

2. Assigned to:

M&O Responsible Individual: Richard Nolting

Phone: 5-4450

DOE Contact: Jaime Gonzalez

**Phone:** 5-5454

M&O Manager

M&O Responsible Individual

### 3. Issue Description:

At issue are the stability and maintenance of emplacement drifts. Constraints on the issue are:

- Construction materials for ground support must be compatible with post-closure performance.
- The ground support method must be compatible with performance confirmation requirements and the construction method.
- Drifts must be safely useable for a long operational life including a potential retrieval period.
- Emplaced waste packages producing heat and radiation will make access difficult for drift maintenance.

### 4. Describe the current status and the significance of the issue:

- A preliminary analysis of emplacement drift stability and support methods is in progress to support
  VA and will be completed by 9/30/97. Linings are being designed to be durable and capable of
  accommodating thermally-imposed rock deformation, because a robust, long-lived structure is
  needed to provide for performance confirmation and for possible retrieval.
- A preliminary assessment has been made of an appropriate pH and mix design for concrete. Work continues on a concrete formulation suitable for repository construction.
- A strategy is being developed for geologic mapping of the emplacement area which will largely
  determine the permissible method of lining construction. For example, the currently preferred
  support method using rapid installation of precast segments does not easily accommodate
  mapping.
- As currently planned, drift maintenance will be accomplished by removal of waste packages to temporary storage drifts to allow access without a radiation hazard.

### Significance includes:

- The analysis and design of a robust lining system will increase the safety of preclosure operations and closure, and support the viability of retrieval, and backfill, if needed.
- Determination of a concrete formulation that meets PA approval for postclosure performance is needed to support the use of concrete as the most important repository construction material.

- The emplacement drift support system must meet performance confirmation requirements, be compatible with construction methods, and achieve efficient installation.
- 5. Indicate its importance and what effects it will have on a VA:

  The issue affects the following significant aspects of repository design: the ground support system, the repository layout, and retrievability. Until all aspects of the issue are resolved, alternative, but viable, methods of ground support will be developed for VA. This approach should not significantly affect VA if longevity and maintenance aspects are acceptable.
- 6. Describe how the issue ties to the TSPA, MGDS cost estimate, and LA planning:
  - Selection of materials suitable for postclosure (e.g., an acceptable concrete formulation) will be provided to PA for use in the TSPA.
  - MGDS cost estimate determination of types and quantities of construction materials, associated costs of fabrication, and erection and efficiency of overall construction methods.
  - LA planning resolution of the issue forms the design basis for long-term, maintainable drift design.
- 7. Describe the strategy and criteria for achieving a degree of closure sufficient for VA:

  The strategy for VA is to present designs for three ground support options (CDA, DCSS 034). These options, which will bound the possible range of alternative criteria, are as follows:

Option 1: Precast concrete segmental lining - This is the preferred option because it can be rapidly installed and can be fabricated under controlled conditions to enhance quality. Assumptions: (1) concrete allowed by PA (CDA, DCSS 027), (2) geologic mapping strategy based on mapping selected non-emplacement drifts prior to emplacement drift lining (this is an alternative to be used with CDA, Key 061, 10a.).

Option 2: Cast-in-place concrete lining - This is the second preference and requires initial installation of support such as rockbolts. Assumptions: (1) concrete allowed by PA (CDA, DCSS 027), (2) geologic mapping strategy based on mapping all emplacement drifts (this is an alternative to be used with CDA, Key 061, 10a.).

Option 3: Steel sets with steel lagging - This is the third preference and allows steel lagging to be installed in stages at different times. Assumptions: (1) concrete use restricted or not allowed by PA (this is an alternative to CDA, DCSS 027), (2) geologic mapping strategy can be either mapping of all emplacement drifts or selected mapping of other drifts to meet CDA, Key 061, 10a.).

Completion of current design analyses and drawings will establish the three alternative ground support options for VA, thus giving sufficient flexibility to accommodate changes in important aspects of the issue such as acceptance of the ground support material by PA and the method of support construction by the performance confirmation group. The alternative ground support methods also demonstrate that stability and maintenance can be achieved using different materials. Development of a geologic mapping strategy is necessary to define the final ground support method and develop a position which is licensable. A reference ground support method will be selected for TSPA based on resolution of the geologic mapping strategy (late FY97) and the use of cementitious materials (early FY98).

In summary, closure for VA will be achieved in one of the following three ways:

- (1) If concrete is found to be acceptable for postclosure use <u>and</u> the acceptable geologic mapping strategy is to map nonemplacement drifts, then the reference ground support for VA will be Option 1 precast concrete segments.
- (2) If concrete is found to be acceptable for postclosure use <u>but</u> the only acceptable geologic mapping strategy is to map all emplacement drifts, then of the remaining available options, Option 2 cast-in-place concrete would become the reference ground support for VA.
- (3) If concrete is found to be unacceptable for postclosure use, then Option 3 steel sets and steel lagging would be the reference ground support for VA, regardless of the geologic mapping strategy.

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### APPENDIX H

# MGDS VA REVIEW Preliminary

The data contained in this appendix reflects the status of the Yucca Mountain Site Characterization Project as of 12/16/96. Because of the evolving conditions of the Yucca Mountain Site Characterization Project, data in this appendix is changed or updated as necessary. However, this VA Design and Review Plan will not be revised or reissued as a result of data updates. For a current status of the data in this appendix and/or a copy of the current version, contact J. Clouet. For suggested changes to the contents, contact R. Snell.

# MGDS VA REVIEW Preliminary E&I Section

### 1.0 PROPOSED CONCEPT

The proposed concept for the MGDS VA Review will be focused on the YMP. The lead for this review will be the Regulatory group. The review will cover the four VA products; VA MGDS Cost Estimate, TSPA-VA, VA Design, and the LA Plan, and will concentrate on the progress that has been made in the four product areas.

The review will be presented to the Director of the OCRWM with presentations provided by both YMSCO and M&O Management leads. The target audience will be the OCRWM and M&O Management.

This MGDS VA Review covers the documentation, support and presentations that will be provided by E&I on the MGDS VA Design and Cost Estimate.

### 2.0 QUALITY ASSURANCE

Based on an evaluation in accordance with QAP-2-0, Conduct of Activities, the MGDS VA Review was determined to be a non-QA review.

#### 3.0 PRESENTATION OF E&I VA PRODUCTS

### 3.1 VA MGDS Cost Estimate

Details describing cost estimate are to be provided at a later date.

### 3.2 VA Design

The MGDS Design to support the VA milestone will focus on Systems, Structures and Components which are important to radiological safety, and have no licensing precedence with the NRC.

The Design Products listed in Appendices C, D and E of the VA Design and Review Plan will define the MGDS VA design and will be described in the Engineering chapters of the Project Integrated Safety Assessment. The Design Products include:

- Chapter 3 Design of Systems, Structures and Components
- Chapter 4 Repository Design
- Chapter 5 Waste Package Design
- Chapter 6 Engineered Barrier System Design
- Chapter 11 Conduct of Operations

The Project Integrated Safety Assessment chapters will be summarized into a VA Design Summary, which will be similar to the Director's Summary.

The presentation of the MGDS Design for VA will be based on the VA Design Summary and will describe how the system design balances the overall facility. The presentation will also describe what potential solutions have been developed to resolve unprecedented regulatory designs with specific emphasis on the key design issues that have been identified as important to the VA milestone.

The format and flow of the Design Summary will include the concept of operations for the repository from receipt of waste through emplacement and repository closure or, if necessary, waste retrieval. The focus of the descriptions will be based on repository operations, surface, subsurface, waste package design, and waste form testing. Critical design features will be described as well as the binning methodology related to their selection. The rationale for selection of the reference design will be summarized. Reference to the Project Integrated Safety Assessment design chapters will be made to identify supporting design documentation. The additional work to be performed in each area to support the LA will be summarized. The document will make liberal use of graphics and illustrations to describe, explain, and emphasize focus areas.

### 4.0 REVIEW LOGISTICS

A pre-review package consisting of the Design Summary and the Engineering chapters of the Project Integrated Safety Assessment will be provided to a selected audience after June 30, 1998.

Comments generated from the MGDS VA Review will be applied toward the next phase of LA design.

The MGDS Cost Estimate will have been published in March of 1998, and updated before its submittal as a VA product. Any comments generated against the MGDS Cost Estimate will be included in the next cost estimate cycle.

### 5.0 SCHEDULE

The MGDS VA Review will be held July 31, 1998. The key Engineering milestones that lead to this date are:

- MGDS VA Cost Estimate June 1998
- Phase I Design Review September 1997
- Engineering Chapters of the Project Integrated Safety Assessment complete June 30, 1998
- VA Design Summary June 30, 1998

### 6.0 VA DESIGN REVIEW CHECKLIST

The intent of the VA Design Review Checklist is to provide a methodical listing of items to be evaluated against expectations at the conclusion of the design effort intended to support the VA milestone. Currently, this point is expected to occur during the initial stages of the Phase II Design, but prior to the VA milestone itself. The checklist includes a list of engineering products and their expected level of completion, a list of critical interfaces, expected progress on issue resolution, expected progress on selected topics and/or items requiring decisions, and an assessment of cost and schedule variances.

### APPENDIX I

### SYSTEMS ENGINEERING SCHEDULE

The data contained in this appendix reflects the status of the Yucca Mountain Site Characterization Project as of 12/16/96. Because of the evolving conditions of the Yucca Mountain Site Characterization Project, data in this appendix is changed or updated as necessary. However, this VA Design and Review Plan will not be revised or reissued as a result of data updates. For a current status of the data in this appendix and/or a copy of the current version, contact F. VanDerLaan. For suggested changes to the contents, contact R. Wagner.

### SYSTEMS ENGINEERING SCHEDULE

The Systems Engineering (WBS 1.2.1) schedule for FY 97/98 is provided. This schedule reflects the current status of the FY 98 planning activity. All of the Systems Engineering activities are tied to the VA milestone.

Activity ID'	Activity Description	OD	Early Start	Early Finish	MILE	FY96 FY97 FY98 YS
	PPkg - IN06X - ESF Construction Suppo		والموا	CANAL STATE	याः,	
SE806	Update ESF Con-Ops	251 0	02FEB98*	01FEB99		
SE824	DIE FY'99	251 0	10CT98*	30SEP99	<del> </del>	-
YP1XPP007	: PPkg - LA200 - Prepare Project Integr	<del></del>	. (W. )		4	
SE708A	Provide PISA Development Support	16170	10CT97	22MAY98	;	
YP1XPP008	: PPkg - LA355 - Write PISA Ch. 1, Intr	•	1:-	1 4 10	.32	
SE708	Provide PISA Development Support - Chapter 1	110 3	31OCT97	10APR98	<u>.</u>	
YP1XPP011	: PPkg - MG010M2 - PISA Chapters 2,3,4,				19	
MG010M2	PISA Chapters 2,3,4,5,6,9,11 Design/Ops/Site	0		30JUN98*	X2	<b>↑</b>
YP1XPP032	PPkg - SE124M2 - Submit MGDS Cost Est			25AUĞ98*	M2	
SE124M2	Submit MGDS Cost Estimate to OCRWM	. 0		25AUG98*	M2	<b>†</b>
	i: PPkg - SE125A - MGDS Design SRA - Ph		$A_{i}^{i,j}$	12.50 MEZ	\$908000	
SE310B	DBADBE Definition & Analysis - Ph 2	204 (	02DEC96*	19SEP97		
YP1XPP034	I: PPkg - SE126 - MGDS Design SRA - 3		[.<]#I	01MAR01		
SE800A	Support ESF Operations	855	010СТ97	01MAR01	,	
YP1XPP037	PPkg - SE306M2 - Complete Chapter 11	<del></del>		ig		
SE306M2	Complete Chapter 11 PISA	1 0		03APR98	M2	<b>†</b>
	): PPkg - SE322 - Classification Analysi				:	
SE322A	Classification Analysis/Q-List Update - 2	204	01OCT98	26JUL99	,	(Remark)
YP1XPP043	3: PPkg - SEGHIM2 - Complete Waste Qty,		7	: •s.,d		
SEGHIM2	Complete Waste Qty, Mix, and Throughput Study	ō		11APR97*	M2	<b>†</b>
YP1XPP047	7: PPkg - SERSTM2 - Complete Retrievabil					
SERSTM2	Complete Retrievability Study - VA	0		12MAY97*	`M2	<b>†</b>
YP1XPP049	9: PPkg - SEUVWM2 - Complete Safeguards					
SEUVWM2	Complete Safeguards & Security Regmns Study	0		29OCT97*	X2	
YP1XPP05	1: PPkg - SEXYZM2 - Complete Regional Tr			·5.3		,
SEXYZM2	Complete Regional Transportation Data Collection	0	· · · · · · · · · · · · · · · · · · ·	30SEP97*	'X2	<b>↑</b>
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TR11FA1: \$	Systems Engineering Management				F.18.1	
oject Start	010CT95 CARPO Early LAPO		·····			Sheet 1 of 21 KRISHNA 12/19/96 [1600HR3] (5-5315
oject Finish	01OCT02			UCCA MOUN		
sta Dale of Dale	18DEC96			-		NGINEERING
© Primavera Syste	l l			LONG RANG	: PLAN (F	FY96-FY98)

Activity	Activity	OD	Earty	Earty	MILE	FY96 FY97	FY98 Y9
ID	Description		Start	Finish			
SE452	Provide Management Support	251	010CT96A	30SEP97	1		
TR11GA1: S	ystems Engineering Management					· · · · · · · · · · · · · · · ·	▼ · · · · · · · · · · · · · · · · · · ·
SE568	Provide Management Support	455	01OCT97	26JUL99		1	
		1					
TR12FA1: E	SF Operations Support	251	010CT96A	30SEP97	134		
				<del></del>			
TR12FB1: D	evelop System Description Documents FA/DCA	251	010CT96A	30SEP97			
SE405705	Develope Bin 3 SDD's	251	010CT96A	30SEP97	: :	4 1	
	SDD Status Report	·	· 	31DEC96*	М4	A	<b>▲</b>
			,	31MAR97*	1	- I	·
<b>I</b>	SDD Status Report		, 	1	: IVI-9		<u></u>
SE410700	Develop Bin 2 SDD	:	01APR97	30SEP97	1	A 3	57. · · · · · · · · · · · · · · · · · · ·
SE415700	Develop Bin 1 SDD's	128	101APR97*	30SEP97			
SE405CM4	SDD Status Report		5	30JUN97*	M4		• <u> </u>
SE405M4	SDD Status Report		5	30SEP97	M4		<b>*</b> i
TR12FB2: R	tequirements Documentation/Verification		<del></del>		1		
SE422700	Maintain Top Level Requirements	251	01OCT96A	30SEP97			
SE422705	Update CDA	123	3701OCT96A	30APR97			• • • • • • • • • • • • • • • • • • •
SE422BM4	Briefing on CDA Status	(	5	27NOV96*	M4	<b>†</b>	
SE422M3	MGDS Requirements Document	; (	o	03MAR97*	M3	<b>4</b>	
SE422CM4	Briefing on CDA Status		<b>5</b> ,	30APR97*	M4	-	:
SF422710	Update CDA	706	5 01MAY97	30SEP97			
	·		··		<u></u>	<u></u>	· · · · · · · · · · · · · · · · · · ·
SE400700	AGDS Concept of Operations  Evaluate Technical Baseline	6	1 010CT96A	31DEC96	<u> </u>		1
SE400705	Update ConOps	6:	2 02JAN97	31MAR97		· ·	
	Evaluate ConOps	10	7'01APR97	29AUG97	<del>-</del>	Y	
		<u> </u>			: '	<b>Y</b>	
Project Start Project Finish	01OCT92 CARPO Progress Bar		Y	UCCA MOUN	TAIN PRO	DJECT PLAN	Date KRISHNA 12/18/96 (1600HRS) (5-5315 Revision Checked Approved
Deta Date	18DEC96 Critical Activity			BS 1.2.1 - SYS LONG RANGI		NGINEERING	
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Activity	Activity	OD	Early	Early	MILE	FY9	e i	FY97	EV	98
ID	Description		Start	Finish					<del></del>	30
SE400715	Update Con-Ops	43	01JUE97	29AUG97		;		AA		X * * * * * * * *
SE400720	Review & Comment Resolution	1 21	02SEP97	30SEP97					<b>V</b>	
SE400BM3	MGDS Con Ops - Rev 1	0		30SEP97	M3	<u> </u>		-•		Harri
TR12GA1:M	i GDS Concept of Operations			Take 1		. 4			<u>Å</u>	
SE400800	Maintain MGDS Con Ops	251	01OCT97	30SEP98	,	;				
SE400AM4	MGDS ConOps Status Report	0.	1 <del></del>	02FEB98*	M4		4		<u> </u>	
SE400BM4	MGDS ConOps Status Report	0		31JUL98*	'M4		1	,	i	•
TR12GB1: D	Develop System Description Documents		AIAA4A41		4 1					
1	Maintain/Update Sum & Crit Sections (Bin3 SDD's)		01OCT97*	30SEP98		,			A STATE OF THE STA	
	Support for Design Sections (Bin 3 SDDs)	•		31MAR98		;				
SE521800	Maintain/Update Sum & Crit Sections (Bin2 SDD's)	251	01OCT97	30SEP98						
SE522820	Complete FY97 4th Quarter SDDs (Bin 1 SDDs)	39	010CT97*	26NOV97				!		;
SE523800	General SDD Support Tasks	251	01OCT97*	30SEP98						
SE522AM4	SDD Status Report			31DEC97*	M4				1	
SE520805	Requirements Analysis (Bin 3 SDDs)	62	02JAN98*	31MAR98				·		1
SE521810	Support for Design Sections (Bin 2 SDDs)	126	02JAN98*	30JUN98	·				<b>∀</b>	5788.
SE522BM4	SDD Status Report	. 0.		31MAR981	. ма	•			A .	
SE521805	Requirements Analysis (Bin 2 SDDs)	64	01APR98*	30JUN98	<u></u>					E COR
SE522CM4	SDD Status Report	0		30JUN98*	.:M4	• • • • • •			<u> </u>	<u> </u>
SE522810	Requirements Analysis (Bin 1 SDDs)	64	01JUL98*	30SEP98				1		FILE
SE522805	Maintain/Update Sum & Crit Sections (Bin1 SDD's)		01SEP98	'31AUG99	· • · · · ·					A V
SE522815	Support for Design Sections (Bin 1 SDDs)		01SEP98	09MAR99						<b>\$</b>
	SDD Status Report			30SEP98	™4 °					A X
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SE530800	Requirements Documents  Maintain Top Level Requirements Documents	313	01OCT97	04JAN99	<del></del>	•			<b>7</b>	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
	LIRPO					<u> </u>	·	Sheet 3 of 21	¥ Y Y	(1600HRS) (5-5315
ect Start ect Finish i Date	010CT95 020CC96 020CC9			UCCA MOUN				Di	te Revision	Checked
Date	18DEC96			BS 1.2.1 - SYS LONG RANGE				} -		

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Activity	Activity	OD	Early	Early	MILE			<del></del> -				
ID	Description		Start	Finish		FY96	<u> </u>	1	FY97	<del>  </del>	FY98	Y9
l 1	Maint Controlled Dsgn Assump Document	251		30SEP98	ļ	<del>┩</del> ┩	1111	╁┤┼				
	Requirement Documentation Revision	0	· ·		P3	1		:		1	·	-
	Controlled Dsgn. Assump Doc. Status Rpt.	i O			M4				·	•	I	
	Requirements Document Status Report	. 0		. !	M4			1		1	Ĭ	
<b>(188</b> )	Controlled Dsgn Assump Doc Status Rpt.		· •	1	М4	<u>'</u>		<u> </u>				<b>.</b>
	Requirements Document Status Report	, <del>,</del>	<del> </del>	30SEP98*	M4	\$		:	•			
	dditional Underground Excavation Desig			Ship .						· · · · · · · · · · · · · · · · · · ·		
SE800A80	Support ESF Operations	82	:.01OCT97*	30JAN98		Ĺ		:				
SE806800	Update Concept of Ops. for Operations of ESF	63	02FEB98	30APR98		,		ļ	;	•		;
SE806805	Update Con.Ops./Turnover of ESF/Constru.to Oper.	64	01APR98*	30JUN98	<del> </del> -						variation of the same of the s	
SE806AM4	ESF ConOps Status Report		)	30JUN98*	<del> </del>	•				i	: •	
SE806810	Update ConOps/Turnover Perm.ESF to Repos.	64	01JUL98	30SEP98						,		
SE806BM4	ESF ConOps Status Report	C	)	30SEP98				- <del></del>				•
TR12GB4: E	SF Operations Support			test	14.	<b>1</b>					i	
	Update ESFDR for Add'l Under grd Excav.		3 04FEB98*	04MAY98	:: !c1	}			i		A v	•
	Add U'ground Exc. Revision of ESFDR	!" T	,		P3						•	,
	Update ESFDR for Mgmt Turnover/NLP-3-26 Impacts		05MAY98	'30SEP98	1							=
	ESF Transition Update of ESFDR	` (	),	'30SEP98	P3							•
YP1XPP033 (SE580	: PPkg - SE125A - MGDS Design SRA - Ph Maintain MGDS Dsgn Assumpt Document	455	01OCT97*	26JUL99	rije.				• • • • • • • • • • • • • • • • • • • •		100 (CO) (CO)	
	The state of the s	<b>.</b>										:
TR13FB1: P	rogram & Project Management Controls Perform TRA	155	3 010CT96A	2111121207	ta	,						:
	Evaluate Existing Project Documentation		9'01OCT96A		: ; ——···-							
	Support TMIP Development		1702DEC96*		·•				,			
32443700	Oupport Hair Development	<u></u> _			<u>:</u>	] :		<u>,                                    </u>	Y . Ÿ	- <u>1</u> .7		_ <u> </u>
Project Start	01OCT95 EARLY LRPO		V	UCCA MOUNT	TAIN DPO	IECT DI AN		·	Sheet 4 of 21	KRISHIN Dafa	A 12/18/96 (1600HRS) (5-5	315 Tacked Aggrovad
Project Finish Data Date Plot Date	01OCT02 OCDEC96 Progress Bar Oction Activity		WE	BS 1.2.1 - SYS	TEMS EN	IGINEERING						
© Primavera System			·	LONG RANGE	PLAN (F	Y96-FY98)						<u> </u>

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	865UA¥1 86A9A10 86	Develop Planned Profiles	SE527820
	865UAÞF 86A9A10 86	Develop Draft Plan	SE419710
	PM BEHAMIE 0	Status Briefing	SE419AM4
	86AAMIE 86NALSO S9	Select Parameters	SE527810 ::
	148,01DEC252 3070N38	Prepare Draft Plan	2E240802
6596	39 01OC197 26NOV97	Evaluate Previous Compliance Plan	2E240800
	91.01OC197* 31DEC97	etabiish Parameter Selection Criferia	SE527800 I
	367 01OCT97 • 7eT3O10 78E	Develop Technical Performance Measures	JL LZSAS
	165 010CT37 *79MAY98	AsiO eisqei	2E420800 1
	123 010CT97 Tell 1889	Pedect Management Controls  ART moher	2E419700
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Activity	Activity	OD	Early	Early	MILE		100		<b></b>	/A=			FVAA	<del></del>	1 7/2
ID	Description		Start	Finish	1.0	<b>             </b>	<b>'96</b>	$\neg \vdash \vdash$	<b>     </b>	<b>′97</b>	$\Box$	ПТ	FY98		<b>Y9</b>
i i	Prepare Final & Issue	54	16JUL98	30SEP98	<del> </del>			1 1		<u> </u>		4 4	<del>                                      </del>	1 4 4	
SE419720	QAP-3-5 Review		17AUG98	31AUG98	·	•					•			¥	
SE527830	Issue First Draft	32	17AUG98	30SEP98	<u>.</u>	•								<b>Y</b>	
SE540815	Prepare & Issue Final Plan	32	17AUG98	30SEP98	·										
SE419740	Prepare Final Report	21	01SEP98	30SEP98	المعاد بالأشها									7	
SE419M3	Final VA T&EP	- <del>:</del> · - <del>c</del>	<b>5</b>	30SEP98	P3	;									<b>↓</b>
SE450M3	Revised Risk Management Plan Complete		Di	30SEP98	Р3	. }									<b>.</b>
SE527M4	Technical Performance Measures Plan	· · · ·	) <sup>.</sup>	30SEP98	M4	į į				ï					<b>↓</b> !
SE540M3	Compliance Plan Complete		<u> </u>	30SEP98	P3	<del>  -                                   </del>				-:··		•			<del></del>
	1.		<u> </u>	10.00	· ·	<u>.</u>			<b></b>						- <b></b>
TR142FA1:	Systems Integration Provide Technical Document Review Support	25	1 010CT96A	30SEP97	to constant	,					≓ 40, <b>4</b> , 434 <u>2</u>	1	1		•
	Support Ad-Hoc Regulatory		1 010CT96A		* www			V -				1			:
	Support PR 16		1 03FEB97*		:' <del></del>	:			7	<b>-</b>		_		٠	1
	Systems Input to PR 16		5	17MAR97*	.; <sub>М4</sub>	<b>!</b> ,				5					
	Support PR 17	- 4:	2 01AUG97*	30SEP97					Ì		<b>∀</b>	▼ i			i 1
	Systems Input to PR 17	. (	ō	15SEP97*	.ма-	<del>                                     </del>				<del></del>		<u>.</u>			
	Support SDD Development				·						_, .				
SE446700	Integrate SDD Development	25	1 01OCT96A	30SEP97							Ç. G.				
SE446M4	CDA Status Report	··· i	0	02JAN97*	M4				•	_					•
SE446M5	CDA Status Report	•	σ	31MAR97*	M4				1	<b>\rightarrow</b>			;		
SE446M6	CDA Status Report		0	30JUN97*	-M4						<b>↓</b> ·	_			
SE446M7	CDA Status Report		0	30SEP97	M4						•	<b>↓</b>			:
TR142FA3: SE142700	Technical Bases Management Technical Bases Management	25	1 010CT96A	30SEP97	!			Y			Arran as **.	1 7 7 7			•
Project Start Project Finish Deta Data Plot Data O Primavera System	01OCT09 01OCT02 02DEC96 18DEC96		W	UCCA MOUN BS 1.2.1 - SYS LONG RANG	STEMS EI	GINEERING				Sheet 6 of 2	Dale	KRISHN	A 12/18/98 (160 Revision	00HRS) (5-5311 Che	ched Approved

Activity ID	Activity  Description	OD	Early Start	Early Finish	MILE	FY96 FY97	FY98 Y
TR142GA1:	Technical Bases Management Technical Bases Management	455	0100197	26JUL99	şi	<b>A A</b>	
TR142GA2: \$	Systems Integration			Prof. State		<u> </u>	<u> </u>
	Integrate SDD Development		01OCT97	26JUL99			<b>7</b>
	Provide Technical Document Review Support		01OCT97	26JUL99	•		
SE706800	Support Ad-Hoc Regulatory Interactions	455	1010CT97*	26JUL99			
SE706835	Support VA Design Summary Statement	74	01OCT97*	20JAN98	1		
SE706840	Support MGDS VA Review	44	01OCT97	05DEC97	.		
SE446AM4	CDA Issues Status Report	0	i	02JAN98*	M4		<b>*</b> • • • • • • • • • • • • • • • • • • •
SE706810	Support PR 18	143	02FEB98*	24AUG98	<del>-</del>		District MA
SEPR18M4	Systems Input to PR18		<del> </del>	13MAR98*	M4		<b>→</b>
SE446BM4	CDA Issues Status Report	ō	;•··	31MAR98*	M4		
SE446CM4	CDA Issues Status Report	. 0	· · · · · · · · · · · · · · · · · · ·	30JUN98*	: <sub>М4</sub>		<b>.</b>
SE706820	Support PR 19	137	'25AUG98*	15MAR99	1		
	Systems Input to PR 19			15SEP98*	M4		<b>1</b>
	CDA Issues Status Report	c	)	30SEP98*	M4		
TR142GA3:5	Support PISA Chapter 1 Development Review PISA Plan				1 1 1 1 1 1		
			310CT97*	16DEC97			(1) 22 k :
ł	Support TOC Development		310CT97*				<b>2</b> 1 ▼
SE708815	Support AO Development	15	310CT97*	21NOV97			e V
SE708820	Support Text Development	55	24NOV97	12FEB98	# 1 to 1		
SE708825	Support Chapter 1 Review	40	13FEB98	10APR98			THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NA
TR142GA4:S	Support PISA Development Support PISA Chapter Integration	187	0100197	30JUN98	<u>; /: }                                  </u>		<b>V</b>
	Participate in Integrated M&O Review		1 15JUN98*		•		Y Y Y
ject Start ject Finish is Date I Date © Primevers System	01OCT95 01OCT02 02OEC96 18DEC96		w	UCCA MOUNT BS 1.2.1 - SYS LONG RANGE	TEMS EI	IGINEERING	KRISHNA 12/18/96 (1600HRS) (5-5315 Revision Checked Ap

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Activity	Activity Description	OD	Early Start	Earty Finish	MILE		FY96			FY97		FY98		Y9
SE708855	Support DOE Review/Comment Resolution	22 0	TJUL98	31JUL98				111_			1111			
			3AUG98	21AUG98		,			_	-	<del>-</del> -		<u> </u>	[
SE708860	Support PISA Completion			21/10/030	. !		-	=						
TR142GB1:	Support PISA Chapter 11 Development Prepare First Draft	61.0	10СТ97	31DEC97	· · · · · · · · · · · · · · · · · · ·						-,2.4	7		
SE306835	Coordinate First Draft Review	417	3DEC97*	30JAN98	÷ . i						A	V Chroma		
		٠		31DEC97	. 1014							I		
	Deliver First Draft			!					ļ.			•		
	Prepare Final Draft		02FEB98	03APR98								A STATE		:
SE306AM3	Complete PISA Ch.11 - Conduct of Operations			03APR98	P3 T	'						•		1
7045504.4	Charles Charles Compart to CDAIDation		£*u:r						•	• • • • • • • • • • • • • • • • • • • •	**			1
SE050700	System Studies Support to SRA/Design Conduct Research & Development Plan	23 (	DIOCT96A	06DEC96	<del></del>									
SE440700	Conduct Research	32,0	010CT96A	-106DEC96		1								
SE506700	Conduct Research	31 (	01OCT96A	06DEC96										
SE050720	Complete Initial Performance Confirmation Plan	107	11NOV96A	29AUG97		-					4, .			
SE506705	Identify Sealing Options for Nevada Regimts			24DEC96	* 1				•	95				;
SE440705	Dev. Apprch/Quantifying Thresh Add'g Eng'rg Perf			06DEC96						<u>[</u>				·
SE050705	Estab Draft Ref. Perform Confirm Baseline		09DEC96	05MAR97	: :					*********				
					. <u>-</u>					578 A				:
SE050710	Supplement Perform Confirm Requirements		09DEC96	30APR97						M. D. S. V. R. C.				i
SE440710	ID Engird Components Contrib./Perform & Ass.Cost		09DEC96	03FEB97						<u> </u>				:
SE440715	Compare Contributions Against Threshold.	49	09DEC96	18FEB97	•					(725) -				!
SE506710	Identify Sealing Options for 10CFR60 Regimts	41"	26DEC96	24FEB97						<b>EXEC</b>				
SE506715	Formulate Selection Criteria	32	26DEC96	10FEB97	•					RF5			`	'
SE440720	Prepare Report Documenting Results	35	17JAN9 <b>7*</b>	07MAR97		ł				<u>€776</u>				;
SE506720	Evaluate Sealing Requirements Options	53	11FEB97	25APR97						V V				
SE440725		16	10MAR97	31MAR97				•		₹				:
						<u> </u>				7.7		<u>Y</u>		<u> </u>
Project Start Project Finish	010CT02 Early Progress Bar		Y	UCCA MOUN	ITAIN PRO	JECT PL	AN			Sheet 8 of 21	Date Ki	Revision	OHRS) (5-5315 Ched	ked Approved
Data Date Plot Date	02DEC96 Critical Activity			BS 1.2.1 - SY										
O Primavera Syst	ems, Inc.			LONG RANG	E PLAN (F	190-119	0)							· 4:

Activity ID	Activity Description	OD Early Start	Early Finish	MILE	FY96 FY	/97 FY98
SE436700	Conduct Research & TDPP	33 01APR97*	15MAY97		<b>A A</b>	
SE440M3	Waste Isolation Regimt Study Report	0	01APR97*	M3	1	<b>♦</b>
SE506725	Prepare Report & QAP-3-5 Review	25 01APR97*	05MAY97	1		
SE460700	Conduct Research & Develop Plan	22 02APR97*	01MAY97	1		
SE050715	Update ConOps Desc.& Devel.Input to PISA-Ch11	64101MAY97	31JUL97	<del></del>	-	V.
SE460705	Develop WP Size Alternatives	31 02MAY97	16JUN97		· · · · · · · · · · · · · · · · · · ·	- <u>-</u>
SE506730	Incorp Comments & Issue Report	18 06MAY97	30MAY97	<u></u> .		<b>V</b>
SE460710	Establish Selection Criteria	13 13MAY97	30MAY97	<u> </u>		
SE436705	Identify Disposal Options	10 16MAY97	30MAY97	÷		V i
SE436710	Formulate Selection Criteria	11 02JUN97	16JUN97	· <u>·</u> ····-		<b>▼</b>
SE506M3	Seals Study Report	0	03JUN97	M3	<del> </del>	<del>                                      </del>
SE436715	Evaluate Disposal/Packaging Options	42 17JUN97	14AUG97			<b>V</b>
SE460715	Evaluate WP Size Alternatives	34 17JUN97	04AUG97	<del></del>		WESTS 1
SE460720	Prepare Study Report & Review	20 05AUG97	02SEP97			<b>y</b> .
SE436720	Prepare Report & M&O Review	16 15AUG97	08SEP97			<b>V</b>
SE050725	Incorp Comments & Issue Report	21 02SEP97	30SEP97	-+	A	· · · · · · · · · · · · · · · · · · ·
SE460725	Incorp. Comments & Issue Report	20'03SEP97	30SEP97			<b>▼</b>
SE436725	Incorp. Comments & Issue Report	16 09SEP97	30SEP97	· · · · · · · · · · · ·		<b>∀</b> <b>2</b> 4
SE050BM3	Performance Confirmation Report	. o	30SEP97	∂ <b>M</b> 3		<b>.</b>
SE436M3	Waste Generated Study Report		30SEP97	М3		
SE460M3	Waste Package Size Study Report	<b>o</b> , -	30SEP97	М3		- · · · · • • · · · · · · · · · · · · ·
TR15FB2: V	Vaste Qty, Mix, Throughput Study Formulate Selection Criteria	11 01NOV96A	06DEC96	777		
	Identify Waste Receipt Schedules	* 8 19NOV96A	·		1	· · · · · · · · · · · · · · · · · · ·

Project Start 010CT95
Project Finish 010CT92
Deta Dote 92DEC16
Plot Date 18DEC96

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Progress Bar Critical Activity

YUCCA MOUNTAIN PROJECT PLAN WBS 1.2.1 - SYSTEMS ENGINEERING LONG RANGE PLAN (FY96-FY98)

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Activity	Activity	OD	Early	Earty	MILE												
ID	Description	-	Start	Finish		-	FY96		<del>-  </del> -	<b>. F</b>	<b>Y97</b>	<del></del>	<u> </u>	FY	98	YS	<u> </u>
SE200715	Evaluate Waste Receipt Schedules	53	13DEC96	28FEB97		<del> </del>		11.1			44					111	4
SE200720	Prepare Report & Initiate QAP-3-5 Review	14	03MAR97	20MAR97						1	7 <b>E</b> 3					# #	
SE200725	Resolve Comments & Deliver Report	16	21MAR97	11APR97	<i>i</i>						<b>Y</b>						
SE200M3	Complete Throughput Study	0	- · · · · · · · · · · · · · · · · · · ·	111APR97	М3	-			• •		<del>-     -  </del> -	: : :		- ·	·		
	tetrievability Study Conduct Research/Develop TDPP	27	01OCT96A	18DEC96		<u> </u>											
	Identify Alternatives		03DEC96*	07FEB97		<u> </u>										;	
i i	Develop Scenarios/Eval Alternatives	43	09DEC96*	07FEB97												i	
SE502715	Prepare Report	58	20DEC96*	14MAR97		-   '				¥	2						
SE502720	Internal Rev./Revise Rpt & Initiate YAP-5.1Q Rev	31	17MAR97	28APR97							<b>Y</b>						. !
SE502M3	Retrievability Study - VA Rpt	ō	,	30APR97	.М3	1	<u>.</u>			1	•	· • • • •					
TR15FB4: T	ransportation Studies System Support to NEPA Activity	251	01OCT96A	30SEP97		- 1 · · · · · · · · · · · · · · · · · ·				~ <b>3</b> ™,3,™≪,	4, * . q		 d				_
SE457	Transportation Rapid Response	251	'01OCT96A	30SEP97	<u>.</u>	<b> </b>				i Sala	م الأسرادي		•				
SE457700	TEA Support	251	01OCT96A	30SEP97	· · · · · · · · · · · · · · · · · · ·					D Some Ac	1370		Š			1	
SE457705	Prepare Rapid Response/Briefing Information	⁻251	010CT96A	30SEP97						162744		, k ,	1			•	
SE457710	Support Development of Nevada Transp.Policies	251	010CT96A	30SEP97						5 7 4 WAR	120 e (c)	11 / 2 2 NO	7			ļ	
SE457715	Participate in DOE Transportation Meetings	251	010CT96A	30SEP97					-	73.00		362 50	ī			- <del>i</del>	
SE456702	Prep Detail Road Upgrade Req mts Inc. ITF Access	61	01NOV96A	30JAN97						N-488							
SE456705	Develop New Rail Corridor	39	08NOV96A	30DEC96					•	<del>2</del> 0						1	
SE456725	'Identify Feasible Rail Alig's- Each Corridor	120	02DEC96	21MAY97						WHEED T	- Carta					1	
SE456710	Internal Rev/Comment Resolution	7	31DEC96	09JAN97	1					B							
SE456715	Prepare/Issue Corridor Evaluation Report	15	10JAN97	30JAN97		,				- Y	: 1						
SE457725	Eval Impacts-Size/Weight Shipping Containers	62	31JAN97	29APR97					<b>T</b>	V E	oles VV		: Y Y Y	•	•	; \$	
Project Start Project Finish Data Date Plot Date  © Primovera Syste	010CT95 Early LRP0 010CT02 020CC96 180EC96 180EC96		W	UCCA MOUN BS 1.2.1 - SY LONG RANG	STEMS EN	NGINEERI	NG				Sheet 10 of			NA 12/18/96 Revision	(1600HRS) (5-5:	315 hecked Appro	eved

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Activity	Activity	OD	Early,	Earty	MILE	<u> </u>	FY	96		F'	Y97	<del></del>	FY98	<del></del>	Y9
ID SEAFEMS	Description		Start	Finish	]		ЩТ			Пİ	<del>'</del>	TIIII	1 1 30	ПП	
SE456M3	Rail Corridor Evaluation Report	, 0		30APR97*	M3				1		4				<del>                                     </del>
	Prep Intermodal Transfer Station Altern & Costs	64	30APR97	30JUL97							<b>Table 1</b>				•
SE456730	Identify Single Preferred Alignments	6	22MAY97	30MAY97					1		Y •				1
SE456735	Prepare Report	24	02JUN97	03JUL97		1					Y	*	· - <del>-</del>		i
SE456740	Internal Review & Comment Resolution	5	07JUE <b>9</b> 7	11700	<del>,</del>	·					<b>Y</b>				1
SE456745	Prepare & Issue Document	44	14JUL97	12SEP97		1					▼.				1
SE457735	Prep Detail HH Cycle Times & Equip'mt Estimate	43	31JUL97	30SEP97	•						7				1
TR15GB1: 8	System Studies Support to SRA/Design					-			· · ·			 			
SE457750	IEA Support	251	01OCT97	,30SEP98		İ						V The state of the			!
SE457755	Prepare Rapid Response/Briefing Information	251	010CT97	30SEP98	•- •		•					·			i
SE457760	Support Devel./Nevada Transp.Policies	251	01OCT97*	30SEP98		;						Ÿ		Ο,	I
SE457765	Participate in DOE Transportation Meetings	251	01OCT97	30SEP98					!			Ÿ	•.		1
SE508780	System Studies Support to FA/RA	251	010CT97*	30SEP98	<del></del>							,	· · · · · · · · · · · · · · · · · · ·		; ; ]
SE515800	Conduct Research & Develop Plan	22	01OCT97*	3100 97	<del></del>										i ►· ·
SE516800	Conduct Research & Develop Plan	22	01OCT97*	3100197	<del> </del>										
SE515804	Identify List-Prohibited or Limited use Mat'ls	9	03NOV97	14NOV97	<del>! :</del>							Ť			
SE516802	ID Issues Assoc With DOE SNF Fuel Types	9	03NOV97	14NOV97						ł		Ţ		:	:
SE515806	ID Mat'ls That Have Significant Impact if Excl.	19	17NOV97	15DEC97	<u></u>							¥ F29			
SE516804	ID Altern. for Dealing with the Issues	51	17NOV97	30JAN98		- • -					<b>-</b>	V.		i	
SE515808	1D Altern.Dsgn Concepts/do not Comp.exclud.mat'l		16DEC97	30JAN98	· ·							▼			
SE515810	Evaluate the Options		02FEB98	27FEB98	<u>.</u>							6.5	<b>3</b> ▼		
	Evaluate the Alternatives		02FEB98	27FEB98									<b>₩</b>		
<b>1</b>	Document Results & Publish Report			01APR98									<b>₩</b>		
	Document & Publish the Results		02MAR98	31MAR98	<u>.                                    </u>								<b>I</b>		
				3 HVIARSO					. ¥ .			7 7		T. Y	,
Project Start Project Finish	01OCT95 01OCT02		V	LICCA MOUNT	AIN DOC		N AN1		-	SI	west 11 of 21	KRISHA	À 12/18/96 (1600H	R8) (5-5315	
Data Data Plot Date	01OCTO2 02DEC96 18DEC96			UCCA MOUNT 3S 1.2.1 - SYS'							Date		Revision		d Approved
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Activity	Activity	OD	Earty	Early	MILE	FY96	FY97	FY98	3 Y9
ID	Description	ļ	Start	Finish					
SE516M3	LA Strategy for DOE SNF	0		31MAR98	P3			** **	
SE508700	Conduct Research	28	01APR98*	08MAY98				<b>#5</b>	:
SE515M3	Prohibited Limited Use Mat'ls Report	0		01APR98	.P3			Į.	:
SE517800	Conduct Research & Develop Plan	;= 11	02APR98	16APR98		t		Y ,	. !
SE517802	Identify the Issues	12	17APR98	04MAY98	- <del></del>	-1	<b>.</b>	V.	
SE517804	ID Reasonable Alternative Definitions	20	05MAY98	02JUN98					
SE508705	Identify 10CFR60 Decommissioning Req mts	13	11MAY98	28MAY98		;		<b>,</b>	<b>.</b>
SE508710	Identify Decommissioning Alternatives	12	29MAY98	15JUN98	77 - 4	i. i			¥ .
SE517806	Evalutate the Alternatives	23	03JUN98	06JUL98					V <sub>1</sub>
SE508715	Formulate Selection Criteria		16JUN98	26JUN98	*** ********			The second sections as a second section of the section of the	1 :
SE508720	Evaluate Decommissioning Options	. 22	29JUN98	29JUL98					<b>V</b>
SE517808	Document & Publish the Results	22	2.0430F28	705AUG98					
SE508725	Prepare Report & Initiate QAP-3-5 Review	. 32	30JUL98	14SEP98					<b>V</b>
SE517M3	Restricted Area Requirements & Concepts	(	)	05AUG98	P3				<b>*</b>
SE508730	Incorp.Changes & Issue Report	12	15SEP98	30SEP98	<u>.</u>	-	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	<u>A V</u>
SE508M3	Decommissioning Study Report	(	)- '	30SEP98	P3				<b>,</b>
TR15GB2:	Additional Underground Excavation Dsgn			1.14				• • • • • • • • • • • • • • • • • • • •	**************************************
SE830700	Conduct Research & Develop Plan	_	1"01OCT97*	30OCT97				<u>57</u> ▼	: :
SE830705	Identify Objectives of U'ground Exc Dsgn	2	1 16OCT97*	14NOV97	!			<b>5</b> 28 ▼	·
SE830710	Identify U'ground Exc. Dsgn Alternatives	T	7 03NOV97*	26NOV97			1	20 *	
SE830715	Formulate Selection Criteria		5 01DEC97	05DEC97				į	·
SE830720	Eval U'ground Exc. Dsgn. Alternatives	2	3 08DEC97	86NAC60	,			<b>E</b> 3	: :
SE830725	Prepare Report & Initiate QAP-3-5 Review	· 1	4 08DEC97	26DEC97	<del></del>			<u>L</u>	• • • • • • • • • • • • • • • • • •
SE830730	Compile Data & Issue Report		7 29DEC97	07JAN98	1			, i	
Project Start	010CT95 Constitution Early LRP0			LICCA MOUNT	TAIN 000	J	Sheet 12 of 21 Date	KRISHNA 12/18/96 (18	SOOHRS) (5-5315
Project Finish Data Date	01OCT02 DECEMBER OF THE PROPERTY OF THE PROPER			UCCA MOUN BS 1.2.1 - SYS			·		- Approx
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Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96 FY97	FY98 Y9
SE830M3	U'ground Exc. Design Req'mts Study Report	0	£	07JAN98	P3		**************************************
TR15GB3: S	ystems Study Support to FA/RA		ALTBEXAL	ं अंध्र	,		
]	Conduct Research & Develop Plan			30APR98			•
SE900102	Identify the Issues	22	16APR98*	15MAY98		1:	<b>E5</b>
SE900104	Identify Reasonable Alternative Decisions	20	18MAY98	1530198	4		
SE900106	Evaluate the Alternatives	43	16JUN98	14AUG98	<del>-</del>		Y COMP
SE900108	Document & Publish the Results	32	17AUG98	30SEP98	· <del>• • • • • •</del>	<b>!</b>	
SE900M3	Thermal Management Technical Analysis	0	) <sup>*</sup>	01OCT98	P3		
TR15GB4: V	Vaste Isolation / EBS Requirments						
	Conduct Research & Develop Plan		01OCT97*				· · · · · · · · · · · · · · · · · · ·
SE125A20	Identify Barriers	18	03NOV97	01DEC97	••		
SE125A30	Conduct Performance Assessments	52	02DEC97	13FEB98	•	1:	
SE125A40	Evaluate Results	19	102FEB98*	27FEB98			•
SE125A50	Prepare Report & Review	19	17FEB98	13MAR98			<b>E</b> 3
SE125A60	Incorporate Comments & Issue Report	73	16MAR98	01APR98			
SE125AM3	Waste Isolation / EBS Requirments Report	0	).	01APR98	P3		<b>↓</b>
YP1XPP033	B: PPkg - SE125A - MGDS Design SRA - Ph			NA 11 11 NO		<u> </u>	<u>V</u>
SE514	System Studies Support to FA/RA	205	01OCT98	27JUL99			
TR16FA1: Ir	nterface Management			1		¶ į	
SE426700	Develop Bin3 Interfaces	187	01OCT96A	25JUL97	·	ALIESZON N. S. SOL	STATE OF THE STATE
SE426705	Develop Bin2 Interfaces	187	01OCT96A	25JUL97		<b>व</b> र्षान १९८० वर्षे ।	PA.
SE426710	Evaluate Interfaces	187	01OCT96/	25JUL97	-	मिन्न १८८ <u>३ के व</u> र्के (१४ में १	ग्द्रह
SE426715	Document Interface Requirements	46	28JUL97	30SEP97			V V ···································
SE426M3	Interface Management Process Report		)	30SEP97*	M4		<b>↓</b>
TR16GA1: I	nterface Management						
ject Start ject Finish a Date	010CT95 010CT02 020CC95 020CC95 020CC96 020CC96			/UCCA MOUN /BS 1.2.1 - SY			21 Date KRISHNIA 12/18/86 (1600HRS) (5-5315 Checked Apr
4 Date • Primevera Syste	18DEC96			<b>LONG RANG</b>	E PLAN (F	Y96-FY98)	· · · · · · · · · · · · · · · · · · ·

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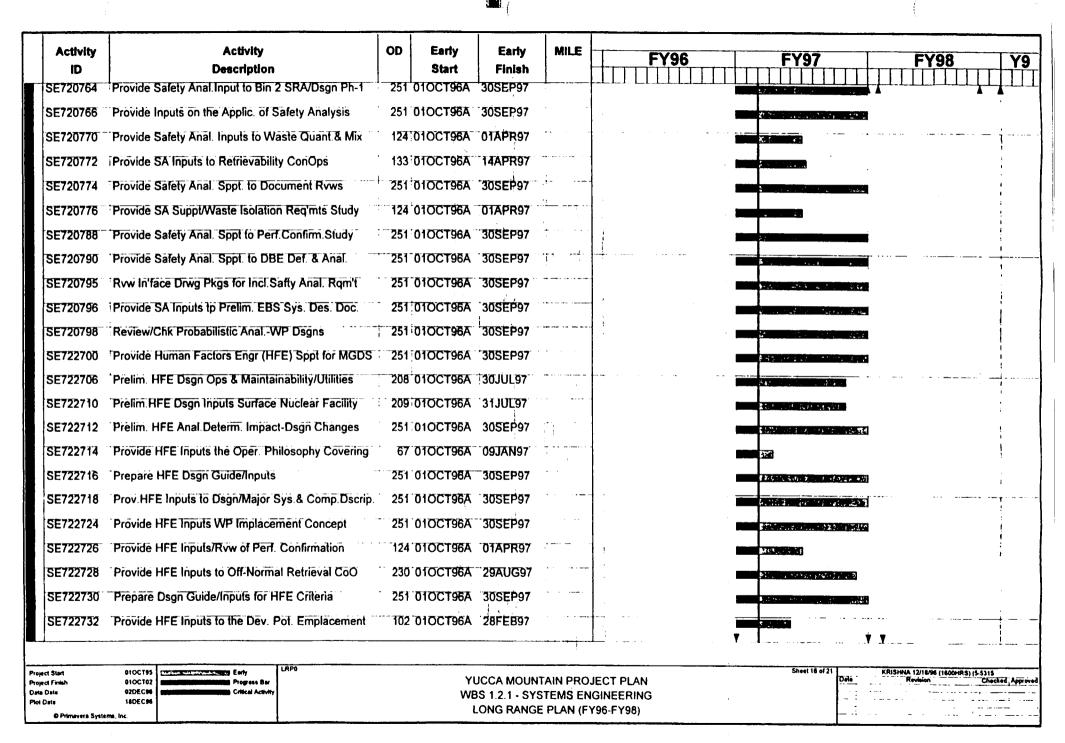
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Activity	Activity  Description	OD	Early Start	Early Finish	MILE	FY	96		FY97		FY98	Y9
ID SE532810	Update Bin 3 SSC Interface Requirements	187	01OCT97*	l.	<u></u>			$\Box$		<u> </u>		
į	•		010CT97*					·				
	Update Bin 2 SSC Interface Requirements		!									i
SE532820	Evaluate Interfaces	187	010CT97*	30JUN98								
SE532AM4	Interface Management Status Report	0		31MAR98*	M4						<b>.</b>	<u></u>
SE532825	Update Interface Requirements	64	01JUL98	30SEP98	· <b>i</b>					•		
SE532BM4	Interface Management Status Report	. 0	·	30SEP98	M4			<del></del>				🚶
					_				<u>.</u>			
TR17FB1: N	IGDS Cost Analysis Cost Models Update	0.5	210CT96A	10EE807		] !			eseren	į		
	·		18NOV96A									
	Interim MGDS-VA Cost Est. Analysis Update								) a .	:		:
	PCE Assumptions Approved by RW-1			17DEC96*	!M4				•	•		;
SE124725	Prelim. Draft MGDS-VA Cost Est. Notebook	78	20JAN97*	08MAY97					was and			•
SE124M4A	Update to RW-1		).	19MAR97*	M4				<b>!</b> •			
SE124720	Preliminary Draft MGDS-VA Cost Est. Report	36	20MAR97	08MAY97	- 1	1			823	1		
SE124735	Final Draft MGDS-VA Cost Est. Report	. 66	29MAY97*	29AUG97					7			•
SE124740	Final Draft MGDS-VA Cost Est. Notebook	33	16JUL97*	29AUG97						<b>7</b>		1
SE124745	Final MGDS-VA Cost Estimate Report	21	02SEP97*	30SEP97						- <b>∀</b> 521		:
SE124M4B	Final MGDS-VA Cost Est. Comments Received		)	09SEP97*	M4					I		
SE124AM3	Submit Cost Estimate	. (	j	30SEP97	M3							- · - · ·
				·		<del> </del>						•
SE124800	MGDS Cost Analysis Develop VA Case Assumptions	23	3 01OCT97*	03NOV97	<del></del> -	-				V Mari		•
SE124805	Develop 98 TSLCC Assumptions	28	8 06OCT97*	14NOV97	· 	-				76	}· · -	
SE124810	Cost Models (VA & TSLCC) Update	33	3 200CT97*	08DEC97	.4 .							
	Prepare Draft TSLCC & VA Estimates	. 3	7 14NOV97*	09JAN98	•					<del>-</del> ,	7 (1)	
SE124825	Draft TSLCC Documentation for ICE		5 17NOV97*		1						<u> </u>	1
JSE 124023	DIAN TOLOG DOCUMENTATION TO TOL	J.			<u> </u>				<u> </u>		<u> </u>	<u>.</u>
Project Start Project Finish	010CT95 Eurly LRP0		Y	UCCA MOUN	TAIN PRO	DJECT PLAN			Sheet 14 of	Date Date	Revision (1500HR	S) (5-5315 Checked Approve
Oata Date Piol Date	02DEC96 CHICAGO CHICAGO ACTIVITY		W	BS 1.2.1 - SY	STEMS EI	NGINEERING						
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Activity	Activity	OD	Early	Early	MILE	FY9	)6		FY97		FY98	Y
ID	Description		Start	Finish			ШШ					Ш
	Update VA Estimates		1	26FEB98	1.					A A	<b>-</b> 1/2	A A
SE124820	Draft TSLCC Report for ICE	12	19JAN98*	†03FEB98	1					•	<b>}</b> ·	į
SE124855	Prepare Final Cost Documentation	135	09FEB98*	19AUG98	T						٠	}
SE124835	Support Ice Review	55	02MAR98*	15MAY98	<del>-</del>							
SE124840	Prepare Final VA Estimate	77	16MAR98*	01JUL98		! 						i
SE124845	Update TSLCC per ICE Inputs	34	06JUL98*	20AUG98								
SE124860	Support YMSCO Review	27	15JUL98*	120AUG98	<b>†</b> :	j					<b>V</b>	!
SE124850	Prepare Final VA Cost Report	20	24JUL98*	20AUG98	4	<u> </u>						
SE124M3	Issue MGDS Cost Analysis to YMSCO for Review	<u></u>	<del>,</del>	20AUG98	Р3							
		-			!						-·· <del>-</del>	
TR18FA1: S	pecialty Engineering Support to MGDS D Provide SA Supt-Nuclear Facility Design	251	01OCT96A		1. "他不是"。					#780*P		;
	Provide SA Supt-Site Util. Sys. Dsgn		0100130A		•				e i stand de stande de co			į
	Provide SA-Underground HVAC Sys.Regits		010CT96A		i,	į			: 193617270378			:
	Provide SA-SubSurf.WP Handling Dsgn		010CT96A	. 1	·	'			Fr. C. HXAL CO.			
	Provide SA SuptDevel of Retrieval Dsgn		010CT96A		<u>.</u>				6 (4 14 17 ) (7 14 14 14 16 16 16 16 16 16 16 16 16 16 16 16 16	1.		;
	•				 			38	of the state of th	<u>.</u>		
	SA Supt-Devel/Dsgn Guide-Radiation Shield-Drifts		010CT96A		- <b>-</b> -				42. 3 pt. 3 -7 2 \$ 1 f 2 f 2 f 1 f 2 f 2 f 2 f 2 f 2 f 2 f	ម្មស		
	Prov.Dsgn Salety Input/Review Empl.Strategies-RP		010CT96A	•		!		7,1				
	Provide SA-MGDS Concept of Operations		010CT96A	•	,			7	经证券 经股份	(5)		
	Provide SA-Bin3 Sys.Description Documents		010CT96A					21	श <i>्याकः विशासक्ति है ।</i>	a.·		İ
SE720754	Provide SA To Bin 3 SRA Design-Phase 1	251	01OCT96A	30SEP97		!		FI.	ENICO DE LA CONTRE EN LA COMPA	S.E.		ı
SE720758	Provide SA-Bin2 System Description Doc's	251	010CT96A	30SEP97		<u> </u>		-	Committee and	<u>-                                    </u>		
SE720760	Rvw VA Test and Evaluation Plan	251	010CT96A	30SEP97	<del>,</del>			25	on 20 to AMORY	8 <b>4</b>		
SE720762	Provide Analysis Romts, to MGDS DRD & CRWMS RD	251	010CT96A	30SEP97	T				Company on Apply 1	Ftt		
	NU				<del></del>	<u></u>		▼l		. <b>T</b>	<del></del>	

LONG RANGE PLAN (FY96-FY98)

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Activity   Activity   Description   Description   Start   Finish   SE722734   Provide HFE Inputs to MGDS CoO   251 010CT96A   30SEP97   SE722736   Provide HFE Inputs to Bin 3 System Desc. Doc.   251 010CT96A   30SEP97   SE722738   Provide HFE Inputs SRA Dign-Bin 3 Ph-1   251 010CT96A   30SEP97	FY96 FY97 FY98 Y9
SE722734 Provide HFE Inputs to MGDS CoO 251 010CT96A 30SEP97 SE722736 Provide HFE Inputs to Bin 3 System Desc. Doc. 251 010CT96A 30SEP97	
SE722736 Provide HFE Inputs to Bin 3 System Desc. Doc. 251 010CT96A 30SEP97	
SE722/38 Provide HFE Inputs SRA Dsgn-Bin 3 Ph-1 251 010C196A 30SEP97	
SE722742 Provide HFE Inputs to the Bin 2 Sys. Descr. Doc. 251 010CT96A 30SEP97	
SE722744 Provide HFE Inputs SRA Dsgn-Bin 2 Ph-1 251 01OCT96A 30SEP97	
SE722748 Rvw VA Test & Eval. Plan 251 010CT96A 30SEP97	
SE722750 Provide New/Updated/Mod. HFE Romts. 251 010CT96A 30SEP97	· · · · · · · · · · · · · · · · · · ·
SE722752 Provide HFE Inputs for SSC Interfaces 251 010CT96A 30SEP97	
SE722754 Provide Inputs on Applic. of HFE Reg. Guidelines 251 010CT96A 30SEP97	
SE722758 Prov. HFE Inputs/Rvw MGDS Dsgn Assump. Doc 251 010CT96A 30SEP97	
SE722760 Provide HFE Inputs to Retrievability CoO 133 010CT96A 14APR97	
SE722762 Provide HFE Sppt. to Document Reviews 251 010CT96A 30SEP97	
SE722764 Provide HFE Inputs to Progress and Adhoc Rpts 251 010CT96A 30SEP97	
SE722766 Provide HFE Inputs to Safety Anal. Act. & Rpts. 251 01OCT96A 30SEP97	A. 1
SE722778 Rvw Interface Drwg Pkgs for HFE Rqmts 251 010CT96A 30SEP97	
SE722780 Participate in Mockup Test to Eval. Welding Proc 251 01OCT96A 30SEP97	© ± 20 Aks + 13 (40% - 12 ± 12 € 12 € 12 € 12 € 12 € 12 € 12 €
SE722782 Dev/Eval Proced for Testing & Exam Closure Wel 251 010CT96A 30SEP97	型・更からい。 毎週120mm 110mm
SE722784 Provide HFE Inputs to Prelim. EBS Sys. Desc. 251 010CT96A 30SEP97	200 metal design of the
SE724700 RAM Sppt. to SRA/Dsgn 251 010CT96A 30SEP97	NA MATORIZADA POLICIA
SE724702 Provide RAM Sppt. to Updating/Integration 251 01OCT96A 30SEP97	
SE724704 Provide RAM Sppt. to Site-Utilities Sys. Dsn 208 01OCT96A 30JUL97	\$1.00 TO THE PARTY OF THE PARTY.
SE724708 Provide RAM Sppt. to Subsurface WP Handling 251 010CT96A 30SEP97	
Dsgn	30 37 S 45 545 37 S 1
SE724714 Provide RAM Analysis Inputs to MGDS CoO 251 010CT96A 30SEP97	V

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01OCT95 01OCT02 02DEC96 Progress Bar 02DEC96 Critical Activity

YUCCA MOUNTAIN PROJECT PLAN
WBS 1.2.1 - SYSTEMS ENGINEERING

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LONG RANGE PLAN (FY96-FY98)

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Activity	Activity Description	OD	Early Start	Early Finish	MILE	FY96 FY97 FY98 Y9
SE724716	Provide RAM Anal. Inputs Bin 3 Sys. Des. Doc's	251	010CT96A	30SEP97	ļ	
SE724718	Prov.RAM Anal Inputs SRA Dsgn P-1/Bin 3	251	010CT96A	30SEP97		
SE724722	Prov. RAM Anal. Inputs Bin 2 Sys.Desc.Doc (SDD)	251	010CT96A	30SEP97	<b>-</b>	
SE724724	Prov.RAM Anal Inputs SRA/Dsgn P-1 for Bin 2	251	010CT96A	30SEP97		
SE724728	Rvw the VA Test & Eval. Plan to Ensure RAM	251	010CT96A	30SEP97	<u> </u>	
SE724730	Provide New/Update/Mod. RAM	251	010CT96A	30SEP97		
SE724732	Provide Inputs on Applic. of RAM Analysis	251	01OCT96A	30SEP97	<u>:</u>	
SE724734	Provide RAM Analysis Inputs to Retriev. CoO	133	010CT96A	14APR97	-; :!	
SE724736	Provide RAM Analysis Sppt. to Doc. Rvws	251	010CT96A	30SEP97		
SE724738	Provide RAM Analysis Inputs to Progress & Adhoc	251	'01OCT96A	30SEP97		
SE724742	Rvw Interface Drwg Pkgs for Inclusion RAM Anal.	251	01OCT96A	30SEP97		
SE724744	Provide RAM Anal. Inputs to Prelim. EBS Sys.	251	01OCT96A	30SEP97		
SE724746	Prov.RAM Supt. U'ground HVAC Sys.Req'mts	251	010CT96A	30SEP97	<del></del>	
SE724750	Prov.RAM Supt. Devel. Retrieval Dsgn.	230	010CT96A	29AUG97	· · · · · ·	
SE722720	Provide HFE Dsgn Inputs/Subsurf. Facility Arrang	187	01NOV96A	27JUN97	•	See Mark Street Co.
SE722722	Prov. Prelim HFE Inputs/Specs, Emerg Warn System	187	01NOV96A	27JUN97		
SE722704	Prelim. RFE Dsgn to Include Site & Facil. Access	147	03JAN97*	31JUL97		
SE720720	Provide SA Supt -Prelim Sealing/Closure Dsgn	141	11FEB97*	29AUG97	<del>-</del>	
SE724748	Prov.RAM Supt. Prelim Sealing/Closure Dsgn	141	11FEB97*	29AUG97		HARRING STREET
SE722756	Provide Inputs Concerning HFE Dsgn Features	128	01APR97*	30SEP97		
SE720756	Provide SA-Desc. of Ops.& Maint DescBin 3	107	30APR97*	30SEP97		
SE720765	Prov.SA to Desc.Of Ops & Maint. Cond/Bin 2	107	30APR97	30SEP97	•	
SE722740	Provide HFE Inputs Desc.Oper. & Maint./Bin3	107	30APR97*	30SEP97		
<u> </u>					<del>- i</del>	J

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Project Finish 0
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YUCCA MOUNTAIN PROJECT PLAN WBS 1.2.1 - SYSTEMS ENGINEERING Sheet 18 of 2

KRISHNA 12/16/96 (1600HRS) (5-5315
Revision Checked, Approved

LONG RANGE PLAN (FY96-FY98)

Activity	Activity	OD	Early	Early	MILE		
ID	Description		Start	Finish		FY96 FY97	FY98 Y9
SE722746	Provide HFE Inputs Desc. Oper. & Maint./Bin 2	107	30APR97*	30SEP97	<del>-  </del>	<del>╒╸╸╸╸╸╸╸</del>	
SE724720	Prov.RAM Anal.Inputs Bin 3 Desc. Oper. & Maint.	107	30APR97*	30SEP97		_	
SE724726	Prov.RAM Anal.Inputs Bin 2 Desc. Oper. & Maint.	107	30APR97*	30SEP97			
TR18FB1: S	upport ESF		1		八月		- :
	Provide SA Inputs/Rvw ESF ConOps Update		01OCT96A				
SE814704	Provide Safety Anal. Inputs/Rvw to ESFDR	251	01OCT96A	30SEP97			
SE814706	Provide Safety Anal. ESF Facilities/Part. CCB	<sup>-</sup> 251	01OCT96A	30SEP97			
SE814766	Provide Dsgn Safety Inputs/ESF Subsurf Facil.	251	010CT96A	30SEP97			
SE814776	Prov. Dsgn Safety Inputs/ESF Surface Facilities	251	01OCT96A	30SEP97			<del></del>
SE814781	Eval. Data/DS Heating Phase Single Heater Test	163	010CT96A	27MAY97		F-10-10-10-10-10-10-10-10-10-10-10-10-10-	
SE814787	Rvw Asbuilt Inputs ESF, O&M Baseline & ESFDR Rom	251	010CT96A	30SEP97			S. C. C.
SE814793	Provide Dsgn Saftey Rqmts Inputs Emerg. Ops Ctr	251	01OCT96A	30SEP97			
SE814798	Provide Dsgn Safety Into the Dev. of EOC	251	010CT96A	30SEP97			
SE814700	Update SSA's to As-Builts as Required	229	01NOV96A	30SEP97			
SE814792	Prov. Dsgn Safety Inputs to Title IIDsgn ESF SGDF	- 28	13JAN97*	20FEB97	· ·	· · · · · · · · · · · · · · · · · · ·	
SE814784	Prov.Dsgn Safety/Single Heater Test Status Rpt	115	18APR97*	30SEP97	-	· •	and Control
SE814M3	Deliver Safty Analysis Activity Report (SAAR)	٠. ر	ji	30SEP97	М3		<b>1</b>
	erform MGDS Safeguards & Security Land			i tal			
SE500700	Perform Saleguards & Sec. Land Withdrawal Study		02JAN97*	1		<b>●参加和</b> 市	•
SE500705	Write Draft Report		28APR97	09MAY97			
SE500710	Internal & External Review			<b>20JUN97</b>			B
SE500715	Prepare Final Report		23JUN97	27JUN97	;		
SE500M3	Saleguards & Security Land Withdrawal Study Rpt.		),	27JUN97	М3		• · · · · · · · · · · · · · · · · · · ·
TR18GA1: 8	Specialty Engineering Support to MGDS	777		NAKIAS/A×			· · · · · · · · · · · · · · · · · · ·
SE/20/91	Provide Specially Engineering Support to PISA	146	01OCT97*	U1MAY98		l	V V
Project Start Project Finish	01OCT95 01OCT02		Y	JCCA MOUN	ITAIN PRO	Sheet 19 of JECT PLAN	
Data Date Plot Date	020EC96 18DEC96		WE	3S 1.2.1 - \$Y	STEMS EN	IGINEERING	
© Primavers Syste	ime, Inc.		· <del></del>	LONG RANG	E PLAN (F	190-F 198)	

Activity	Activity	OD	Early	Earty	MILE										
1D	Description	00	Start	Finish	MILE	Ц.,.		FY	96			FY97	FY98		<b>Y9</b>
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SE720A	Provide System Safety Support to SRA/Design	455	01OCT97	26JUL99	1									-	
SE722A	Provide HFE Support to SRA/Design	455	01OCT97	<b>26JUL99</b>	- • · · · ·								Y	: 12.8 J. G	
SE724A	Provide RAM Support to SRA/Design	455	01OCT97	26JUL99											
SE726A	Provide ILS Support to SRA/Design	455	01OCT97	<b>26JUL</b> 99									<b>Y</b>	11.2.	
TR18GA2: S	Specialty Engineering Support to ESF			1 1	1.		-					-			-
SE812	Update Maindrift SSA to Add'l U-Grnd Excavation	106	01MAY98*	30SEP98									•		1
SE812M4	Briefing Maindriff SSA			30SEP98	M4	3								1	
TRISGAS:S	afeguards & Security	<del></del>	· · · · · · · · · · · · · · · · · · ·			ţ									
SE730A	Provide Safeguards, Security to SRA/Design	455	01OCT97	26JUL99		:							<u> </u>	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
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										•	•				
	Degraded Mode Criticality Degraded Mode Criticality	27	01OCT96A	DEDI COC	<b>b</b> ar dahari men	l '									i
SE1A700	Degraded Mode Criticality	32	UIOC 196A	OODECAR									•		ĺ
SE1A0M3	Degraded Mode Crit.Analysis of Immob.Plut.	0		06DEC96	М3							•			
	External Criticality			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		Ī			•			·   · · · · · · · · · · · · · · · · · ·			
SE1A705	External Criticality	198	02DEC96*	11SEP97	,	1						11. 在 <b>经股</b> 份的联合企			:
SE1A2M3	Rpf. External Criticality of Plutonium	- 0		11SEP97	M3							İ	<b>!</b>		
TRIAFAS F	Plan/Stragery for Inclu of Plut Wst int				<del></del>										!
SE1A710	Plan/Strategy -Inclusion of Plut.Waste in FWMS	145	010CT96A	27MAY97		1					-	29/9H-125/4523			
SE1A3M3	Approach to Incorp Plut Waste into FWMS	<sub>0</sub>		27MAY97	М3							İ			
				21107	WIS							•			
	Plan Implementation		44.	a lyn a sai								1			
SE1A715	Plan Implementation	118	03MAR97*	15AUG97								Wars trive			
SE1A4M3	Data Needs Document	0		-30JUN97*	M3							1			
SE1A5M3	Draft MOA	<sub>.</sub> .		-29AUG97*								· ·	Ţ		
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TR1BFB1: (	DBE Definition & Analysis					]									
SE310700	DBE FY'97 (1ST HÅLF)	123	010CT96A	31MAR97	<del> </del>	1						54- y-29128)			
SE310705	DBE FY'97 (2ND HALF)	128	01APR97	30SEP97	2	<u> </u>						-21082			
<u> </u>						l							_ Y . Y		
Project Start Project Firsh Data Date Plot Date © Primavera Syste	01OCT95 01OCT02 02DEC96 18DEC96		Wi	UCCA MOUN BS 1.2.1 - SY LONG RANG	STEMS EN	GINEE	RIN					Sheet 20 of 21 Date	KRISHNA 12/18/96 (1600) Revision	Checke	ed Approved

Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96	FY97	FY98
TR1BFB2: 0	Classification Analysis/Q-List Update			Service and	A	<del>                                     </del>	<del>╌┸</del> ┪╌ <del>┖╶╏┈╏┈╏</del>	<del>▗</del> ╅┸┸┸┸┹┹┹┹┸┸┸ <del>╻</del>
SE320700	CA/Q-List FY'97 (1st Half)	123	010CT96A	31MAR97	·	1	::::::::::::::::::::::::::::::::::::::	_
	CA/Q-List FY'97 (2nd Half)	128	01APR97	30SEP97	! !		<b>V</b>	<b>.</b>
	DIE Analyses			***		· · · · · · · · · · · · · · · · · · ·	· · - · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
SE820700	DIE FY97 (1ST QTR)	61	010CT96A	31DEC96		:		
SE820705	DIE FY97 (2ND QTR)		75 IX.II.	31MAR97	· · · · · · · · · · · · · · · · · · ·	· -	<b>1</b>	
	1	02	UZJANY	31MAR97				
SE820710	DIE FY97 (3RD QTR)	, 64	01APR97	30JUN97	·		<u> </u>	
SE820715	DIE FY97 (4TH QTR)		Samus <del>a.</del>		1	!		
SE0207 13	DIE F1 97 (41H Q1K)	64	01JUL97	30SEP97	:		<u> </u>	
SE820M3	DIE FY'97 REPORT	0		30SEP97	М3	İ		Ì
T045044	DIP A I	:			1			•
SE822800	DIE Analyses		04007074	12	100			· · · · · · · · · · · · · · · · · · ·
GLOZZOGO		231	010CT97*	30SEP98		-		
SE822M4	DIE FY'98 Briefing	_0;		30SEP98	M4			Ì
TD4DOAO.	PISA Chapter 7			1				▼
SE5603	Support Chapter 7 PISA Development	224	10NOV97*	30SEP98	·			7
	•	224	TONOVSI	303EP90	;			
TR1BGB1:	Classification Analysis/Q-List Update	· · · · · · · · · · · · · · · · · · ·	`		*****			<u></u>
SE322800	CA/Q-List FY'98 (1st Half)	123	01OCT97	31MAR98				
SE322805	CAQ-List FY'98 (2nd Half)	<u></u> . <sub>128</sub> .	01APR98	30SEP98				<b>V</b> .
		120	UIAFINSO	303EF90	j			
TR1BGB2: I	DBE Definition & Analysis		1		· · ·			<u> </u>
SE310800	DBE FY'98 (1ST HALF)	123	01OCT97	31MAR98	<del>i</del>			Total Control of the
SE310805	DBE FY'98 (2ND HALF)	128	01APR98	30SEP98				Ÿ

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© Primavera Systems, Inc.		LONG RANGE PLAN (FY96-FY98)		

## APPENDIX J

## WASTE PACKAGE DEVELOPMENT AND MATERIALS SCHEDULE

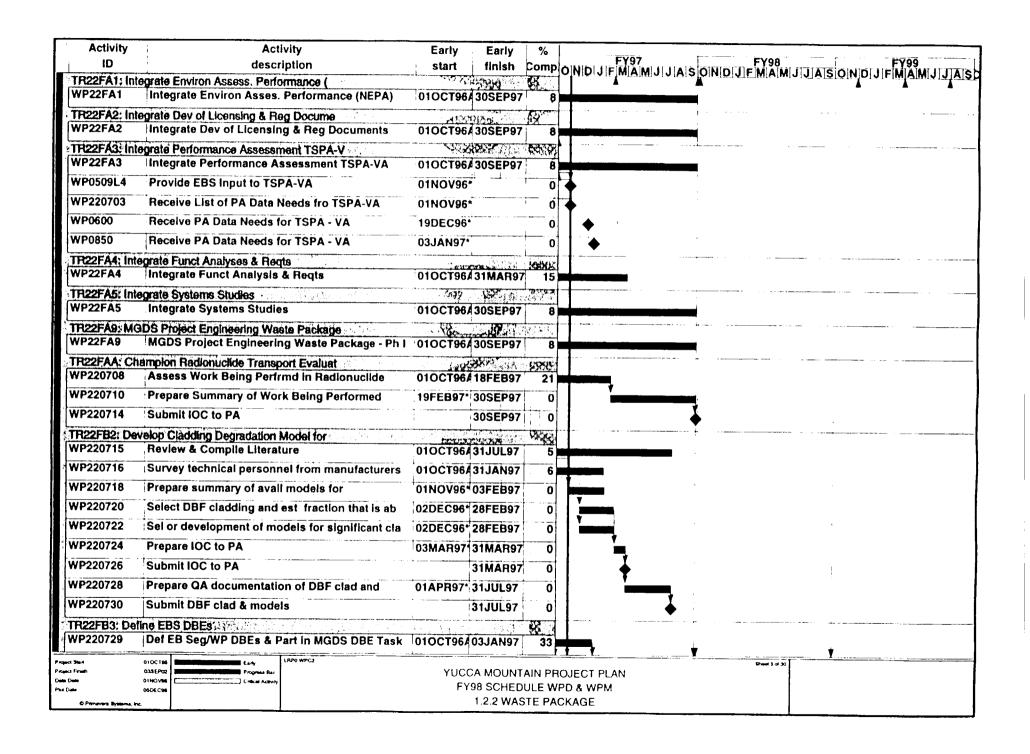
The data contained in this appendix reflects the status of the Yucca Mountain Site Characterization Project as of 12/16/96. Because of the evolving conditions of the Yucca Mountain Site Characterization Project, data in this appendix is changed or updated as necessary. However, this VA Design and Review Plan will not be revised or reissued as a result of data updates. For a current status of the data in this appendix and/or a copy of the current version, contact C. Chagnon. For suggested changes to the contents, contact A. Segrest.

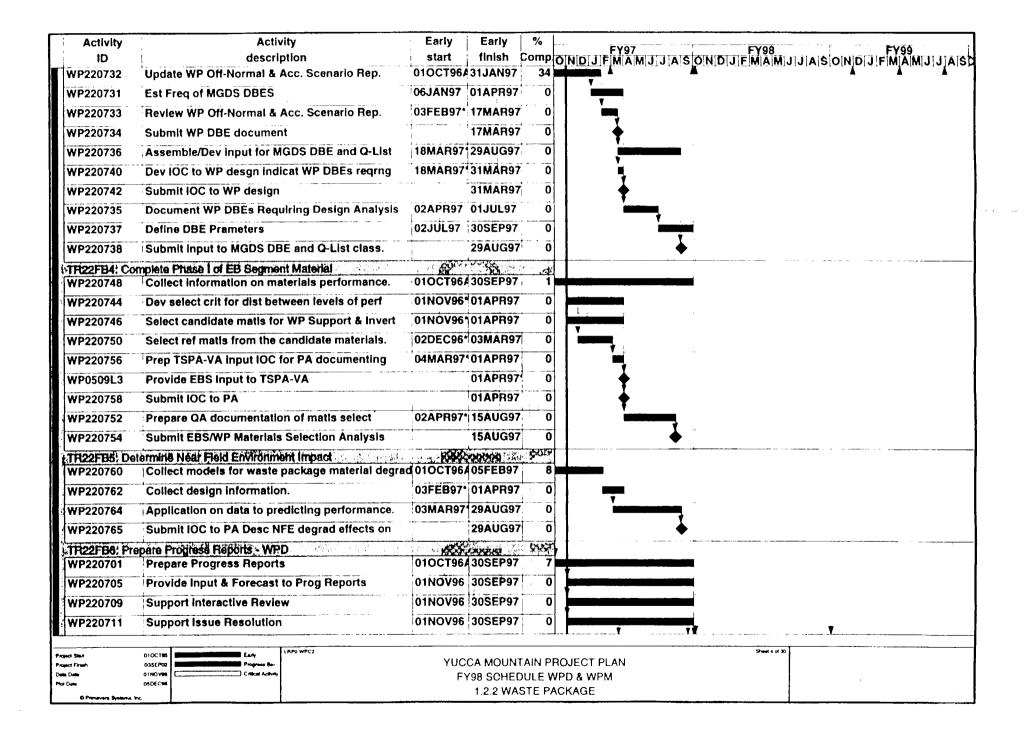
## WASTE PACKAGE DEVELOPMENT AND MATERIALS SCHEDULE

The Waste Package Development and Materials (WBS 1.2.2) schedule for FY 97/98 is provided. This schedule reflects the current status of the FY 98 planning activity. All of the Waste Package Development and Materials activities are tied to the VA milestone, except those that exclusively support the EIS/NEPA development.

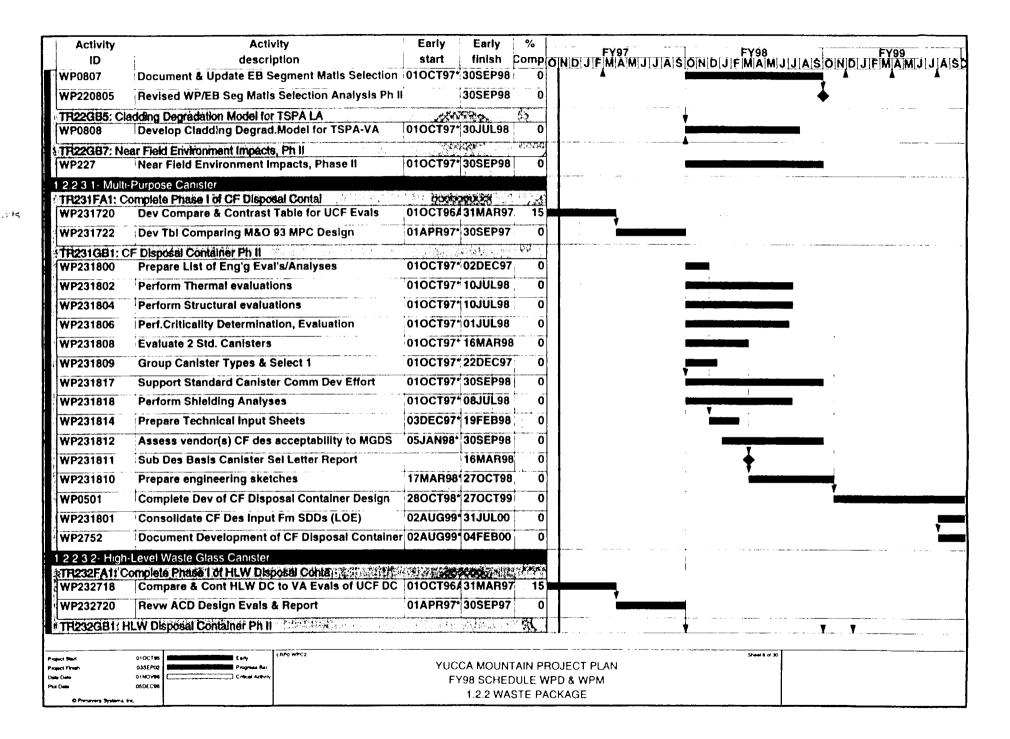
Activity	Activity	Early	Early	/
ID	description	start	finish	Comp OND JEMAMUJASOND JEMAMUJASOND FY99
1.2.2 Waste				
	: PPkg - WP0020M2B - Complete EMCR Rev	1000	A CANA	
WP0020M2E	B   Complete Engr. Matis. Char. Rpt. Rev 2		01APR9	99' 0
YP2XPP021	: PPkg - WP0035M2B - Complete WFCR Rev	<i>*</i> ∂554,	10/08/	Contraction
	Complete Waste Form Char. Rpt. Rev 1		26FEB97	971 0
YP2XPP023	: PPkg - WP015M2B - Complete EMCR Rev 1	198	1 2	
WP015M2B	Complete EMCR Rev 1		26FEB97	97 0
YP2XPP028	: PPkg - WP080M2 - Complete Disposal Cr	Town.	A CONTRACT	
WP080M2	Complete Disposal Criticality Technical Report		14AUG9	96, 100
YP2XPP032	: PPkg - WP110M2B - Complete WFCR Rev 2			
WP110M2B	Complete Waste Form Char. Rpt. Rev 2		30NOV9	98 0
YP2XPP036	: PPkg - WP150M2 - Update Disposal Crit	68	- 33	
WP150M2	Update Disposal Criticality Topical Report		08OCT97	
.2 2.1 · Waste	e Package Coordination and Planning			
	artagement & Integration Outside EBS	<b>U</b> .		······ • ···· • ···· • · · · · · · · ·
WP21FA2	Management & Integration Outside EBS - Ph I	01OCT96		97 8
	PVEDC/PCG - Ph I		MAY	Division .
WP21FA3	OPI/EDC/PCG - Ph I	01OCT964	i	
	GDS Waste Package Dsgn Review Phase I	1.5/1/290		in the second se
WP21FA4	MGDS Phase I Dsgn Review - Waste Package	02APR97*		
TR21FA5: W WP21702	PD Management & Integration Phase I		स्ट्राज्य.	
	Dev WP Design Completion Letter Report	01OCT964	i	
WP21FA5	WPD Management & Integration	01OCT964	30SEP97	97 8
WP21704	Submit EBS/WP Ph-1 Dsgn. Comp. Letter Rpt		12SEP97	77* 0
	NL M&I Phase I	- Proces	ZJ2GG	
WP21FA6	LLNL M&I Phase I	01OCT96	30SEP97	97 8
TR21FA7; Su	pport LLNL Lab Leads	10.000	300000	
WP21FA7	Support LLNL Lab Leads	01OCT96/		07 8
	Prepartaion - LLNL	· · · · · · · · · · · · · · · · · · ·		
WP21FA8	PR Preparation - LLNL	01OCT96	30SEP97	
	inual/Long-Range Planning - LLNL	A.A.	1 287	
WP21FA9	Annual/Long Range Planning -LLNL	01OCT964		
	aste Package Consulting Board		7. O. S.	
WP21FAA	Waste Package Consulting Board	02DEC96*		
ict Start	010C196 Early LNP0 WPC2		<u> </u>	Sheet to (10)
ct Fresh Date	0.3.5.FP02 0.1NO.V98 Critical Additive			NTAIN PROJECT PLAN
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Activity	Activity	Early	Early	%		EV97		FY	B	1	EVAG
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	D Long Range & Annual Planning		:05 <b>7</b> 01	13	, j	Δ				<b>A</b>	<b>A</b>
WP21FB1	Annual/Long Range Planning -WPD	101OCT96	430SEP97	7 8							
TR21GA1: WP	M M&I Phase II	<b>~</b> 000	N.C.	13°			*				
WP21GA1	WPM Management & Integraton, Ph II		1 30SEP9	3 0					,		
TRAIGAS WE	D Management & Integration Phase II	ार्ड ।	2005	. bess			•				
WP0712	Management & Integration Support, Ph II	01OCT97	* 30SEP9	3 0						<b></b>	
WP0813	WPD Management & Integration	01OCT98	3 26FEB9	ē						V	
WP2751	Support Development of LA	30JUL99	* 28JUL00	0							<u></u>
TR21GA3: WF	D Progress Reports, Ph II	KSL/	77.7(Q)	in Chie							
WP0701	Prepare Progress Reports, Ph II	01OCT97	7"30SEP9	9 0							
WPPR18M3	WPMWPD Input to Progress Report 18		13MAR9	8 0			<b>A</b>	<b>•</b>		•	
WPPR19M3	WPMWPD Input to Progress Report 19		15SEP9	81 0				•		<b>∳</b>	•
WPPR20M3	WPM/WPD Input to Progress Report 20		15MAR9	9 0						•	<b>†</b>
WPPR21M3	WPMWPD Input to Progress Report 21		17SEP9	1							•
TR21GA4: M&	d Outside EBS, Ph II		CONST.				*				
WP0825	Management & Integration Outside EBS		7 :01MAR0	i							
TR21GA5: OP	VEDC/PCG - Phase II	1889		Per Si			▼				
WP0830	OPI/EDC/PCG, Ph II	01OCT97	7 OIMARO	2 0							
TR21GA8: MG	DS Waste Package Dsgn Rev, Ph II		KICEON	100°X							
WP210809	WPD/WPM Input to VA Design Summary Prep	01OCT97	7" 20FEB9	B   0							
WP210811	WPD/WPM Input to MGDS VA Review	01OCT97	7* 30SEP9	ВО			į.				
WP21GA6	MGDS Ph-II Design Review - WP		7° 30SEP9	i							
TR21GA7; LLI	NL Leb Leads Support, Ph II		المرابع المرابع				<b>\psi</b>				
WP21GA7	LLNL Lab Leads Support	01OCT97	7 30SEP9	вј О							
TR21GAS: WE	PM Progress Reports, Ph II	70,50	ASSOCIATION OF THE PROPERTY OF	L Corn			•				
WP21GA8	WPM Progress Reports, Ph II	01OCT97	7 30SEP9	9 0			Ĭ <b>E</b>				
PLEASIGNE M	PM Annual/Long-Range Planning Ph II	IN A.A.	राष्ट्रस्थार ।	् प्रभूष							
WP21GA9	WPM Annual/Long-Range Planning	01OCT97	7 30SEP9	8 0	1 1		<u> </u>				
TREIGAA: W	aste Package Consulting Board, Ph II	363	<u>፠፠፠</u>	ं शहरा	1-1		1				
WP21GAA	Waste Package Consulting Board, Ph II	01OCT97	7° 30SEP9	8   0	] [						
THE GAR W	PD Long Range & Annual Plahning Ph II		प्रत्य हर		t-1						
WP21GB1	WPD Long Range & Annual Planning	01OCT97	7° 30SEP9							_	
1.2.2.2- Waste	Package Requirements				<u> </u>		<u> </u>			. ¥	
ropect Shart	010CT86 Early LRPO WPC2	VIII		JTAINI D	ROJECT PL	ΔN		Shake	of 2 of 30		
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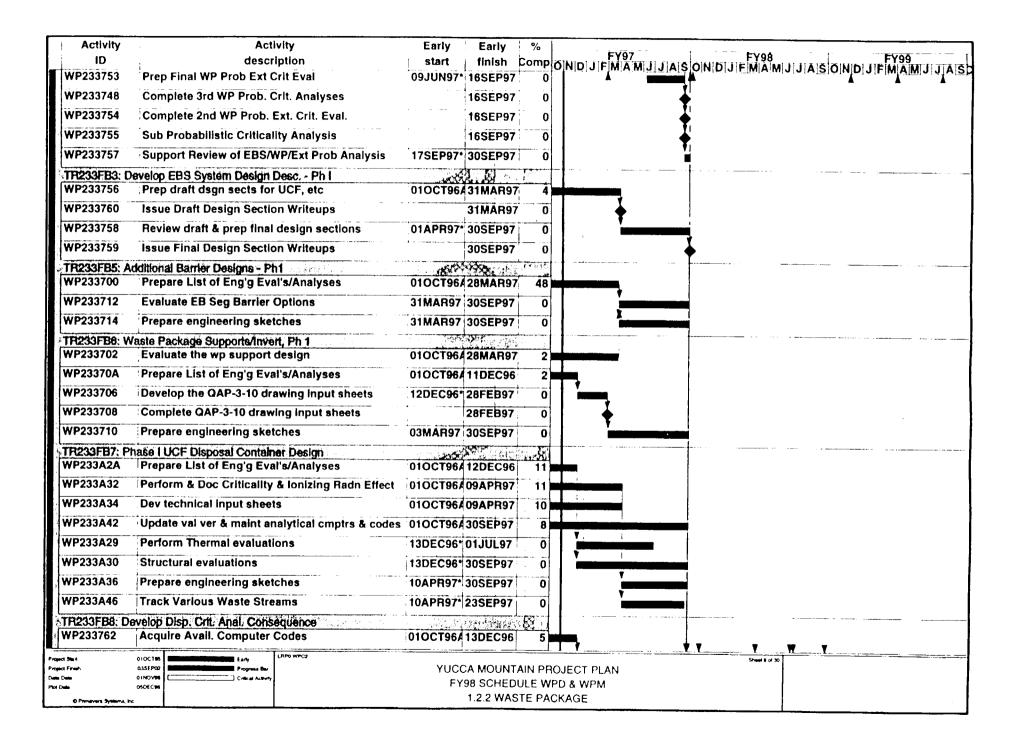
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WPPR16M3	WPM/WPD Input to progress Report 16	:	17MAR97	0	4			NIND TO IT WITH MINITO TO IT
WPPR17M3	WPMWPD Input to Progress Report 17		15SEP97*	0		<b>¥</b> 6.		
TR22GA3: Sys	tems Studies Ph II	A 183 3	30 K. K.	(A)		<u> </u>	•	
WP0509E	Integrate Systems Studies	06OCT97*	30JUL99	0				
TR22GA4: Des	sign Criteria & Requirements Ph II		4.9 V	******		· · · · · · · · · · · · · · · · · · ·		
WP0509F	Design, Criteria & Requirements, Ph II	01OCT97	27JUL99	Ö				
TR22GA5: Em	viron Assesment Performance	25	\$8057	8360		· · · · · · · · · · · · · · · · · · ·		
WP0509H	Integrate Environ Assessment Performance	01OCT97	27JUL99	0				
TR22GA6; Per	formance Assessment TSPA-LA	650 N	The state of the s	14.00	•	·		
WP0509I	Integrate Performance Assessment TSPA-LA	01OCT97		0				
WP0600A	Receive PA Data Needs for TSPA - LA	12MAR98		ō			<b>•</b>	A .
WP0509IA	Provide EBS Input to TSPA-LA		29JAN99*	0		•		<b>.</b>
WP0509IB	Receive Dsgn Assess.Feedback from PA		17MAR99	O				<b>.</b>
WP0509D	Receive PA Data Needs for TSPA-LA	18MAR991		0	•	,		<b>♦</b> `
TR22GA7: Rec	julatory & Licensing Ph II	1.77500	OCCUPATION.		<del></del>	*		· <del></del>
WP0509K	Integrate Dev of Licensing & Reg Documents	01OCT97*	27JUL99	0		<u> </u>		
TR22GA9; MG	DS Project Engineering Waste Package	002	<b>37</b>	KSD'X				
WP22GA9	MGDS Project Engineering Ph-II - Waste Package	01OCT97*	30SEP98	0				
WP0920	MGDS Project Engineering -WP, LA	01OCT98	29SEP00	0			Y	
TR22GAA: Rad	dionuclide Transport Evaln, Ph II	KKKKX	20000	50			· - · · <del></del>	
WP220812	Eval Data & Dev Recommendations	010CT97*		0		-		
WP22GB6	Champion Radionuclide Transp.EvalPh II	01OCT97*	30SEP98	Ō				
WP220807	Coord Quarterly Workshops	01OCT98*	30SEP99	0		1		
TR22GB1: WP	D Input to PISA Chap 5 & 6	- 33	11.185	881		· · · · · · · · · · · · · · · · · · ·		
WP050A9M	Prepare WPD Input to PISA Chap 5&6	01OCT97*		0		<u> </u>	<del></del>	
WP050A9D	Issue Draft WPD Input to PISA Chap 5&6	· • · · · · · · · · · · · · · · · · · ·	27FEB981	0			<b>.</b>	
WP050A9E	Issue Final WPD input to PISA Chap 5&6		30JUN981	0			<b>.</b>	
TR22GB2 WP	M Input to PISA Chap 5 & 6	रसप्रक	C-FYNE	1500		· · · · · · · · · · · · · · · · · · ·		
WP0802		010CT97*	29JUL98	O			<del></del>	
WP0802A	Issue Draft WPM Input to PISA Chapter 5 & 6		27FEB98*	Ō			<b>↓</b>	
WP0802B	Issue Final WPM input to PISA Chapter 5 & 6		30JUN981	ō		•	<b>↓</b>	
TR22084: EB	Segment Materials Selection Ph II		4	2000				
Project Start	010C186 Early LRP0 WPC2						Sheet 5 of 30	
Project Firsuh Dute Date	035£P02 Progress Bar 01NOVBS Critical Authory			AIN PROJE				
Plot Date	06DEC96	FY		ULE WPD &				
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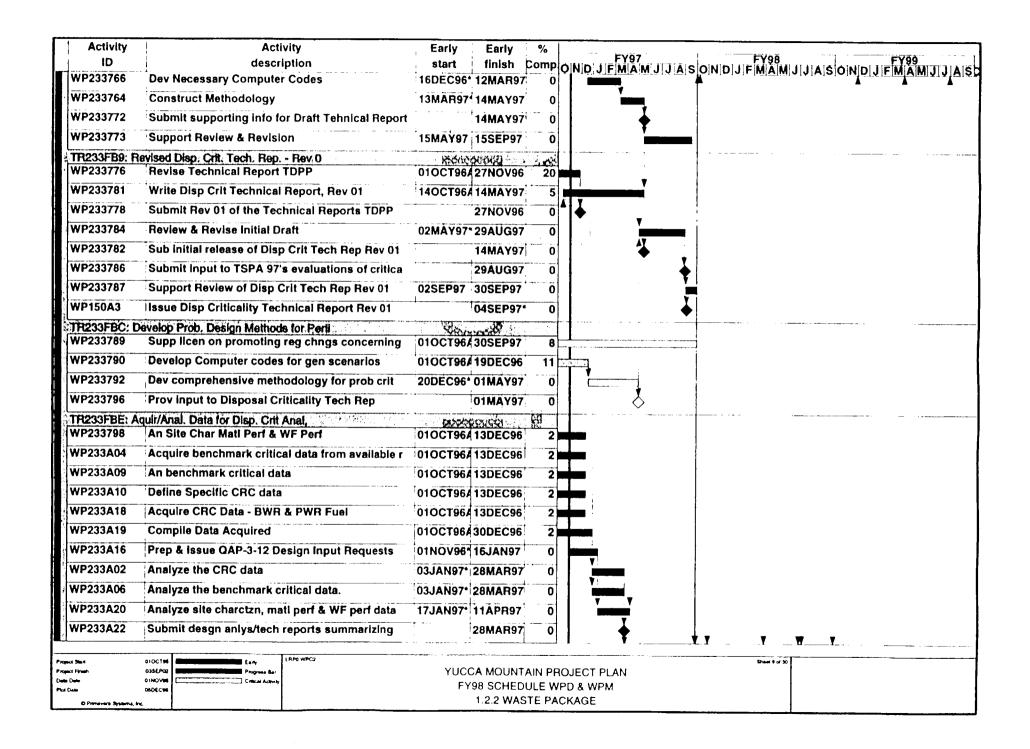


Activity ID	Activity	Early	Early	%	FY97 FY98 FY99
WP232800	description Prepare List of Eng'g Eval's/Analyses	start 010CT97	finish 05DEC97	Comp	FY97 ONDJEMAMJIJASONDIJEMAMJIJASONDIJEMAMJIJA
WP232802	Thermal evaluations		13JUL98		
WP232804	Structural evaluations		* 13JUL98	-	
WP232806	Disposal Criticality Determination	į.	09APR98	1	
WP232816	Update val ver & maintain analytical codes (LOE)	1	30SEP98		
WP232812	Assess vendor(s) HLW DC Des acceptability to	l	30SEP98		
WP232808	Prepare technical input sheets	·	04MAY98	<u>i</u>	<u> </u>
WP232810	Prepare engineering sketches		17DEC98	_ ,	
WP232814	Develop and coordinate the MGDS/EBS inputs	·	30SEP98		
WP0503	Complete Dev of HLW Disposal Container Design			. 1	
WP2754	Document Development of HLW Disposal	: 	17JUN99	<u> </u>	
WP232801	Consolidate HLW DC Des Input Fm SDDs (LOE)		31JUL00	0	
1 2 2 3 3 · Unca	anistered Spent Fuel				
	valuate DOE-Owned SNE, Phase I		3 M		
WP233722	Participate in the DOE Canister Working Group		31MAR97	!	<b>*</b>
WP233724	Coordinate DOE/EMs SNF canisterization and		30SEP97	0	
*TH233FB1: C WP233703	omplete Ph I-EB Segment Parts List & Prepare initial indentured parts list		4 13DEC96	69	
WP233728	Coord dev of drawing input sheets		19DEC96		. <b>.</b>
WP233730	Dev prei tech drwgs for UCF DC compnts	1	30JUN97		
WP233732	Develop tech drwgs for other EBS compnts		30JUN97	0	
WP233738	Dev WPD Program Drawings	1	30SEP97	0	
WP233735	Sub EBS/WP Parts List		30SEP97	0	h
TR233FB2: P	erform Probabilistic Eval. of WP Desi	: 	PROFESSION .		
WP233744	Perform 3rd WP Prob. Crit. Analyses		28FEB97	2	
WP233745	identify Prior Analyses for Update	01OCT96	28FEB97	2	
WP233750	Perform 2nd WP Prob. Ext. Crit. Eval.	01OCT96	03MAR97	2 =	
WP233746	Revw 3rd WP Prob. Crit. Analyses	03MAR97	06JUN97	0	
WP233752	Revw 2nd WP Prob. Ext. Crit. Eval.	04MAR97	06JUN97	0	<b>Y</b>
WP233747	Prep Final draft 3rd WP Prob Crit Analyses	09JUN97	16SEP97	0	
прист Бълг	010C196 (RPO WPC2				Sheet 7 of 30
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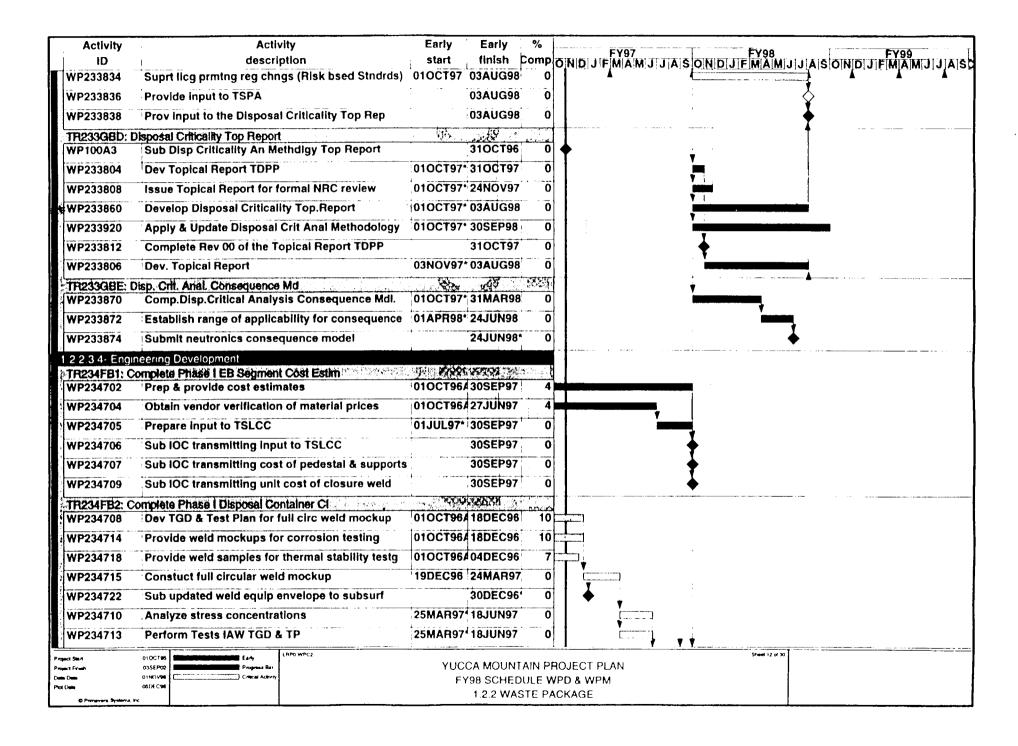
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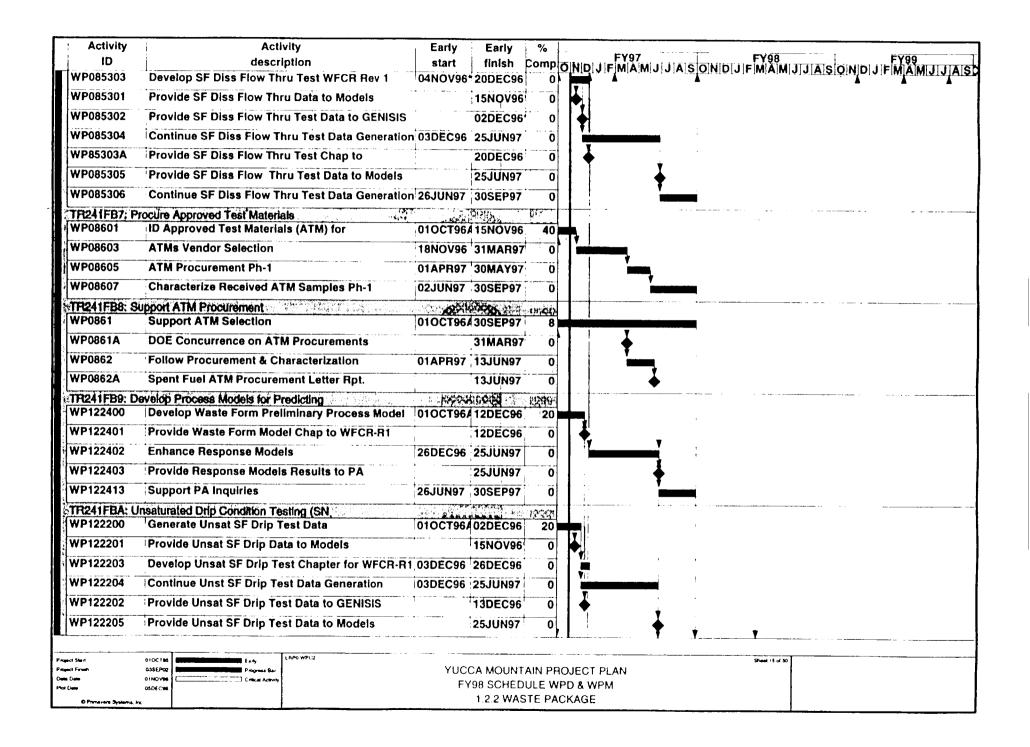
Activity	Activity	Early	Early	%	PVAR PVAR
ID	description	start	finish	Comp	PONDIJIFMAMIJIJAS ONDIJIFMAMIJIJAS ONDIJIFMAMIJIJAS
WP233A24	Support configuration model		28MAR97	0	
WP233A12	Analyze irradiated fuel assembly isotopic data	31MAR97	130SEP97	0	
WP233A26	Provide supporting info for Disp Crit Tech Rep		30SEP97	0	ō
WP233A28	Provide Support to the consequence model		30SEP97	0	ō
TR233GA1: DC	DE-Owned SNF Design Ph II	22532	984443		₫
WP233827	Provide design data input to Waste Package		30SEP97	0	0
WP0504B	Comp.DOE High Level Waste Evaluation	01OCT97	27JUL99	0	0
TR233GB1: WI	P Supports/Invert Ph II		and the		
WP233801	Conduct engineering evalns	01OCT97	109APR98	. 0	0
WP0504	Complete Dev of EBS Invert	10APR98	30SEP98	0	0
WP2760	Document Dev. of EBS Invert	10APR98	30SEP98	0	0
TR233GB2: Ad	Iditional Barrière Design Ph II		<i>7.</i> 63		<del></del>
WP233842	Develop the QAP-3-10 drawing input sheets	01OCT97	03DEC97	' 0	
WP233844	Complete QAP-3-10 drawing input sheets		03DEC97	0	0
WP233840	Cond engineering evalus & revw long term perf	1	02MAR98	!	<b>1</b> 1
WP0504A	Comp.Devel/EBS Backfill,Drip Shield & Add.Barr	03MAR98	11JUN98	0	
WP2762	Doc.Dev. of EBS Backfill,Drlp Shield,& Add Barr.	12JUN98	05OCT98	0	
	S Parts List, Dwgs & Specs Ph II	0509	99000	C SANG	
<b>3</b>	Develop EB Segment Parts List, Dwgs & Specs		05DEC97	i i .	
WP233856	Complete EB Segment Parts List, Dwgs & Specs	l	06APR98		
WP233734	Develop procurement/fabrication drawings, parts	!	109JUL98	1	0
WP233848	Develop Interface drawings		01OCT98		
11.4	S DBE Evals Ph II				
WP0509G	Define DBEs & DBAs		* 30SEP98	4 .	
WP233868	Define EBS-DBE's-DBA's, Phase III		29SEP99		<u> </u>
	3S System Désign Descriptions Pti II		J-887		
WP0509J	Develop EBS System Design Description		30SEP98	1 : .	
WP233905	Finalize EBS System Design Description	!	*30SEP99	1	
	3S Design Prob Evals Ph II		9		
WP0509N	Analyse EBS Performance - Ph II	1	30SEP98		Ţ
WP0509P	Perform Probabilistic Eval.of EBS Designs	01OCT97	30SEP98	0	0
	LRPo WPC2				Sheet 10 of 30
Project Start  Project Finals	035EP02	YUC	CA MOUN	TAIN P	PROJECT PLAN
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Activity	Activity	Early	Early	%	
ID	description	start	finish	Comp	ONDJEMAMJIJAISONDJEMAMJIJAISONDJEMAMJIJAIS
WP233873	Perform Probabilistic Eval. for Licensing Proc.	01OCT97	*30SEP99	0	AMERICA INTO A MANAGEMENT OF THE PROPERTY OF T
WP0509P1	Probabilistic Eval. Anal.of EBS Designs		31AUG98	0	<b>↓</b>
WP0509P2	Final Prob. Eval. Anal. for Licensing Process		30JUN99	0	<b>↓</b>
	isposal Criticality Topical Rp	'A.		(0,0,0)	· · · · · · · · · · · · · · · · · · ·
WP100C	Disposal Criticality Integration	01OCT97	30SEP98	0	
WP233910	Respond to formal NRC comments	25NOV97	21MAY98	0	
WP233850	Update Disposal Criticality Topical Report	04AUG98	04JUN99	Ō	
WP233952	Submit Update Disp Criticality Topical Report		04JUN99	Ö	<b>A</b>
	(sp: Crit Analytical Methods	N. S.	. a.g 55, p. 19	***	•
WP233854	Aquir/Anal.Data-Disp.Crit.Anal.Method '98	01OCT97	19DEC97	0	
WP233A08	Acquire chemical assay data	01OCT97	15DEC97	0	
WP233A14	Acquire site charactn data, Matl & WF Perf.	010CT97	15DEC97	0	termina .
TR233GBA: E	BS Tech: Specs		0000	B % 12 W	
WP233GBA	Develop EBS Technical Specs	010CT97	*30SEP98	0	
	CF Disposal Container Design Ph II		A PARTY		V
WP233818	Det acceptable isotopics generation system	01OCT97	*03APR98	0	
WP233819	Complete Dev of UCF Disp Cont	01OCT97	03APR98	0	
WP233820	Determine method for combining criticality condi	01OCT97	* 20MAR98	0	
WP233821	WP/EB Segment Design Integration Ph II	01OCT97	* 30SEP99	Ō	
WP233822	Establish range of applicability for consequenc	01OCT97	* 27MAR98	0	
WP233A44	Establish Design Basis SNF	01OCT97	20MAR98	0	
WP233A38	Assess vendor(s) UCF des acceptability to MGDS	05JAN98	02JUL98	0	
WP233826	Provide supporting inform for the Top Rep	I	20MAR98	0	<b>∐</b> :
WP233828	Prov supporting inform for License App	1	27MAR98	0	
WP233824	Submit neutronics consequence model	<del>                                     </del>	03APR98	0	<u> </u>
WP233A40	Update Thermal Conductivity Methodology	01JUL98	23DEC98	. 0	V . 1
WP2753	Doc. Devel'mt of UCF Disposal Container Design	01OCT98	02APR99	ō	<b>V</b>
WP233802	Consolidate UCF Des Input fm SDDs (LOE)	02AUG99	31JUL00	Ö	
TR233GBO: P	rob. Design Methods for Topical Rep	rec:	अ प्रश	2.0	
WP233830	Develop a statistical analysis of potential redu	01OCT97	03AUG98	Ô	
WP233832	Refine the criticality methodology to incorporat	01OCT97	03AUG98	0	
Propoci Starl	GIOCTISS ELANY LAPO WPCZ	1		<u> </u>	Sheet 11 of 30
Propect Firms. Data Data	01HOV96 Critical Activity				ROJECT PLAN
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Activity	Activity	Early	Early	%	
ID	description	start	finish	Comp	PY97 DNDJFMAMJJASONDJFMAMJJASONDJFMAMJJAS
WP234719	Dev WP Clos Methds Report	01MAY97	01JUL97	0	
WP234711	Provide stress concentrations for design work	19JUN97	22JUL97	0	
WP234720	Review WP Closure Methods Report	04AUG97	29AUG97	0	į,
WP234721	Sub WP Closure Methods Report		29AUG97	7 0	<b>↓</b>
WP234724	Submt updated weld equip envelope to surf	•	30SEP97	• 0	<b>↓</b>
TR234FB3: C	ompl. Ph.I Development of Non-Destruc		i K	RV	
WP234727	Develop TGD/TP	01OCT96	13DEC96	24	<b></b>
WP234726	Develop NDE method for WP closure weld	16DEC96	03JUN97	0	The state of the s
WP234730	Perform 100% Mapping	16DEC96	03JUN97	0	
WP234732	Det need for in-process inspection	16DEC96		' '	
WP234728	Use circular mockup to demonstrate closure weld	10MAR97	22AUG97	0	
WP234734	Develop NDE Report	04SEP97	158EP97	0	
WP234736	Sub WP NDE Methods Report	· <del> </del> · · <del>- · · · · · · · · · · · · · · · · </del>	15SEP97	O	1
WP234737	Supp Review of NDE Report	16SEP97	30SEP97	0	Y
TR234FB4: PI	nase I Disposal Container Fabrication	እኅሃሃ	occord 15	4307	
WP234740	Document recommended fabrication methods	01OCT96		34	A Contract of the Contract of
WP234746	Prep Raw Manuf & Matl Cost Est	01NOV96	310CT97	0	373
WP234738	Docmnt 30% completion w/ fabrication sketches	15JAN97*	30SEP97	, 0	
WP234742	Submit report detailing recommended fabrication	+	29AUG97	, o	<b>↓</b>
WP234744	Develop fabrication drawings	÷	30SEP97	Ō	<b>↓</b>
TR234GB1: D	lsp Container Fabrica Methols Ph II	ARRA	Personal Control	9000	
*WP234804	Disposal Container Fabrication Summary Report		30SEP97		<b>↑</b>
WP0509	Develop Disp Container Fabrication, Ph II	010CT97		1 -1	
WP234802	Dev Disp Container Fabrication Summary Report	1	1	1 1	
WP234942	Comp. Devel'mt of Disposal Container Fabrication	03NOV98	02NOV99	0	^
	sp Container Closure Methos Ph II	.00	30m <sup>3</sup>	1,60.7.1	
WP0509A	Dev Disposal Container Closure Method, Ph II	01OCT97	02OCT98		
	on-Destructive Exam Methods PH II		<b>38</b>		
WP0509B	Develop Non-destructive Examination Mthds, Ph	010CT97*	30SEP98	0	
WP234944	Document Non-destructive Examination Mthds	01OCT98	30SEP99	0	
TR234GB4 E	B Segment Cost Estimates Ph (I		Walter Committee	त्रहरू	
Project Start	010CT86 EANY LAPOWPC2				Sheet 13 of 30
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Activity	Activity	Early Early %
ID.	description	start finish Comp OND JEMAMUJJAS OND JEMAMUJJASOND JEMAMUJJ
WP122206	Continue Unsat SF Drip Test Data Generation	26JUN97 30SEP97 0 A A
	ow Temperature Dry Bath Oxidation Tes	
WP122100	Generate Dry Bath Oxidation Data	01OCT96/02DEC96 50
WP122103	Develop Dry Bath Oxidation Chap forWFCR-R1	04NOV96120DEC96 0
WP122101	Provide Dry Bath Oxid.Data to SF Oxidation	15NOV96 0
WP122104	Continue Dry Bath Oxidation Data Generation	03DEC96 25JUN97 0
WP122102	Provide Dry Bath Oxidation Data to GENISIS	13DEC96 0
WP122105	Provide Dry Bath Oxidation Data to Oxidation	25JUN97 0
WP122106	Continue Dry Bath Oxidation Data Generation	26JUN97 30SEP97 0
TR241GA1: V	Vaste Form Model Abstractions	The state of the s
WP241150	Waste Form Model Abstractions	01OCT97 30SEP98 0
	Vaste Form Support to System Studies	<b>1</b>
WP241250	Waste Form Inputs to System	01OCT97 30SEP98 0
	repare & Review the WFCR Rev. 2	
WP110A01	Prep WFCR Rev 2 Prelim Draft	09JAN98* 30JUN98 0
WP110A03	Review/Finalize WFCR Rev 2 Draft	01JUL98 29JUL98 0
WP110A05	Provide WFCR Rev 2 Draft to Perf. Assess.	29JUL98 0
WP110A06	Finalize WFCR Rev 2	30JUL98 18SEP98 0
WP110A07	Submit WFCR Rev 2 to YMSCO for Review	18SEP98 0 ▲
WP110A08	YMSCO Review of WFCR Rev 2	21SEP98 09OCT98 0
WP110A09	Incorp YMSCO WFCR Rev 2 Review Comments	21SEP98 23OCT98 0
WP110A10	YMSCO WFCR-R2 Review Comments Resolved	23OCT98 0
WP110A3	Submit Waste Form Char. Rpt. Rev 2	23OCT98 0 ↓
TR241GB3: C	-14 Release Tests	
WP08567	Prepare Activity Plan	01OCT97*23DEC97 0
WP08569	Set Up Equipment	01OCT97 04DEC97 0
WP08571	SF C-14 Release Measure Test (Ph I)	05DEC97 13MAR98 0
WP08572	issue SF C-14 Release Test Data Report	13MAR98 0
WP08573	SF C-14 Release Measure Test (Ph II)	16MAR98 05JUN98 0
WP08572A	Provide SF C-14 Release Data to GENISIS	27MAR98 0
WP08574	Issue SF C-14 Release Test Data Report/WFCR2	05JUN98 0
oper Start	OJOCTOS SAN FANY OJSEPOZ Progress Bar	YUCCA MOUNTAIN PROJECT PLAN
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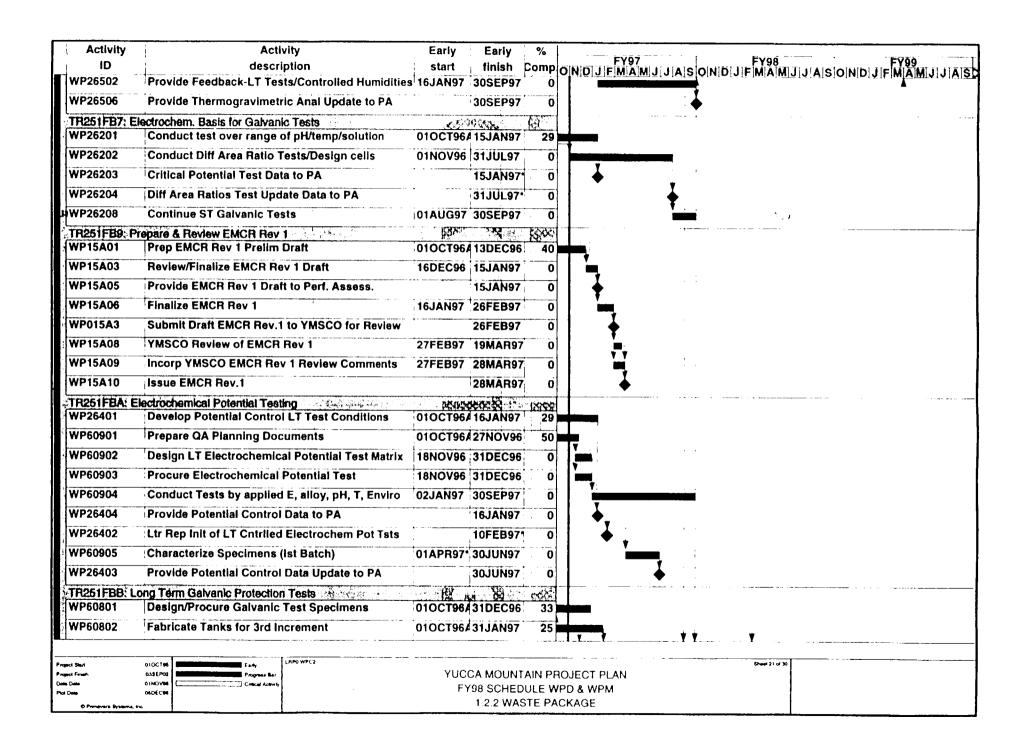
Activity	Activity	Early	Early	%	
ID	description	start	finish	Comp	FY97 ONDJFMAMJJASONDJFMAMJJASONDJFMAMJJA
WP08575	SF C-14 Release Measure Test (Ph III)	86NDF80	05MAY99	0	
WP08576	Submit SF C-14 Release Final Report & Data	•	05MAY99	· o	<b>↓</b>
TR241GB4: N	Measure SF Oxidation Using TGA Tech.	s\$03	MANAGE !	18	
WP08528A	Continue TGA Oxidation Test Data Generation		29MAY98	0	
WP08530	Analyze Samples	02MAR98	30APR98	0	
WP08529	Provide TGA Oxidation Data to Oxidation Models		29MAY98	0	<b>I</b> I
WP08532	Develop TGA Oxidation Chapter for WFCR Rev 2	01JUN98	30JUN98	Ö	Y
WP08536	Continue TGA Oxidation Test Data Generation	01JUN98	29JAN99	· · · · · · · · ·	Mar.
WP08534	Provide TGA Oxidation Chapter to WFCR Rev 2	+	30JUN98	0	
WP08538	Provide TGA Oxidation Test Data to Oxida.	1	29JAN99	0	¶ ·
TR241GB5: N	Aeasure SF Flow Thru Dissolution	400	18600	\$11.25F	
WP085320	Continue SF Diss.Flow Thru Test Data Generation	010CT97	11JUN98	O	Y
WP085322	Analyze Samples	02MAR98	30APR98	0	
WP085307	Provide SF Diss Flow Thru Data to Models	1	11JUN98	0	<b>∤</b>
WP085311	Provide SF Diss Flow Thru Test Data to Models	·	11JUN98	0	<b>↓</b>
WP085308	Develop SF Diss Flow Thru Chapter for WFCR	12JUN98	14JUL98	0	
WP085310	Continue SF Diss Flow Thru Test Data Generation	12JUN98	30SEP98	0	<u> </u>
WP085309	Provide SF Diss Flow Thru Chapter to WFCR Rev	•	14JUL98	0	<b>\</b>
TR241GB6: M	leasure Releases from SNF Hardware	10/100	xxxxxx	M	
WP08554	Issue SF Hardware Rel.Test Rpt/WFCR2/GENISIS	13/4/2/	310CT96	0	lack lack
WP08551A	Prepare Activity Plan	010CT97	27FEB98	0	
WP08551	SF Hardware Release Measure Test (Ph I)	02MAR98	30SEP98	Ō	
WP08552	Issue SF Hardware Release Test Report	-	30SEP98	0	
WP08553	SF Hardware Release Measure Test (Ph II)	01OCT98	30JUN99	0	. 1
WP08553A	Prepare Hardware Release Rate Report	01JUL99	31AUG99	0	
TR241GB7; P	rocure Approved Test Materials (MCC)	****		N-532-X	
WP08608	Select & Procure ATM		31DEC97	0	
WP08610	Characterize Received ATM Samples Ph-II	05JAN98	30JUN98	0	<u> </u>
	upport ATM Procurement	78,4	त हर		
WP08612	Support ATM Procurement Ph-II	01OCT97		0	<b>V</b>
WP08614	Follow Characterization Effort	05JAN98	30JUN98	0	
quict Start	01OC196 Early (APIG WPC2		<u> </u>	<del></del>	Sheet (7 of 30 )
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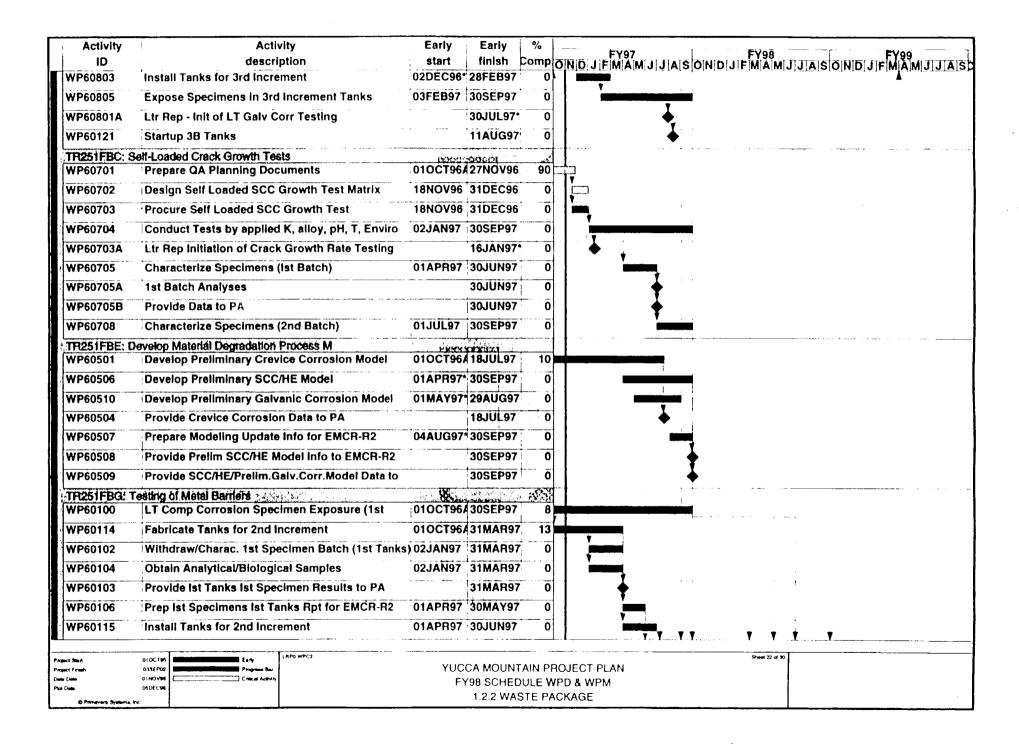
Activity	Activity	Early	Early	%	EVA2	,
ID	description	start	finish	Comp	FY97   D J F M AM J J A S O N D J F M A M J J A	FY99 SONDJEMAMJJJAR
WP08616	Provide Letter Report to YMSCO		20201430	0	<b>A A A</b>	The second secon
<del>}</del>	Develop Waste Form Process Model	क्षान्	\$350g			
WP122407	Enhance Response Model (Excluding		09APR97	:	•	
WP122404	Improve Response Model(Including Dissolution)	10MAR98	11JUN98	0		,
WP122405	Prepare Response Model Chap to WFCR-R2	12JUN98	31AUG98	0	-	<u> </u>
WP122420	Improve Response Model Continued	12JUN98	08MAR99	0	-	
WP122406	Provide Response Model to PA & WFCR-Rev 2		31AUG98	0	1	
TR241GBA: U	Unsat, SF Drip Condition Testing	مر ا	<b>1</b> % 3	(A)\$ 7	▼	
WP122220	Continue Unsat.SF Drip Test Data Generation	01OCT97	* 11JUN98	0		
WP122222	Analyze Samples	02MAR98	29MAY98	0	<b>—</b>	
WP122207	Provide Unsat SF Drip Data to Models		11JUN98	0	•	
WP122208	Develop Drip Test Chapter for WFCR Rev 2	12JUN98	14JUL98	0	<u></u>	
WP122210	Continue Unsat SF Drip Test Data Generation	12JUN98	14OCT98	0	A : 1	
WP122209	Provide Drip Test Chapter to WFCR Rev 2		14JUL98	0	<b>↓</b>	
WP122211	Provide Unsat SF Drip Test Data to Models		14OCT98	0		<b>↓</b>
TR241GBB: I	Dry Bath SF Oxidation Testing	200	2000	173/36	•	
WP122120	Continue Dry Bath Oxidation Data Generation	01OCT97	11JUN98	0		
WP122122	Analyze Samples	02MAR98	129MAY98	ō		
WP122107	Provide Dry Bath Data to Oxidation Models		11JUN98	0	<u>.</u>	
WP122108	Develop Dry Bath Oxidation Chap for WFCR-R2	12JUN98	14JUL98	0	V 1	
WP122110	Continue Dry Bath Oxidation Data Generation	12JUN98	11FEB99	0	V . I	
WP122109	Provide Dry Bath Oxidation Chap to WFCR-R2		14JUL98	Ō	<b>↓</b>	_
WP122111	Provide Dry Bath Data to Oxidation Models		30SEP98	. 0	,	<b>↓</b>
TR241GBC: (	Cladding Degradation Testing		to the female of	12700		· · · · · · · · · · · · · · · · · · ·
WP241800	Prepare Activity Plan		30JAN98			
WP241802	Set Up Equipment	01DEC97	31MAR98	0		
WP241804	Conduct Phase I tests	01APR98	30SEP98	0	Y	<b></b>
WP241806	Analyze Samples	01JUL98	30SEP98	0		<b>▼</b>
2 2 4 2- Boro		J	<u> </u>			
<del></del>	LWG Dagradation Parameter Tests					
WP085600	Prepare Activity Plan	01OCT96	431JAN97	25	**************************************	<b>T</b>
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ect Firmh Data	0.35 PO2 Progress Bar 0.1MOV96 Created Activity		CA MOUNT Y98 SCHEE	1		

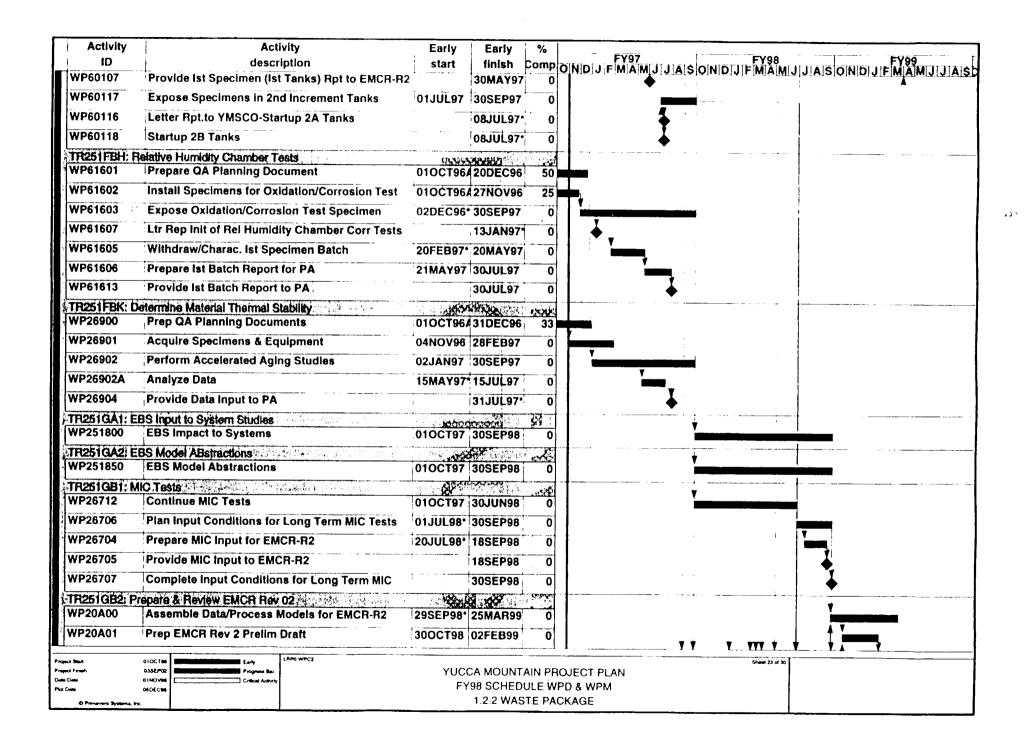
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Activity	Activity	Early	Early	%	FV0*	,		
ID ID	description	start	finish	Comp ONE	)]J[F[M]A[M]J]J	LIDINOZIA	PY98 FMAMJIJIAIS	ONDIJIFIMAMIJIJIAIS
WP085602	Resolve Activity Plan Comments/Finalize	03FEB97	01APR97	0 1	<b>A</b>		A TOTAL	
WP085604	Procure Samples & Initiate Test	02APR97	30MAY97	Ó	<b>-</b>			
WP085606	Collect Data	02JUN97	30SEP97	0	· ·			
	LW Glass Unsaturated Drip Tests	(%.			•	** **	- •	*
WP122300	Generate HLWG Drip Test Data	01OCT96	402DEC96	50				
WP122301	Provide HLWG Drip Data to Models		15NOV96	. 0				
WP122303	Develop HLWG Drip Test Chap for WFCR-R1	18NOV96	12DEC96	0		•		
WP122304	Continue HLWG Drip Test Data Generation	18NOV96	12JUN97	0				
; WP122302	Provide Unsat HLWG Drip Test Data to GENISIS	1	02DEC96	0	_			
WP122307	Provide HLWG Drip Test Data to Models	-	12JUN97	0	· •			
WP122306	Continue HLWG Drip Test Data Generation	13JUN97	30SEP97	Ō	· · · · · · · · · · · · · · · · · · ·			
TR242FB3: H	LW Glass Modeling	78	287	राष्ट्रहरू,				
WP085100	Develop HW Glass Dissolution Rate Prelim Model	01OCT96	12DEC96	40				
WP085101	Provide HWG Dissolution Rate Mdl Chap to		12DEC96	0	•			
WP085102	Enhance HW Glass Dissolution Rate Model	13DEC96	13JUN97	0				
WP085103	Provide HWG Dissolution Rate Mdl Results to PA		13JUN97	0	<b>.</b>	_		
WP085104	Improve HW Glass Dissolution Rate Model	16JUN97	30SEP97	0	<b>Y</b> _			
TR242GB1: H	LWG Degradation Parameter Tests	8636	330376	8888		· · · · · · · · · · · · · · · · · · ·		
WP085610	Continue to Collect Data		29MAY98	0				
WP085612	Analyze Samples	01OCT97	06JAN98	0		·	1	
WP085618	Develop HLWG Flow Thru Test Chap for WFCR	01JUN98	30JUN98	0			<u></u>	
WP085623	Continue HLWG Flow Thru Test Data Generation	01JUN98	29JAN99	· o			<u>V</u>	
WP085629	Collect Data Phase II	01JUN98	30NOV98	O			Y !	
WP085620	Provide HLWG Flow Thru Test Chap to WFCR Rev	<i>'</i>	30JUN98	ō			<b>.</b>	<u> </u>
WP085630	Provide Data to Model	•	30NOV98	0				
WP085631	Provide Data to GENESIS		29DEC98	. o				. ↓
WP085625	Provide HLWG Flow Thru Test Data to Models		29JAN99	o				<b>↓</b>
TR242GB2: G	lass Degradation Unsat, Drip Tests Committee	8		088 T		· · · · · · · · · · · · · · · ·		
WP122320	Continue HLWG Drip Test Data Generation		10MAR98	Ö			٩.	
WP122308	Develop HLWG Drip Test Chapter for WFCR Rev 2	11MAR98	09APR98	0		•	<b>A</b>	
	LRPO WPC2					************		
Project Start Project Femily	035EPG Progress Bar	YUC	CA MOUNT	AIN PROJEC	T PLAN		Sheet 18 of 30	
Deta Dete Plot Dete	01NOV98 Crelical Activity 050E C96	F۱	Y98 SCHED	JLE WPD & \	WPM			•
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ID	description	start	finish	Comp	PONIDIJIEMAMIJIJIAIS ONIDIJIEMAMIJIJIAIS ONIDIJIEMAMIJIJIAIS
WP122310	Continue HLWG Drip Test Test Data Generation	11MAR98	10JUL98	0	
WP122309	Provide HLWG Drlp Test Chapter to WFCR Rev 2	· No above ·	09APR98	0	ō    • • • • • • • • • • • • • • • • • •
WP122311	Provide HLWG Drip Test Data to Models	•	10JUL98	. 0	0
WP122314	Continue HLWG Drip Test	13JUL98	3070789	Ö	Ö
	lass Process Models	2000	143993	3	
WP085120	Improve HW Glass Dissolution Rate Model	01OCT97	29JUN98	0	
WP085105	Provide HWG Dissolution Rate Mdl		29JUN98	0	0
WP085106	Provide HWG Dissolution Rate Mdl Results to PA		29JUN98	0	<b>0</b>
WP085107	Enhance HW Glass Dissolution Rate Model	30JUN98	29JAN99	0	0
WP085108	Provide HWG Dissolution Rate Model Results to		29JAN99	Ō	ō
1.2 2 5 1 · Metallic Barriers					
WP251FA1: EE	3S Input to System Studies   EBS Impact To Systems				
\$# L	<u> </u>	01OCT96		8	8
	3S Model Abstractions   EBS Model Abstractions	0100196	30SEP97	A	8
TR251FB1: Me	Accessional to the second seco		33555	· · ·	
WP26702	Continue Microbial Culture & Analyses		16JAN97	29	9
WP26703	Perform parallel abiotic & biotic (MIC) tests		31JUL97		0
WP26708	Iss Ltr Rep -Init of Abiotic & Biotic MIC Tests		16JAN97		0
WP26713	Provide MIC Data Input to PA	····	16JAN97	0	ō
WP26709	Provide MIC Data Input Update to PA	•	31JUL97	1	<u></u>
WP26710	Continue MIC Tests	01AUG97	30SEP97	0	0
TR251FB4: Me	easure Critical Potential	CHA!	292459	. ,,,,,,,,	
WP26301	Continue Critical Potential Measurements	010CT96	15JAN97	29	9
WP26309	Provide Crit. Pot. Measurements Data to PA (1)		15JAN97	0	<u></u>
WP26306	Continue Critical Potential Measurements	16JAN97	29AUG97	0	0
WP26305	Provide Crit. Pot. Measurement Update Data to PA	<u> </u>	29AUG97	0	<u></u>
WP26307	Continue Critical Potential Measurements	02SEP97	30SEP97	0	<u>o</u>
	permogravimetric Analysis Studies		8 10	<b>1000</b>	<b>v</b>
WP26501	Continue Critical Relative Humidity Tests	01OCT96	15JAN97	29	9
WP26505	Provide Thermogravimetric Anal. Data to PA		15JAN97	0	□ •
Prosct Stud 010CT95 (100CT95 Lafty LRPg WPC2 5940 20 430					
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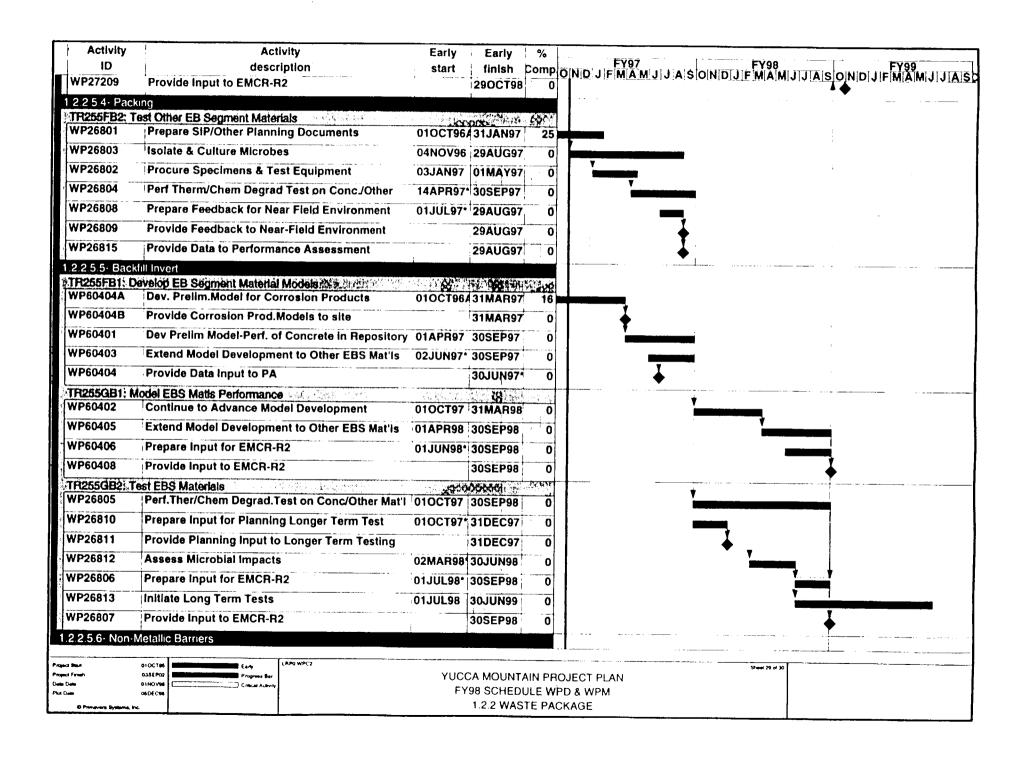
Activity	Activity	Early	Early	%	
ID Î	description	start	finish	Comp	DINIDIALE MAMINIALE CINIDIALE MAMINIALE CINIDIALE EX 99
WP20A02	Begin LLNL EMCR Rev 2 Prei Draft Review	03FEB99		0	
WP20A03	Review/Finalize EMCR Rev 2 Draft	03FEB99	03MAR99	0	
WP20A04	Provide EMCR Rev 2 Draft to Perf. Assess.	,	03MAR99	0	
WP20A06	Finalize EMCR Rev 2	04MAR99	01APR99	0	
WP20A07	Submit EMCR Rev 2 to YMSCO for Review	# . T. WW. S. A	01APR99	0	
WP20A08	YMSCO Review of EMCR Rev 2	02APR99	22APR99	0	
WP20A09	Incorp YMSCO EMCR Rev 2 Review Comments	02APR99	05MAY99	0	i
WP2013	Submit Engr'd. Mat'ls. Char. Rpt. Rev 2		05MAY99	0	l ver
WP20A10	YMSCO EMCR-R2 Review Comments Resolved	• • • • • • • • • • • • • • • • • • • •	05MAY99	0	
TR251GB3: M	easure Environmentally Assist. Cracki	11.00		1227010	
WP27001	Prepare QA Planning Documents	01OCT97	31DEC97	0	n-gram
WP27002	Acquire Specimens & Equipment	04NOV97	02MAR98	0	
WP27003	Conduct SCC/HE Tests	03MAR98	30SEP98	0	
WP27004	Prepare Input for EMCR-R2	01JUL98*	31AUG98	0	
WP27005	Provide Input to EMCR-R2	,	31AUG98	0	<b>→</b>
	ritical Potential Measurements		PANAAI .	5 <b>84</b> 0 58	<b>V</b>
WP26300	Complete Critical Potential Measurements	02SEP97	28JAN98	0	
WP26300A	Änalyze Data	29JAN98	01APR98	0	
WP26302	Prep Critical Pot. Measurement	02APR98	01JUL98	ō	
WP26303	Provide Crit. Pot. Measurments Rpt to EMCR-R2		01JUL98	0	<b>↑</b> ;
	ectrolyté Drip Tests on Heated Tübla		ANNE S		•
WP26503	Prepare Activity Plan	010CT97	<u> </u>		V
WP26504	Procure/Set-Up Equipment	01DEC97	<u> </u>		
WP26507	Initiate Ph I Tests		31AUG98	<u> </u>	The state of the s
WP26509	Characterize Samples		30SEP98	i -	
WP26510	Prepare Input to EMCR Rev.2	03AUG98	30SEP98	0	
WP26511	Provide Input to EMCR Rev.2	· ·	30SEP98	0	<u> </u>
* <del></del>	evelop Advanced Techniques		9 34 1A NO7		
WP25800	Prepare QA Planning Documents		31JAN97	0	
WP25802	Acquire Specimens & Equipment	01NOV96	28FEB97	0	7 7 777 7 7
Project Stad Project Firsth Date Outs Plot Outs 6 Princeurs Systems, In-	010CT66 035EPQ 01NOV96 01NOV96 Critical Activity 05		CA MOUNT /98 SCHEE	ULE WF	

Activity	Activity	Early	Early	%	
ID	description	start	finish	Comp	PY97 DNDJEMAMJJJASONDJEMAMJJJASONDJEMAMJJJA
WP25804	Evaluate Sensors	03FEB97	31JUL97	0	
WP25806	Eval.Other Microanalytical Techniques	03MAR97	29AUG97	r o	
WP25808	Prepare Input to EMCR - Rev 2	01AUG97	30SEP97	0	
WP25810	Provide Input to EMCR - Rev 2		30SEP97	0	•
	lectrochem Basis for Galvanic Effects	8888	1 (18888		
WP26210	Continue ST Galvanic Tests	01OCT97	29SEP98		
WP26211	Analyze Specimens	01APR98	30JUN98	0	
WP26205	Prepare Input for EMCR-R2	01JUL98*	30SEP98	0	
WP26209	Provide Data To Model Activity		29SEP98	0	
WP26206	Provide Input to EMCR-R2		30SEP98	0	
TR251GB8: T	hermogravimetric Analysis Studies	OB) G	WAS STA	PARTY.	• • • • • • • • • • • • • • • • • • • •
WP25850	Perform TGA Studies	01OCT97	27FEB98	O	
WP25852	Characterize Samples	02JAN98*	31MAR98	0	<u>'</u>
WP25854	Complete TGA Studies	01APR98	31JUL98	0	
WP25856	Analyze Samples	01APR98	01JUL98	0	<u></u>
WP25858	Prepare Results to EMCR Rev 2	01APR98	30JUN98	0	
WP25860	Provide Results to EMCR Rev 2		30JUN98	0	<b>↓</b> '
TR251GBA: L	T Electrochemical Potential Tests	(130)	3000 S	6978	•
WP60910	Continue Conduct Test/Applied E,Alloy,PH,T,Evn.	01OCT97	29JUL99	0	
WP60906	Characterize Specimens (2nd Batch)	02MAR98	30JUN98	0	
WP60907	Prepare Report for EMCR-R2	01JUN98*	31JUL98	Ō	Y. L
WP60908	Provide Electrochem Potential Report to	· · · · · · · · · · · · · · · · · · ·	31JUL98	0	<b> </b>
TR251GBB; L	ong Term Galvanic Protection Test			· 1000	
WP60805A	Expose Specimens in 3rd increment Tanks	01OCT97	28AUG98	0	
WP60807	Obtain Analytical/Biological Samples (3rd Tank)	01OCT97	26NOV97	0	
WP60809	Prepare 1st Batch/3rd Tank Report for EMCR-R2	01OCT97	05DEC97	0	
WP60820	Fabricate Tanks for 4th Increment	010CT97	27FEB98	0	
WP60810	Provide 3rd Tank/Ist Batch Report to EMCR-R2	!	05DEC97	0	<b>↓</b>
WP60824	Expose Specimens in 4th Increment Tanks	02JAN98*	26AUG99	0	
WP60822	Install Tanks for 4th Increment	02MAR98	29MAY98	0	TI V
opect Start	010CT06 BERNY LAROWECZ				Sheet 23 of 30
opect Ferenth sta Deba	03SEPQ2 Progress Bay 01NOV98 Created Activity				DJECT PLAN
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Activity	Activity	Early	Early	%	F	Y97	<u>-</u>	FY98		FY99
WP60806	description Withdraw/Charac. Ist Batch (3rd Tanks)	start 01APR98	finish 29MAY98	3 0	ONDJFN	ALLIMIAIN	SIOINIDIJ	FMAMJ	JIAISIONI	FY99 DJJF[M[A]M]JJJ
TR251GBC: S	Self Loaded SCC Growth Test	रहा देश	45000 m		·		· -			
WP60704A	Conduct Tests by Applied K, Alloy, Ph, T, Envn.	01OCT97	27FEB98	0			į			
WP60709	Characterize Specimens (2nd Batch)	01OCT97	310CT97	Ö	1		<b>'</b>	•	!	
WP60704B	Characterize Specimens	02MAR98	30JUN98	0	1		•			
WP60704C	Continue SCC Tests	02MAR98	30SEP98	0				·		
WP60706	Prepare Report for EMCR-R2	01JUL98	31AUG98	3 0			•			
WP60707	Provide Self Loaded SCC Growth Report to	· · · · · · · · · · · · · · · · · · ·	31AUG98	3 0						
TR251GBD:	Provide Feed-Back to Neat-Term Environ	7, A.	rta Hilliana	18,78						
WP26827	Prepare Feedback for Near Field Environment	01OCT97	04DEC97	7 0	1					
WP26828	Provide Feedback to Near-Field Environment	·····	04DEC97	0			•			
WP26829	Provide Data to Performance Assessment		04DEC97	7. 0			· 🗼	,		
WP26830	Prepare Input for Planning Longer Term Test	02JAN98	30MAR9	B 0			-			
WP26831	Provide Planning Input to Longer Term Testing	1	30MAR9	B. 0	Ì			<b>→</b> 1		
WP26825	Prepare Input for EMCR-R2	04MAY98	130SEP98	0						
WP26832	Prepare Add'l. Feedback to Near Field Environ.	01JUL98*	30SEP98	0						
WP26826	Provide Input to EMCR-R2		30SEP98	0					•	
WP26833	Provide Add'l. Input to Near Field Environment	· ·	30SEP98	0			•		∳	
TR251GBE: C	Develop Material Degration Proc. Model	PLAY	W2827-1	i V			<b>†</b>			
WP60505	:Devel.Enhanced Crevice Corrosion Model	01OCT97	19MAY98	3 0						
WP60536	Advance Pitting Corrosion Model	01OCT97	30SEP98	0				11	· · ·	
WP60541	Advanced Oxidation/General Corrosion Model	01OCT97	31AUG98	3 0	1					
WP60513	Enhance Galvanic Corrosion Model	140CT97	31JUL98	0	į					
WP60520	Enhance Preliminary MIC Model	05JAN98	30SEP98	0			,	. :1		
WP60528	Develop Preliminary Phase Stability Model	02FEB98	31AUG98	3 0	ļ					
WP60502	Prepare Modeling Update Info for EMCR-R2	20MAY98	20JUL98	0	į		•	\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \		
WP60514	Prepare Modeling Update Info for EMCR-R2	01JUN981	27JUL98	0	ļ			, =		
WP60530	Prepare Phase Stability Model Update for	01JUL98*	31AUG98	3 0	Ì			ļ	ladla y	
WP60542	Prep Oxidation/Gen Corrosion Update for	01JUL98*	31AUG98	3 0						
WP60503	Provide Prei Crevice Corrosion Update to		20JUL98	o			•	** *		
and Shift	010CT85 LIPO WPC2						I	57-eef 28 of 30	II. I	
pict Firstih in Data	035EP02 Progress Bar 01MOV98 Critical Additive				ROJECT PLAN	N				
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Activity	Activity	Early	Early	%	From 1
ID	description	start	finish	Comp	POPT FY97 FY97 FY99 FY99 FY99 FY99 FY99 FY99
WP60516	Provide Prei Galvanic Corrosion Info to EMCR-R2	!	27JUL98	0	
WP60518	Provide Prel Galvanic Corrosion Info to PA	• • • • • •	27JUL98	0	<b>i</b>
WP60522	Prepare Modeling Update Info for EMCR-R2	03AUG98	30SEP98	Ö	
WP60537	Prep Pitting Corrosion Model Update for	03AUG98	30SEP98	0	
WP60532	Provide Phase Stability Model Update to		31AUG98	0	
WP60534	Provide Phase Stability Model Update to PA		31AUG98	0	•
WP60543	Prov Oxidation/Gen Corrosion Update to		31AUG98	0	
WP60544 40	Provide Oxidation/Gen Corrosion Mdl Update to		31AUG98	0	<b>↓</b>
WP60524	Provide MIC Model Info to EMCR-R2		30SEP98	0	•
WP60526	Provide MIC Model Info to PA	****	30SEP98	0	•
WP60538	Provide Pitting Corrosion Mdi Update to		30SEP98	0	•
WP60539	Provide Pitting Corrosion Model Update to PA		30SEP98	0	♦
	ong Term Corrosion Test	Strail	*********	8888	7
WP60101	LT Comp Corrosion Specimen Exposure(1st	01OCT97	29JAN99	0	
WP60122	Withdraw/Charac. Ist Batch (2nd Tanks)	06JAN98*	01APR98	O	<b>—</b> ,
WP60124	Obtain Analytical/Biological Samples (2nd Tank)	31MAR98	22MAY98	0	
WP60110	Obtain Analytical/Biological Samples	05MAY98	30JUN98	0	
WP60126	Provide Analytical/Biological Samples to NFE		22MAY98	1 1	<b>†</b>
WP60128	Prepare Ist Batch (2nd Tanks) Rpt for EMCR-R2	26MAY98	22JUL98	0	
WP60111	Provide Analytical/Biological Feedback to NFE		30JUN98	0	<b>★</b> ;
WP60120	Expose Specimens in 2nd Increment Tanks	30JUN98	25OCT99	0	<u></u>
WP60108	Withdraw/Charac. 2nd Specimen Batch (1st	01JUL98	28SEP98	0	
WP60130	Provide Ist Batch (2nd Tanks) Report to EMCR-R2		22JUL98	0	<b>•</b>
WP60109	Provide 1st Tanks 2nd Specimen Results to PA		28SEP98	0	•
WP60112		29SEP98	02DEC98	0	<b></b> ,
WP60113	Provide 2nd Specimen (Ist Tanks) Rpt to		02DEC98	0	. ♦
	xid/Corr Test-Controlled Rel Humid		7000 C		
WP61604	Expose Oxidation/Corrosion Test Specimen	010CT97*	16MAR98	0	•
WP61608	Withdraw/Charac. 2nd Specimen Batch	17MAR98	01JUN98	0	<b>,</b>
WP61608A	Continue Oxidation/Corrosion Tets	17MAR98	20JAN99	0	
Opect Star/I	010CT96 Early LAPO WPC2				Sheet 27 of 30
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Activity	Activity	Early Early %
ID	description	start finish Comp OND JEMAM JUAS OND JEMAM JUAS OND JEMAM JUA
WP61609	Prepare 2nd Batch Report for EMCR-R2	02JUN98 03AUG98 0
WP61610	Provide 2nd Batch Report for EMCR-R2	03AUG98 0
TR251GBK: F	Phase Stability/Microstructural Eval.	<u>, 2000, 180, 180, 180, 180, 180, 180, 180, </u>
WP26903	Perform Accelerated Aging Studies	01OCT97 29JAN98 0
WP26903A	Analyze Specimens	30JAN98 29JUN98 0
WP26907	Plan Input Conditions for Long term Ageing Tests	01JUN98*31AUG98 0
WP26905	Prepare Input for EMCR-R2	01JUL98* 31AUG98 0
WP26906	Provide Input to EMCR-R2	31AUG98 0
WP26909	Provide Input Conditions-Long Term Ageing	31AUG98 0
1 2 2 5 2 · Bask		
	odel Basket Materials	220 1200 2000
WP61001	Develop Prelim Basket Mat'l Performance Model	01OCT96#31JUL97 10
WP61004	Prov.Prelim.Basket Mat'l Perf. Model to PA & Dsg	31JUL97* 0
WP61006	Continue Dev.Basket Mat'l Model	01AUG97 30SEP97 0
TR252FB2: To	asting of Basket Materials	
WP27201	Complete QA Planning Documents	01OCT96431OCT964 100
WP27202	Compl Specimen Prep/microstructural	01OCT964 28FEB97 20 10 10 10 10 10 10 10 10 10 10 10 10 10
WP27203	Continue Electrochem Investigations	01OCT96430SEP97 8
WP27210	Provide ST Basket Mat'ls Test Data to PA	15JAN97* 0 •
WP27212	Analyze Specimens	15MAY97 15JUL97 0
WP27211	Provide ST Basket Mat'ls Test Data Update to PA	31JUL97* 0
TR252GB1: M	lodel Basket MattsPerformance	
WP61007	Develop Basket Mat'l Model	01OCT97 31JUL98 0
WP61002	Prepare Input for EMCR-R2	04MAY98*31JUL98 0
WP61003	Provide Input to EMCR-R2	31JUL98 0
WP61008	Continue Dev.Basket Mat'l Model	03AUG98 30SEP98 0
TR252GB2: T	est Basket Mäterlals	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
WP27204	Perform Long Term Testing	01OCT97 31MAR98 0
WP27206	Continue Long Term Testing	01APR98 30SEP98 0
WP27208	Prepare Input for EMCR-R2	01JUN98* 30SEP98 0
WP27205	Analyze Specimens	29JUN98 29OCT98 0
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	Activity	Early	Early	%	
	description	start	finish	Comp	FY97 MIDJJFMAMIJJJAISONIDIJFMAMIJJJAISONIDIJFMAMIJJJAIS
	/elop Ceramic Material Models		78 <b>3</b> 30	रुष	Autoja is imissimita iai sitala ja iai simisimi ai sitala ja lainisimi ai sitala ja ja ja ja ja ja ja ja ja ja
WP60410	Devel. Mechanical Perf. Model	010CT96/	30MAY97	13	
WP60411	Dev Prelim Model-Perf. of Ceramic in Repository	01OCT96/	30SEP97	8	
WP60412	Devel. Chemical Perf. Model	03MAR97	30SEP97	0	
WP60413	Provide Data Input to PA		30JUN97	• 0	<b>♦</b>
TR256FB2: Per	form Ceramic Material Tests	4.450	2 5	- Paris	
WP60315	Perform Mechanical Tests	01OCT96/	29MAY97	13	
WP60300	Evaluate Coating Permeability	02JAN97*	30JUN97	Ō	
WP60316	Perform Corrosion Tests	30MAY97	30SEP97	0	
WP60314	Prepare Specimens for Corr. Testing	02JUN97*	30SEP97	0	1000000001- V.
WP60315A	Letter Rpt.Ceramic Feasibility/Mech.Tests & Eval		13JUN97	1	
WP60301	Provide Into LA, Design		30JUN97	0	<b>♦</b>
	del Ceramic Mat'ls Performance		04000	1000	Ť.
	Continue to Advance Model Development	01OCT97			
	Prepare Interim Report	02JAN98*			
1	Provide Inputs to PA, Design		30APR98	1	<b>♦</b> •
	Prepare Input for EMCR-R2	01JUN98			
WP60420	Provide Input to EMCR-R2	and and and and a	30SEP98	0	<b>•</b>
	st Ceramics Materials			183	
WP60312	Conduct Mechanical Degradation Tests	010CT97*	1	- 1	
	Perform Corrosion Tests	01OCT97	<u> </u>		V
	Mech. Test of Corroded Specimens	15OCT97	1 .	: I	
1	Prepare Input to EMCR - Rev 2	30JUL98		i	
WP60320A	Provide Imput to EMCR Rev.2		30SEP98	0	▲

#### APPENDIX K

# REPOSITORY SURFACE AND SUBSURFACE SCHEDULE

The data contained in this appendix reflects the status of the Yucca Mountain Site Characterization Project as of 12/16/96. Because of the evolving conditions of the Yucca Mountain Site Characterization Project, data in this appendix is changed or updated as necessary. However, this VA Design and Review Plan will not be revised or reissued as a result of data updates. For a current status of the data in this appendix and/or a copy of the current version, contact B. Stanley. For suggested changes to the contents, contact A. Segrest.

### REPOSITORY SURFACE AND SUBSURFACE SCHEDULE

The Repository Surface and Subsurface (WBS 1.2.4) schedule for FY 97/98 is provided. This schedule reflects the current status of the FY 98 planning activity. All of the Repository Surface and Subsurface activities are tied to the VA milestone, except those that exclusively support the EIS/NEPA development and Nevada Transportation.

Activity	Activity	OD	Earty	Early	MILE							
ID.	Description		Start	Finish		FY!	<del>36</del> 11111	<del>                                     </del>	FY97	<del>  </del> .	FY98	YS
			<u> </u>				11111					
YP4XPP008	PPkg - MG120M2 - Complete MGDS Design Complete MGDS Design - Phase I	<del></del>	1. (27-0	30SEP97*	M2	1				1		
	L		<u>.                                    </u>	1303EF91	MZ	•				<b>†</b>		į.
YP4XPP021 RP7401	PPkg - RP070A - Surface Design - Phas Management and Integration - Ph.II	455	0100197	,26JUL99	T. Frank					· <del>-</del>	· ·-·-	_ ;
	•	•	•					- 1				
	NOB-Utility Systems Design - Ph.II	455	010CT97*	26JUL99								
RP7403E	Nevada Transportation - Ph II	455	010CT97	26JUL99	1							
YP4XPP032	PPkg - XRP2055 - Update Sub Surface F	<u> </u>		thus de Cons	<del></del>			.				
RP17030	Prep. Subsurface Supt. Facility Gen. Arrangement	168	30APR98*	31DEC98	1							
P4XPP033	PPkg - XRP2215 - Prepare Thermal Mgmt	<del>-                                    </del>		<del>-1</del>	2 2 2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4						<u> </u>	<del></del>
RP17200	Prepare Thermal Mgmt Technical Report	123	02OCT98*	01APR99								
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TR41FA1: R	epository Management and Integration Repository Management & Integration	251	010CT96A	2000000	Fright Refuser							
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TR41FA2: R	spository Design Consulting Board Repository Tunneling Consultant Board	95	03MAR97*	30JUN97		1	• •					;
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R41FA4: R	epository Management Support Activitie Senior Management Support	251	010CT96A	30SEP97	T	,		<u> </u>				
	Product Integrity - OPI / PCG / EDC		,				,	<b>,</b>	t det	·		
		251	010CT96A	30SEP97				131	4 .			
	epository Management and Integration Repository Management & Integration	251	01OCT97	3000000						<b>y</b>		
		201	0100191	3035790	,					<b>U</b> ( )	0.540.	2 2
TR41GA2: R RP04X702	epository Support Activities Product Integrity - OPL/PCG/EDC	251	01OCT97	30SEP98				· · ·   -		Ť		
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	Senior Management Support		010CT97							N 40 4 5	A. September of the Co.	
RP193754	Repository Support Activities	251	010CT97*	30SEP98	:					(100)	《建建设、公司	
P4XPP001	PPkg - IN04X - Repository Base Suppor		1		<del></del>	·• ··						<del></del>
RP10010A	Provide Management Support	251	01OCT97	30SEP98	,			1			Billion and the	
RPNO4X0A	OPI/PCG/EDC	251	01OCT97	30SEP98		1					antition of	
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ote	18DEC96			WBS 1.2.4 LONG RANGE					Į.			

MILE Activity OD Early Earty **Activity FY96 FY97 FY98** Start Finish Description 1D RP10010B Provide Management Support 251 010CT98 30SEP99 RPNO4X0B OPI/PCG/EDC 251 01OCT98 30SEP99 TR42FA1: Substirface Interface Activities 124 01OCT96A 01APR97 RP121753 Assess CONOP Resulting from FY1966 Work 200 211 02DEC96\* 30SEP97 RP124750 Support of SRA 73 02DEC96\* 17MAR97 RP124765 Progress Report Input PR #16 211 02DEC96\* 130SEP97 RP124770 Support of QA Procedures 211102DEC96\* 30SEP97 RP124775 Systems Engineering Studies Support 17MAR97\* M4 RPPR16M3 Submit Repository Input to PR16 127 02APR97 30SEP97 RP121757 Develop / Revise CONOP Descriptions RP124767 Progress Report Input PR #17 74 02JUN9**7**\* 15SEP97 15SEP97\* RPPR17M3 Submit Repository Input to PR17 TR42FA3: Support SRA - RSD Ph I 30SEP97 251 01OCT96A RP2405A1 | Support SRA (LOE) TR42FA4: Interface Activities - RSD Ph I Interface Activities (LOE) .30SEP97 RP24061 TR42FA6: MGDS Project Engineering - Repository P RP100702 Project Engineering-Ph 1 30SEP97 31DEC96\* RP120MG1 VA Design & Review Plan 30SEP97 **M3** RP120MG2 Draft LA Design & Review Plan TR42FA7: Product Production Support 251 01OCT96A 30SEP97 RP420600 Product Production Support/Product Checking TR42FB3: Prepare Design Guides - RSD Ph I 32 01OCT96A 13DEC96 RP2402D1 Develop Design Guide Plan RP2402D2 Prepare Source Terms Design Guides 133 210CT96A ,02MAY97 01OCT95 Project Start YUCCA MOUNTAIN PROJECT PLAN 81OCT02 Project Finish 02DEC96 **WBS 1.2.4 - REPOSITORY** Deta Date 180EC96 **LONG RANGE PLAN (FY96-FY98)** © Primavera Systems, Inc

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RP2402D4	Prepare Remote Operations Design Guides	86	05MAY97	04SEP97		<del></del>		.11					1111	1111	
TR42FB4: Si	upport Systems Studies - RSD Ph I	·	सन्द	3.7.4	2 1 WHO 10 H							·			
- 1	Waste, Quantity, Mix & Throughput, SE200A	123	01OCT96A	31MAR97	1									•	,
RP2405B2	Retrievability Study, SE502	123	010CT96A	31MAR97	7				V .		-	!			
RP2405B3	Seals Study, SE506	128	02DEC96	03JUN97		•					1	<b>,</b>			
RP2405B8	Performance Confirmation, SE050B	251	02DEC96	30SEP97	<del>-</del>	1									i
RP2405B7	Test Evaluation Plan, SE504	127	27JAN97*	25JUL97	<del>-</del>	÷ ;				1					
RP240584	Safeguards, Security to SRA/Design, SE500	128	01APR97	30SEP97	·	. !				<b>-</b>	<u>Y</u>				
RP2405B5	Waste Package Size Study, SE460	128	01APR97	30SEP97							<b>Y</b>	:		•	
RP2405B6	Waste Generated (Disposal) Study, SE436	128	01APR97	30SEP97	:				:		<b>V</b>	,,			:
	ubsurface Design Documentation	<u>.</u>			1	   <del> </del>									
RP120715	SDD Development	251	010CT96A	30SEP97	50000000000				¥ .					•	
RP120700	Develop Radiation Shielding Design Guide	108	11FEB97*	<b>15JUL97</b>	4										
RP120710	Drift Design (Ref:SNL-Dec1991) Review & Update	118	15APR97*	30SEP97	<del></del>	į					V				1
RP120M3H	Design Guides	. 0.		30SEP97	М3	•						Ī			:
TR42GA1; S	upport SRA - RSD Ph II	<del></del>		34.0				-					·		
	Support SRA (LOE)	459	010CT97*	30JUL99					'			▼ E	State State	• * * * * * * * * * * * * * * * * * * *	u ang pag
	iterface Activities - RSD Ph II		<u>.</u> [3.4	(2) 44 mg									····		
-	Interface Activities (LOE)	455	010CT97*	26JUL99						ı		¥			1.00
TR42GA3: M	IGDS Project Engineering - Repository P MGDS Project Engineering - Repository Ph-II		0400 <del>7</del> 03				-					 T			1
1			01OCT97	30SEP98						İ		Ī	B. (4.2)	74.2 (*4.0); A	44.00
1	Prepare VA Design Summary Statement	74	01MAY98*	14AUG98											<b>a</b> ,
	Coordinate E&I Support to MGDS VA Review	44	01JUN98*	3170058											. 7
RP1000A2	VA Design Summary Statement	0	<del>-</del> -	14AUG98	P3					İ				٠,	<b>.</b> .
RP1000B	MGDS Project Engineering - Repository	251	010CT98	30SEP99		•								i 1	y December
TR42GA4: S	ubsurface Interface Activities				We I	-			V Y	1,	 !			<u>.</u>	
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eject Finish ets Date et Date	010CT02 Progress Bar 02DEC06 18DEC06		YL	JCCA MOUNT WBS 1.2.4			AN					Date	Revi	ilan	Checked App
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-	Subsurface Interface Activities	251	01OCT97*	30SEP98	<u> </u>	<del></del>	<u> </u>		Ш
				:	i. i		1	V :	
RPPR18M3	Submit Repository Input to PR 18	0	1	13MAR98*	M4	]	į	•	
RPPR19M3	Submit Repository Input to PR19	. 0		15SEP98*	M4		·	<b>↓</b>	
TR42GA7: F	roduct Production Support								
RP7303F1	Product Production Support	896	01OCT97*	27APR01				-FURNISHED STUDY	بسير
TR42GB2: S	ubsurface Design Documentation		- 1/4	ules.	F	· · <del> </del> -			-
RP74064	Prep.Repos.Text & Info.to PISA Chpts 2-11	102	010CT97*	02MAR98	·				
RP74062	SDD Development	190	02JAN98	30SEP98	:			8	
RP74066	Coord.& Cond.Rev's of Relative PISA Chpts	64	03MAR98	01JUN98	·	1		Y A	
RP74068	Support Prep. of Plan for Development	85	02JUN98	30SEP98				¥	
TR42GB3: S	Support Systems Studies - RSD Ph II	<del> </del>	<del> </del>					····	
RP7405B1	Decomissioning, SE508	230	01OCT97*	31ÅUG98		,	17000		
TR42GB4: F	Prepare Design Guides - RSD Ph II					· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
RP7403F1	Prepare Design Guides	230	01OCT97*	.31AUG98				and and object the local of	
YP4XPP003	: PPkg - MG010 - Write Design/Operation			<del></del>		<del>                                     </del>			
RPG1402B	Write PISA	186	0100197	29JUN98		] .[		La La Caración de la	
RPG10M3A	Submit Initial Draft Repository PISA Chapters	. 0	• • • • • • • • • • • • • • • • • • • •	30DEC97*	P3			i i i	
RPG10M3	Submit Final Repository PISA Chapters	0		29JUN98	P3	-		-	
YP4XPP024	: PPkg - RP170A - Subsurface Design - P		1	1.0		<del></del>	· · · · · · · · · · · · · · · · · · ·	····	••
RP17000	Support SRA - Phase II	455	01OCT97*	26JUL99		] '	inc:	- 1.5日本の機を使いた。	
RP17005	Update Subsurface Layout	374	01OCT97	31MAR99				s verbe dendes se la de le	. 41
RP17017	Design Guide Development - Phase II	455	01OCT97*	26JUL99			To the state of th	प्रदेशका विश्वती अस्ति ते के ति स्टब्स्ट के अपने का जाते. इस्टब्स्ट के स्टब्स्ट के स्टब्स्ट के स्टब्स्ट के स्टब्स के स्टब्स के स्टब्स के स्टब्स के स्टब्स के स्टब्स के स	Sec. 2.4
RP17022	Support DBA/Q-List Development	455	01OCT97*	26JUL99		-	.2.4	and the second s	. سنيد
RP17065	Cost Update	455	01OCT97	<b>26JUL99</b>			ļas.	12 1 LABOURSE STORY	
RP17075	Develop Tech. Spec's - Phase II	455	01OCT97*	26101.99	<u> </u>	· · · · · · · · · · · · · · · · · · ·		AND THE PROPERTY OF THE PARTY O	
RP17098	M & I - SubSurface	455	01OCT97*	26JUL99			V items	an care the week supply and an in-	
Project Start Project Start Project Finish Deta Deta Plot Date  © Primavera Syste	010CT95 010CT02 020EC96 18DEC96 Trail for			UCCA MOUNT WBS 1.2.4 LONG RANGE	- REPOS	ITORY	Sheet 4 of 18 Dete K	PISHNA 12/18/98 (1800HRS) (3-5315 Revision Checked	Approved

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RP17099	Refine Underground Facility Portion of EB Seg.	455	01OCT97*	26JUL99	<del> </del>	<del>                                     </del>	J.L	1.1.1	1		+		LLJ		-			
RP17205	Seals/Decommisioning	272	01OCT97*	300CT98							, (				: =			
RP17003	Interface Acitivities	397	29OCT97	28MAY99														نصي
RP17010	Refine Ground Support Systems	374	17NOV97*	13MAY99		.,												
RP1701M3	Receive PA Input	0		30SEP98*	M4										ì	<u></u>		
RP17001	Refine Concept of operations	455	01OCT98	25JUL00											i			ă I
RP17020	Radiological Safety	896	010CT98	29APR02		ı												Ā
RP17035	Reline Emergency Systems Designs	146	01OCT98*	03MAY99	17													<b>+</b>
RP17040	Refine Subsurface Waste Handling System Design	156	01OCT98	17MAY99	· • · · · · · · · · · · · · · · · · · ·	<b>  1</b>					- :	. <u>.</u>	-			<b></b>		<b>Y</b>
RP17045	Opdate Materials Identification and Characterist	771	01OCT98*	15MAR99		!												<b>•</b> 1
RP17055	Update Utilities Systems Design	251	010CT98*	30SEP99	.4							•			1;			J
RP17070	SDD Development - Phase II	455	01OCT98	25JUL00														Y
RP17015	Refine Retrieval System and Strategy	190	31DEC98*	29SEP99	· ·										1			į
RP17025	Finalize HVAC System Configurations	190	31DEC98*	29SEP99									- ·· -				• •	
TOMAREDOR	5: Cost Estimating		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				•	• • • • •							-· • ·	***		
TR448604	Prepare TSLCC Data for Report	22	30JUL96Å		<b>i</b> ( ) ( ) ( )	-						3						
						-						-	•		··			
TR46FA1; C RP020720	ost Estimating - RSD Ph I Cost Estimating - RSD Ph 1	251	010CT96A	30SEP97	<u> </u>						<b>Y</b>	5 . ; <u>.</u>	14 T. 15 T.					
	evada Transportation				· ***								-					-
	Addition of a Fifth Rail Corridor		01OCT96A									2 14	22	-				
	Refine Rail Corridor Alignments		01OCT96A		: 1							L2 of F	F87 51	7	•			
	Rapid Response Support		010CT96A		i							10. 3 n	Jey .	<u> </u>				
RP020M3	Nevada Transportation Status Letter	0		05JUN97	M3						, ,	•		<b>↓</b>	 •	•		
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LONG RANGE PLAN (FY96-FY98)

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Activity	Activity	OD	Early	Early Finish	MILE	F	-Y96		FY97		F	Y98	Y9
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RP020704	Support Alternative Selection	: 81	06JUN97	30SEP97						7	<b>A</b>	<b>A</b>	<b>*</b>
TR46FB2: U	pdate/Integrate Nuclear Fac Design - R				<u> </u>	;		₹ .					
RP2403A2	Finalize Waste Handling Concept		010CT96A	30JAN97									
RP2403A3	Size Waste Handling Equipment/Areas	100	02DEC96*	23APR97	•				Town State State (St.)				
RP243AMA	Waste Handling Systems Config.	. 0		30JAN97	M3	<b>}</b> '			<b>*</b>				
RP2403A4	Size Cask Maintenance Areas	20	27MAR97	23APR97	· <del>4</del> - · · · ·	1		: .					
RP2403A1	Size Common Support Areas	. 44	24APR97	25JUN97	- <del></del>	1		٠.	28	<u>32)</u>			
RP2403A5	Size Waste Treatment Equipment/Areas	44	24APR97	25JUN97			· · · · · ·	<del>-</del>		<u> </u>	• • • • • • • • • • • • • • • • • • • •		•
RP2403AA	Complete Design Descriptions	111	24APR97	30SEP97					PES.	phise (CC)	1		
RP243AMB	Waste Handling & Cask Maint.	· · · · · · · · · · · · · · · · · · ·		30MAY97*	<b>ТМ3</b>	li				<b>,</b>	•		
RP2403A6	Develop Initial Integrated Facility Layout	19	26JUN97	23JUL97						<b>♥</b>		·	
RP243AMC	Secondary Waste Treatment Flow	. 0		30JUN97*	М3					<b>.</b>			
RP2403A7	Prepare Structural Design	48	24JUL97	30SEP97	<del></del>					Y	† · · · · · · · · · · · · · · · · · · ·		
RP2403A8	Prepare HVAC design	48	24JUE97	30SEP97						<b>V</b>			
RP2403A9	Prepare Space Summary and GAs	42	01AUG97*	30SEP97	·					A 10 g &	I		
RP243AMD	HVAC Flow Diagrams	······		30SEP97	-М3					\ \			•
RP243AME	Nuclear Facilities General Arrangement		•	30SEP97	. МЗ					•			
RP244M3	Provide Design Data to PA - Ph.I		· ·	30SEP97	- M4				· i		<b>-</b>		
TRASERS: F	Radiological Safety - RSD Ph I		· · · · · · · · · · · · · · · · · · ·			<b>-</b>							
RP2402A1	Radiological Safety Design Analysis	187	010CT96A	30JUN97	4	1 .		Y	Section 2014	<b>2</b> 31			
RP2402A2	Waste Handling Operations Dose Assessment	64	01JUL97	30SEP97						· SANGE	1		
RP242AM	Waste Handling Operations Dose		· ····	30SEP97	М3	1				•			
TR46FB4: (	Operations/Staffing Analysis - RSD Ph I			11.12						-			
RP2402C4	Develop Staffing Estimate	84	010CT96A	03FEB97					1527				
RP242CM	Operations Staffing Letter Report		)	03FEB97	М3				•				
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TR46FB5: S	ite Preparation - RSD Ph I		<del></del>	<u> </u>	ig.	<del>┠╸</del> ┇┸┸┸┸┸┸┸	<del></del>	<del>                                      </del>	<del>▕</del> ▃ <del>▎</del> ▃▎▃▍▃▍▃▍▃▍▃▍▃▍▃▍
	Prepare Site Grading & Drainage Plans	64	01JUE97*	30SEP97	125	1			
RP2403C2	Prepare Site Operations Description	42	01AUG97*	30SEP97					
RP2403C3	Update Site Layouts	42	01AUG97*	30SEP97	·		'		<b>.</b>
RP243CM	Repository Surface Sile Layout Dwgs	· · · · · · · · · · · · · · · · · · ·		30SEP97	мз	İ	:		•
TR46FB7: S	upport DBE/Q-List Development - RSD Ph				701-0	<del>}-</del>   · -	<u>.</u>		• • • • • • • • • • • • • • • • • • • •
RP2405C1	Internal Events Analysis	146	010CT96A	01MAY97		<b>†</b> •	V :	•	•
RP2405C3	Aircraft /Missle Crash/Bombing Events Analysis	102	010CT96A	28FEB97		1	7	· · ·	· •
RP2405C4	Classification Analysis Support	190	01NOV96A	03SEP97		1 !		·	1
RP2405C2	External Events Analysis	127	02JAN97*	01JUE97		!	<b>A</b>	1. 3.2 × 2 × 2.4	
TR46FB8: D	evelop Alternatives Data for NEPA - RS			****	<u></u>				
RP24071	Assemble Engineering Files	84	140CT96A	12FEB97		:			
RP247M3	Engineering File for NEPA	σ		12FEB97	МЗ			· ·	
RP24072	Prepare NEPA Data for Alternatives	106	13FEB97	15JUL97				775-32-11-65	
RP247M3B	Update Engineering File for NEPA	. 0	<del>-</del>	15JUL97	М3			Ţ	
	Cost Estimating - RSD Ph II								<b>Y</b>
RP74041	Prepare Input to '97 TSLCC	67	01OCT97	09JAN98	•		İ		1102.8
RP74042	Support TSLCC Preparation & Reviews		12JAN98	20AUG98	* * *				्रक्रम्बद्धाः व्यवस्थाः । इति । •
RP74043	Refine Cost Estimates .	78	12JAN98	30APR98	•		i		we can also
RP74044	Prepare Licensing, Design & Construction Schedul	272	01JUL98*	30JUL99					A A A A A A A A A A A A A A A A A A A
	Support NEPA Process - RSD Ph II	777	MANA						Ť
RP74071	Support NEPA Process (LOE)	459	01OCT97*	30JUL99	,	]			· 通過學術的學術學 (1995年) (1995年) (1995年)
TR46GB2: S RP7405C1	Support DBE/Q-List Development-RSD Ph I Prepare DBE Analysis	165	01OCT97*	29MAY98	t gr T		•		CHARACH CO
RP7405C3	Support Classification Analyses Preparation	459	010CT97*	30JUL99	* ***				STATE OF THE CONTRACT OF THE STATE OF THE
RP7405C2	Maintain DBE Analysis	376	02FEB98*	~29JUL99			,,	•	V V
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	NOB - Waste Handling Systems Design - R Prepare/Update Configuration Analyses	123	01OCT97*	31MAR98	ir I			<b>A</b>	A A	A
			01DEC97*	29MAY98	<u> </u>		·	1	Y	
	Prepare Flow Diagrams and Descriptions						'		<b>*********</b>	~ » (
RP7402A3	Prepare/Update Component Sizing Analyses		02FEB98*	31JUL98						3-15-6 
RP7402A4	Establish Space and Interface System Requirement	128	01APR98	30SEP98		,	i		T.	
RP7402A5	Prepare Control Logic Diagrams and Descriptions	123	03AUG98	29JAN99						
RP7402A6	Prepare Outline Specifications and Equipment Dra	126	01DEC98*	28MAY99						· · · · · · · · · · · · · · · · · · ·
RP7402A7	Complete SDD Input	169	01DEC98	30JUL99						<b>Y</b>
TRARGES: I	NOB - Waste Treatment Systems Design -				<u>:</u>					
RP7402C1	Prepare/Update Configuration Analyses	107	01APR98*	31AUG98	·		*		6	<u> इ.स. १६८ म् ५६</u> ८ ह
RP7402C2	Prepare Flow Diagrams and Descriptions	106	01MAY984	30SEP98	•					A CONSTRUCTION
RP7402C3	Prepare/Update Component Sizing Analyses	107	<sup>1</sup> 01JUN98*	30OCT98	· 					Y
RP7402C4	Establish Space and Interface System Requirement	103	'01JUL98"	30NOV98	•					V Priling and the second
RP7402C5	Prepare Control Logic Diagrams and Descriptions	. 84	01DEC98	31MAR99						<b>V</b>
									· · · · · · · · · · · · · · · · · · ·	
	NOB - Support Systems Design - RSD Ph I Update the General Arrangements	60	01SEP98*	30NOV98		-				<b>V</b>
RP740202	Update the Support Area Designs	102	01SEP98	29JAN99	<u>.                                    </u>					▼ West of the second
<b>a</b> i	Prepare/Update Configuration Analyses	60	01SEP98	30NOV98						(C) 2 (2) (B)
	Prepare Flow/1-Line Diagrams and Descriptions	311	01OCT98*			İ				<b>▼</b>
RP7402D5	Prepare/Update Component Sizing Analyses		02NOV98*	,						▼
	, ,									<u> </u>
	Establish Space and Interface System Requirement	<b>6</b> 1	01DEC98*	26FEB99	<u> </u>					2.07
TR46GB7: I	NOB - Structure/Piping Design - RSD Ph Update the General Arrangements	60	01SEP98*	30NOV98		-				<b>V</b>
	Update the Support Area Designs		01SEP98	29JAN99						▼
	•	•							:	<i>Reco</i> ssister <b>∀</b>
KP/402E3	Prepare/Update Configuration Analyses		01SEP98	30NOV98			7 7	<b>,</b>	. <b>L</b> J	(244 A
State of State of	010CT94						···	Sheet 8 of 18	KRISHNA 12/18/96	
Project Start Project Finish	01OCT02 Progress Ber		Y	UCCA MOUN				Dille	Revision	Checked Approved
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Activity ID	Activity  Description	OD Early Start	Early Finish	MILE	<b>H</b>	FY96		FY	97	FY98
RP7402E4	Prepare Flow/1-Line Diagrams and Descriptions	311 010CT98*	30DEC99	<del> </del>	<del>    </del>         -				1111111	<del></del>
RP7402E5	Prepare/Update Component Sizing Analyses	60 02NOV98*	29JAN99	• - · · · · · · · · · · · · · · · · · ·					<u> </u>	<del>[-</del> ,
RP7402E6	Establish Space and Interface System Requirement	61'01DEC98*	26FEB99	<u>:</u> 	ļ - <del>,</del> .	· · · · · · · · · · · · · · · · · · ·				
RP7402E9	Finalize General Arrangements	84 01DEC98*	31MAR99	<del></del>						
RP7402EA	Prepare Control Logic Descriptions	65 01DEC98	04MAR99	<del></del>					1	
	arrier Staging Shed Design - RSD Ph II Prepare/Update Configuration Analysis	41 02FEB98*	31MAR98					! <del>- </del>		
	Prepare Flow Diagrams and Descriptions			, • —	!			. [		<b></b>
	Prepare/Update Component Sizing Analyses	42 01APR98*	29MAY98							Y
RP7403A4	Establish Space and Interface System Requirement	42 01APR98*	29MAY98							
RP7403A5	Prepare Control Logic Diagrams and Descriptions	65 01JUN98	31AUG98					İ	•	<b>V</b>
RP7403A6	Prepare Outline Specifications and Equipment Dra	60 01SEP98	30NOV98					-		Y
RP7403A7	Prepare Piping Transpositions	60 01SEP98	30NOV98	· 					:	V
RP7403A8	Prepare Structural Design Analyses	60 01SEP98	130NOV98	1						V
RP7403A9	Prepare General Arrangements	63 01SEP98*	03DEC98	<u> </u>	1					V Domini
RP7403AA	Complete SDD Input	39 010CT98*	30NOV98	• .						A y
TR46GB9: S	ite Preparation - RSD Ph II Prepare/Update Site Grading & Drainage Plans	169 01DEC98*	3000199							
TR46GBA: S	ite-Wide Systems Designs - RSD Ph II Maintenance & Supply Systems	169 01OCT98	04JUN99						· <u></u>	
RP743CB1	Site Electrical Power System	169 01DEC98*	30JUL99							مقع ا
RP743CB2	Site Water System	169 01DEC98*	30JUL99	••••	,					
RP743CB3	Site Communication Systems	169 01DEC981	.30JUL99	•						
RP743CB4	Site Compressed Air System	169 01DEC98*	30JUL99	•= · · · · · · · · · · · · · · · · · · ·				1		
RP743CB5	Security and Safeguards System	169 01DEC98°	30JUE99	- ;-,			- · · · · · · · · · · · · · · · · · · ·	-	· ···—	
iect Start lect Finish a Date Date	010CT95 CANCELLE Early LAPO 010CT02 020EC96 Crisical Activity		UCCA MOUNTA WBS 1.2.4 - LONG RANGE	RÉPOSI	TORY	N			Y Y Y	NNA 12/18/98 (1600HRS) (5-5315 Revision Checked A

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ID	Description		Start	Finish			FY	96		тт-	FYS	97		1-1-	FY9	8	YS
RP743CB6	Emergency Response System	169	01DEC98*	30JUL99	J			_L_l_L	111	ᄔ	$\sqcup_{\mathbf{I}}\sqcup$			44	$\coprod$	Ш	
	Health Safety System		01DEC98*		1						-		7	-	_	•	•••
																	•
	Surface Environmental Monitoring System		01DEC98*	3010[99													
RP743CB9	Central Command and Control Operations System	169	01DEC98*	3010[99	.*												, 1
RP743CBB	Administration System	169	01DEC98*	30JUL99	• <b>•</b> ••••••••		-			-					- · · ·		· Y
RP743CBC	General Site Transportation System	169	01DEC98*	30JUL99"									•				•
RP743CBD	Site Gen Hazardous & Non Hazard Waste Disposal	169	01DEC98*	30JUL99	() 	i.				1							
į	Radiological Safety - RSD Ph II					:									·		
RP7403D1	Prepare/Update Radiological Safety Design Analys	373	01OCT97*	30MAR99	·					١					-3(4,5,6)		
RP7403D2	Prepare/Update Operations Dose Assessment	229	01SEP98*	30JUE99	*****												
	Prepare ALARA Analyses	270	01SEP98	30JUL99													Ť
}	1	223	013EF 30	3030133													
TR46GBD: V	/A Nuclear Facil Sys Des - RSD Ph II Prepare Analyses	111	01OCT97*	13MAR98						1							
İ	Establish Space and Interface System Requirement			,						-				المج المعادية			٠
į	·		03NOV97*	. !	. 1								•	e proper	<b>3</b> · ·		
RP742VD2	Prepare Flow/1-Line Diagrams & Descriptions	70	17NOV97*	27FEB98										4-45			
RP742VD4	Complete SDD Inputs	47	17NOV97*	26JAN98										\$ 8. 27	1		
	/A Site Wide Sys & Stur Des - RSD Ph II			· · · · · · · · · · · · · · · · · · ·	<del></del>	-							· · · •				•
RP743VC1	Utility System Design	101	010CT97*	27FEB98						- 1			1	1.77.			
RP743VC2	Safety & Security Systems Design	101	01OCT97*	27FEB98										11:00 to 1	6.4.3		
RP743VC3	Management & Admin Systems Design	<sup>-</sup> 101	01OCT97*	27FEB98										eriio l	250		
RP743VC4	Transportation Systems Design	101	01OCT97*	27FEB98						1							
ļ t	Site Generated Harazdous/non Harazd waste Syst				·									o Para . ·	******		
į	•	101	010019/	2175090										. 75°01'	SHA		
TR46GBF: P	Prepare Technical Reports - RSD Ph II	755	AACE BACK	-sautika					•				•-			-:	•
RP84091	Prepare Uncanistered Fuel Handling Technical Rep	229	01SEP98*	3010199													
TR46GBG: 1	Fechnical Specifications Site Systems -	• • •				·			<u>.</u>	_	20		-				•

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Data Date 02DEC96
Plot Date 18DEC96

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Early
Progress Bar
Critical Activity

YUCCA MOUNTAIN PROJECT PLAN WBS 1.2.4 - REPOSITORY LONG RANGE PLAN (FY96-FY98) Sheet to brite

KRISHNA 12/18/96 (1600HRS) (5-5315 Revision Checked Approved

Activity		Activity	OD	Earty	Early	MILE	<del> </del>	PVA	,					
ID		Description		Start	Finish			FY96	<u> </u>	<b>[F</b> `	<b>Y97</b>	<del>.                                    </del>	-Y98	
RP10251	Prepare Technica	Specifications for Site System	229	01SEP98*	30JUL99	<del>!</del>				1111			1111	
TR46GBH:	Technical Specifical	tions Nuclear Sys -			### JS1		<del>-</del>							
RP10252		Specifications for Nuclear Sys	229	01SEP98*	3010[99	<u>, , , , , , , , , , , , , , , , , , , </u>								
	Off-Site Utilities				20 4 15 30		1	-	•	- · · · ·				
RP46802	Preliminary Load I	List (Technical Paper)	71	010CT97*	15JÁN98		] :					12		
RP46800	Electrical Services	s Analysis	191	01DEC97*	31AUG98	•						¥	·	
RP46804	Develop Drawings	· · · · · · · · · · · · · · · · · · ·	128	01APR98*	30SEP98					ļ			<b>V</b>	'
1	Off-Site Utilities		645	010CT98*	27APR01	, <del>, , , , , , , , , , , , , , , , , , ,</del>	1					•		7
TR46GBL :	Nevada Transportati	ion Phase II	i			<del></del>	<del>                                     </del>		. =					
RP7403F	Nevada Transport	ation - Ph II	896	01OCT97*	27APR01	<del></del>	1					The total	<u>, 1, 4</u> 1₹, ,	
TR47FAF: C	Cost Estimating			- 3415	* 1 (196)		:		•					
RP127705	Prepare Cost Est	- Subs Dsn,Constr & Ops (TSLCC	) 187	010CT96A	30JUN97	A. Bris of B. S. c.				25-14-63				
1		m for Comparative Dsn Analysis	168	03FEB97*	<sup>→</sup> 30SEP97					7	ner sa sa			
TR47FB1: Id	dentify Materials of (	Construction		1.*		•	<del>                                     </del>	-	<u>:</u>	+		<b>4</b>		
RP500705	Develop Materials	of Construction Data Base	251	010CT96A	30SEP97	<del></del>	1		Y .	<b>※</b> (*)   (*)	C. (1.500.32)	<b>3</b> 1		:
RP1206M3	Deliver Engineerin	g data to PA	. 0	14.4	30SEP97	M4						Ţ		į
TR47FB2: N	Vear Field Environm	ent			<del></del>	<del>-</del>	<del> </del>							
	Near Field Design	•	209	01OCT96A	31JUL97		1			216 (417)	68 45 <b>40,0</b> 5			
TR47FB3: D	Orift Stability Design			<del></del>					-					
RP506705	Identify Ground Su	upport Materials	61	01OCT96A	31DEC96		1		V <sub>m</sub>	E				
RP506710	Perform Analysis		124	140CT96A	10APR97	_			Y	997.97.8°	<b>2</b> 3			
RP506715	Develop Ground S	Support Designs	96	140CT96A	01APR97				Y	3200.50				
RP506720	Preparation of Dra	wings	168	03FEB97*	30SEP97	·				A A	1411270 (1997)	<b>▼</b> 923	•	
	Emplacement Drift	·	- 00		30SEP97	М3	÷					<b>↓</b>		
TR47FB5: S	Subsurface Developr	ment Design	•		<del>-+</del>									
RP120760	Site Geology & Av	ailable Empl. Area	151 (	01OCT96A	08MAY97		•			MC 15 cm 1				
jed Start	01OCT95	•					•				ret 11 of 18	KRISHNA 12/1	8/96 (1600HRS) (5-5	5316
ject Finish n Date	01OCT02	Militaria Progress Bar Militaria Critical Activity		Y	UCCA MOUNT			AN			Date	Revisi		Checked A
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A	Activity	OD	Early	Earty	MILE		
Activity	Description		Start	Finish	m1LE	FY96 FY97	FY98 Y9
RP120795	Subsurface Layout Analysis	80	15OCT96A		<u> </u>		<u> </u>
	·	:				A	
RP120755	Subsurf Constr. & Develop Methods		01NOV96A		j.		i i
RP120765	SS Layout Coordinate Geometry Analysis	85	01NOV96A	01AUG97			<u> </u>
RP120780	Develop Operations & Constr Schedules	43	01NOV96A	<b>03JUN97</b>			!
RP120785	Prepare Drawings	229	01NOV96A	30SEP97	•		
RP120789	Thermal Load Management Analysis	- 102	01NOV96A	31MAR97	• • •	m Marieman	: '
RP120775	Define Prelim Constr Equipment List	43	30APR97	30JUN97	•	- V	
RP120M3	SubSurface Development Design	0		'31JUL97*	M3		
RP120M3A	Excavation/Emplacement Method & Schedule	. 0		31JUL97*	М3	-  '	
RP120M3B	Thermal Load Management		·	01AUG97	М3	<del>                                     </del>	<b>*</b> + ·
TR47FB6: E	mplacement System Design	<u> </u>	1	£/1		<del></del>	
RP502700	Equipment Design Analysis	196	010CT96A	14JUL97			<b>■</b> 1.54
RP502705	Electrification of SS Railed Behicles	187	150CT96A	14JUL97			
RP502735	Prepare Emplacement System Drawings	168	210CT96A	24JUN97	1.		· · · ·
RP502730	RH & C Design Analysis	197	01NOV96A	13AUG97	!	Street con and a second	
RP502715	Equipment Description Document	106	01MAY97*	130SEP97	•		
RP502740	RH & C Description Document	106	**************************************	30SEP97			7-15-E.A.
RP502M3	Waste Päckäge Handling Equipment		).	30SEP97	-M3		<b>↓</b> .
TR47FB7: F	Radiological Design					· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
RP123752	Computer Code Qualification	251	010CT96A	30SEP97			
RP123750	Radiation Shielding Analysis	251	01NOV96A	30SEP97			
RP123758	Retrieval Radiation Analysis	147	7:02DEC96*	30JUN97			
TR47FB9: 5	Subsurface HVAC					<u> </u>	
RP122725	Develop/Empl.Vent. Analysis	145	010CT96A	30APR97			
RP122705	Dust Control Analysis	··· 61	02DEC96*	27FEB97		6-AU18	
Project Start	01OCT95 Carry LAPO					Y Y Y Y Sheet 12 of 1	
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Activity	Activity	QD	Early	Earty	MILE			<del></del>			
ID	Description		Start	Finish		FY!	96	FY97		FY98	Y9
RP122710	Assess Need - Emplacement Side HEPA Filters	80	02DEC96*	26MAR97	.1					ШШ	1111
RP122720	Airflow Control Analysis	80	02DEC96*	26MAR97		ı	i		1		!
<b>!</b>	Prepare Drawings		02JAN97*	30SEP97		,		<b>Y</b> :			1
	Develop Prelim List - Prim & Aux Vent. Equipt.		• 5	: 1	· 						,
t <b>}</b>			27MAR97*	: .	·	;	, , , , , , , , , , , , , , , , , , ,		: ▼		-
RP120M3D	Sub Surface HVAC	0	•	30SEP97	M3	,			•		:
	Retrieval Design Design Analysis	176	01OCT96A	13 II NO7			•				
<b>i</b>					•		₹ **		•		
	Equipment / Component Drawings		140CT96A			İ		7			
	Equipment Description Document	97	15APR97*	29AUG97		,					1
RP504M3	Retrieval Design & Operation	. 0		29AUG97	М3				• •		-
TR47FBD: D	DBE/Q-List Support		<i>D</i> :	4-14	Station of	· <del>·</del>	· · · · · · · · · · · · · · · · · · ·				
	DBE / Scenario Analysis		01OCT96A		•	·					
1.1	Evaluate Common Mode Failure / Logic Diagrams	229	01NOV96A	30SEP97		:		, 0			:
RP123766	Code Qualification for DBE / PRA	122	02DEC96	23MAY97					* - =		
RP123764	Support the Classification Analysis of SSCs	, 157	03FEB97*	15SEP97							
TR47FBH: N	NEPA/Environmental Support	<del></del>		<u> </u> _251 (5 <b>4</b> 4 <b>1</b>	<del> - </del>				<del></del>		-· ·
RP128715	Prepare Engineering Files	201	140CT96A	30JUL97	1			31.	3)		
RP128705	Prepare Drawings	126	02JAN97*	30JUN97				in the state of			
TR47FBI: St	ubsurface EB Segment Design	- <u></u>			_ <u></u>		<del></del>		- · · · · · · · · · · · · · · · · · · ·		
	Define Backfill Strategy - Develop Prelim Design	80	01OCT96A	28JAN97				C 33			
RP126700	Emplacement Drift Invert	··· 61	01NOV96A	30JAN97	,		·				
RP12065A	Receive PA Input	. 0	02DEC96*	A SECTION OF THE PARTY AND	M4						
RP126720	Prepare Prelim Design - WP Support System	80	02DEC96*	26MAR97	<del></del>			25 (25) (26)			
RP126730	Prepare Drawings	83	02DEC96*	31MAR97	<b>.</b>						
RP120M3E	Subsurface EBS Design	۰. ٥		31MAR97	M3	· · <del>-</del>		<u> </u>	· · · · -		
					:			Y	777	Ţ	
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ID	Description		Start	Finish	70116-6-	-	T	F	<b>Y96</b>	; 	-,   ,	<u> </u>	FY97	<del>-                                    </del>	F	Y98	, , ]	<b>Y9</b>
TR47FBJ: P	erformance Confirmation Design	J	<u> </u>	<u> </u>	L	+-	_1 -1	<u>                                     </u>			لِللل	-		لللل		<del>1-1-1</del> -	111	
RP124705	PC Facilities	103	01NOV96A	01APR97		7						2	1. 1. 1. 1.					
RP124700	Remote MCC for PC	112	02DEC96*	09MAY97	<b>í</b> · · · ·	1					-		1000年,2006年					
RP124715	Prepare PC Drawings	74	16DEC96*	01APR97		1						ľ	STEEL STEEL STEEL STEEL					
RP120M3F	Performance Confirmation Design	Ö		09MAY97	М3								¥					
	Cost Estimating	251	010CT97*	30SEP98	- 1			-						Ţ		<u></u>	···-	
RP8405	Cost Estimating	251	0100197	JUSEP96 ,											4.1			
TR47GB4: F	Radiological Safety Radiation Safety/Shielding Dsgn Anal Norm Ops	122	01OCT97	01JUN98	1							T		▼				
						1.												
RP17082	Off-Normal Radiation Safety Evaluation		01OCT97	03AUG98										1025	8∰156, 345 <u>0</u> 7	1. t. 1. 1	- ;	
RP17088	Technical Specifications Development		03NOV97*	01MAY98		] ;									v 			
RP17084	Radiation Anal./Monitors, Critrls, Sys, & Comp.	128	01APR98*	30SEP98														
	mplacement System Design					]						1		▼	· - ·— · · ·		·	
RP47600	General Equipment Analysis	145	0100197	30APR98								ı		R.	Jack Comme			
RP47620	Perform Analysis 1	61	01OCT97*	31DEC97	÷										-6 .7.			
RP47602	WP Transporter Analysis	143	03NOV97*	29MA\$98	:							1		,	K / C, 471 a	16 CF 13		
RP47628	Develop RH&C Drawings	220	17NOV97*	30SEP98		1									1.000			
RP47604	Gantry Structural Analysis	126	01DEC97*	29MAY98								ı			<i>्रस्थिक</i>	<b>₹</b> 80,232	•	
RP47614	Develop WP Transporter Drawings	212	01DEC97*	30SEP98		-  •						١		-			, A	
RP47606	Gantry Carrier Analysis	126	02JAN98*	30JUN98		1									V Las	. 4 × 10 × 12		
RP47622	Perform Analysis 2	62	02JAN98	31MAR98		1						١				2		
RP47608	Isolation Door Analysis	127	02FEB98*	31JUL98	·							١			<b>₹</b>	्र । स्टब्स्ट्रेस्ट्रेस्	8	
RP47610	Shadow Shield Analysis	127	02FEB98	31JUL98	4										,J4.	entre 2 min	Y B	
RP47612	Loading Dock Analysis	· ~ 119	16MAR98*	31AUG98	<del>`</del>	+							•	• -	. !			
RP47624	Perform Analysis 3	64	01APR98	30JUN98		-							•	▼ 1	, ,	T.	<b>V</b>	,
Project Start Project Finish	010C195 910C102 Progress Bar		YL	JCCA MOUNT				AN			· · · · · · · · · · · · · · · · · · ·		Sheet 14 of 18	Date	KRISHNA 12/18 Revision	/96 (1600HRS) (	(5-53)15 Checked	a Approved
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ID	Description		Start	Finish		-	FY9	16 1 1 1 1	<del>                                      </del>	FY97	FY9	<b>B</b>
RP47616	Develop Oulline Specifications	106	01MAY98	30SEP98	<del> </del>	╂╀┸┸			ĻĻ		++1-1-1-1-1	
RP47626	Perform Analysis 4	64	01JUE98	30SEP98							i -	<b>Y</b>
	Subsurface Utilitles						<del></del> ··			· - · <del>- · · _ ·</del>		
RP47900	System Evaluation	82	0100197	30JAN98							A A	:
RP47902	System Schematics	· 49	03NOV97*	15JAN98	<del></del>	1					V Reference	
RP47904	General Arrangements	63	01DEC97*	02MAR98							¥	
RP47906	Assess Changes to Utility Sys Requirements	74	03MAR98	15JUN98							<b>V</b>	!
RP47912	Develop Overall Sys Design Descriptions	149	03MAR98	30SEP98	-						<u> </u>	
RP47908	Devel System & Major Subsystem P&ID's	64	01APR98*	30JUN98					. [		<u> </u>	
RP47910	Develop One-Line Diagrams	75	01JUN98*	15SEP98	<u>.</u> . <u></u>	,					•	<b>V</b>
TR47GB8: S	Subsurface HVAC		·			-			_	·- · · · · · · · · · · · · · · · · · ·		
RP47924	HEPA Filler Analysis	63	27MAR97	24JUN97		<b>!</b> :				<b>Y</b> 632,000		i
RP47928	Backfill & Closure	102	01OCT97*	02MAR98	• • • • • • • • • • • • • • • • • • • •					· · · ·		
RP47934	Design Guide for HVAC Design	61	01OCT97*	31DEC97	- 1, -				}			
RP47920	Isolation Airlocks	60	03NOV97*	30JAN98							V	
RP47938	Develop Drawings	212	01DEC97*	30SEP98								
RP47922	Emplac Drift Vent/Radiation Doors & Regulators	64	02FEB98	01MAY98		<u> </u>					Society (No.	
RP47930	Dust Control Monitoring Analysis		03MAR98	01JUN98	I						GUSAE2 ▼	-
RP47926	Ventilation Equipment		04MAY98 -	<b>i</b>					İ		THE STATE OF THE S	
RP47932	Emergency Ventilation & Evacuation Plans		02JUN98	30SEP98					I		E	<u> </u>
RP47936	Develop Outline Specifications		02JUN98	,					- 1			V V
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RP47500	Retrieval System Design Retrieval Scenario Analysis	101	010CT97*	27FEB98	,					<del></del>	T REPORTED SALES	
RP47502	Retrieval Equipment Analysis	126	01DEC97*	29MAY98							· · · ▼	
RP47504	Develop Retrieval Drawings		15DEC97*		••						V SECTION AND A	
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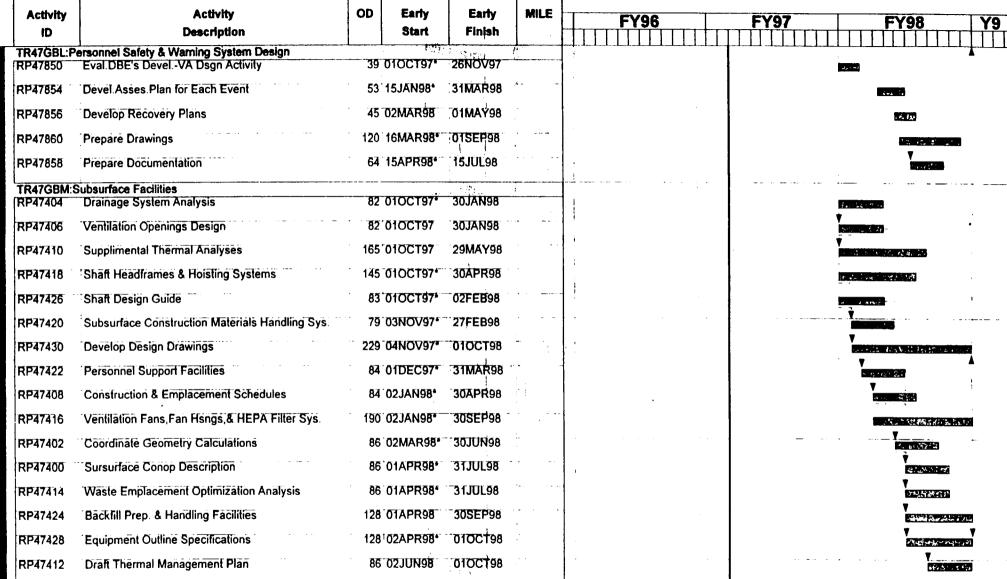
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RP47950	Identify Requirements for Seals	22	01OCT97*	310CT97							1				<b>1</b>				
RP47952	Develop Preliminary Designs	79	03NOV97	27FEB98	• ·										V				
RP47954	Produce Preliminary Drawings for VA	62	01DEC97*	27FEB98	<del></del>										<b>Y</b>				
RP47956	Refine Performance Criteria	44	02MAR98	30APR98	<del></del>	,										Y_	· - ·-		
RP47964	Supt Sys Engrg./Devel Reqmts-B'fill, Sealing	128	01APR98*	30SEP98												ı	- 11 1 1 <del>1</del>	Lett.	
RP47958	Reevaluate Seal Designs	106	01MAY98	30SEP98		-				1				···			<u> </u>	10.70	
RP47960	Refine Proced Subsurface Closure/Decomm.	104	01JUL98*	01DEC98							1			:			7		۵.
RP47962	Develop Drawings	102	01SEP98*	29JAN99						•				!			-	7	
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RP123770	Computational Modeling-DBE Consequences	251	01OCT97	30SEP98		1								Y III			8 2 Ship 18	1 356	
RP123772	DBE AnalEquipment Dsgn Anal.Top.Rpt.	166	03NOV97*	101JUL98							}				<b>Y</b>	•			
RP123776	Analysis & Writeup in Supt. of PISA	124	03NOV97	01MAY98											Y	ر دادون	<b>.</b>		
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RP123778	Technical Specifications Development	127	02JAN98*	0110198							ŀ				7	1 12) \$4.	1 10 10 10	•	
RP123780	Develop DBE Design Guide	178	15APR98*	30SEP98		•			. –								Y 1127 1444	7 N W.	
TR47GBD:	Subsurface EB Segment Design		<del></del>	<del></del>	<del></del>									:					.,
RP47970	Perform Analysis	176	010CT97*	15JUN98		1									1 8	ومني لا ا	10.30		
RP47972	Develop Outline Specs	158	02JAN98*	14AUG98											1	Valance.	412 Storage	Z.	
RP47974	Develop Drawings	169	02FEB98*	30SEP98	- "									!		A Estato	F 20 0 33.	ं लंडी	
TR47GBE	Ground Control Design		1,5	· · · · · · · · · · · · · · ·												· · · · ·			-
RP47822	Update Design Inputs	61	01OCT97*	31DEC97	<del>;</del>	1								K	Com-				
RP47836	ReEvaluate Approach-Database/Catalog	. 61	010CT97*	31DEC97	<b>-</b>									E	* <u>#</u> @				
RP47824	Update Eval of Ground Support Materials	101	*03NOV97	31MAR98	-											を子に難り			
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RP47820	Design Guide Development-Seismic	107	01DEC97*	01MAY98	<del></del>			<u> </u>	
RP47826	Upgrade Thermal & Thermomechanical Anal.	1	101DEC97	31JUL98	.;	;		V	
RP47832	Update List of Materials				<u> </u>		 	•	A
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RP47830	Prepare Drawings	169	02FEB98*	30SEP98	1				
RP47834	Update Quantities, Charac, & Est. Service Life Matl	86	'01APR98*	31JUL98	7				1
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RP47880	TBM Excavation Analysis	101	08MAY98*	30SEP98	7-	1.		i	
RP47882	Secondary Excavation Analysis	101	08MAY98	30SEP98					<b>Y</b>
RP47884	Raise Borer Excavation Analysis	101	08MAY98	30SEP98					Ÿ
RP47892	Develop Drawings	229	10JUN98*	77MAY99					<b>V</b>
RP47886	Secondary Excavation Analysis		0100198	08APR99					<u> </u>
RP47888	Muck Removal Analysis		01OCT98	08APR99			 		
RP47890	Develop Outline Specifications	;	010CT98	707MAÝ99					7
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RP47984	Develop Drawings	144	03NOV97	01JUN98	TT -			· · · · · ·	2.00
RP47982	Develop Equipment Description Document	128	01APR98*	30SEP98	· · · · · · · · · · · · · · · · · · ·			V.	· · · · · · · · · · · · · · · · · · ·
TR47GBH:	NEPA/Environmental Support		·		<u>.</u>		 		<del></del>
RP47870	Prepare New Engineering Files for Review	102	01OCT97*	02MAR98				1. 117457475	
RP47872	Rev.& Revise Existing Engineering Files	251	01OCT97	30SEP98	• · • · · · · ·			▼ 12.00   2.00   2.00   12.00   12.00   12.00   12.00   12.00   12.00   12.00   12.00   12.00   12.00   12.00   1	212 TANK
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RP47806	Performance Confirmation Design Remote Handling & Control	251	01001971	30SEP98					Addition 15 to
RP47800	Update PC Parameters	32	01DEC97*	15JAN98		-			
RP47802	Enhance PC Data Acquisition Strategy		01DEC97*	27FEB98				A	
RP47804	•			1					
RP4/8U4	Update PC Provisions into SubSurface Design	63	02JAN98*	01APR98	1 1				
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LONG RANGE PLAN (FY96-FY98)

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YUCCA MOUNTAIN PROJECT PLAN **WBS 1.2.4 - REPOSITORY** LONG RANGE PLAN (FY96-FY98)

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#### APPENDIX L

#### **E&I INTERFACES**

The data contained in this appendix reflects the status of the Yucca Mountain Site Characterization Project as of 3/7/97. Because of the evolving conditions of the Yucca Mountain Site Characterization Project, data in this appendix is changed or updated as necessary. However, this VA Design and Review Plan will not be revised or reissued as a result of data updates. For a current status of the data in this appendix and/or a copy of the current version, contact M. Sellers. For suggested changes to the contents, contact R. Wagner.

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A preliminary checklist of the interfaces between E&I and the YMP and Program areas has been created by reviewing the data in the FY 97/98 planning database. The resulting list of summary accounts that involve interfaces with E&I are provided in the following pages. Headings are provided to identify the area that is interfacing with E&I, and the interface topic that is being addressed. The summary account title and number are provided along with the approximate time of the interface.

# **E&I DELIVERIES TO PA**

#### **KEY 1997 DESIGN DELIVERIES**

### PERFORMANCE ASSESSMENT

#### **PRECLOSURE**

### 1. Description of Underground Opening Stabilization Techniques

Delivery from Drift Stability Design TR47FB3

Materials: December Analyses: April

Final Delivery: September

# 2. Description of Underground HVAC

Delivery from Subsurface HVAC TR47FB9 Analyses & equipment list: April/May Final Delivery: September

#### 3. Location of Release Sources

Delivery from Subsurface Layout from TR47FB5 Layout Analyses: April

Delivery from Surface DBE work from TR46FB7 Internal Events Analyses: May

Delivery from Subsurface DBE work from TR47FBD Scenario Analyses: September

Delivery from Site Layout from TR46FB5
Updated Site Layout Drawings: September

Delivery from Nuclear Facilities Design TR46FB2

Initial Layout: July

**HVAC Design: September** 

General Arrangements: September Provide Data to PA: September

Delivery from Preparation of Design Guides TR42FB3 Source Term Design Guide: April Delivery from EBS DBEs TR22FB3

EB Seg/WP DBEs: January

WP Off-normal & Accident Scenarios: March

# 4. Transporter Design and Underground Operations

Delivery from Subsurface Emplacement System Design TR47FB6

Emplacement System Drawings: June Handling Equipment: September

### 5. Retrieval Information

Delivery from Subsurface Retrieval Design TR47FBA Equipment/component drawings: June

Delivery from Retrievability Study TR15FB3 Retrievability Study: May

# 6. Waste Handling Concepts of Operation

Delivery from Nuclear Facility Design TR46FB2
Waste Handling Concept: January

Delivery from Radiological Safety TR46FB3 Waste Handling Ops Dose Assessments: September

Delivery from Subsurface Development Design TR47FB5 Waste Emplacement Method: July

Delivery from Subsurface Interface Activities TR42FA1 Revise subsurface con-op description: September

Delivery from Subsurface Emplacement System Design TR47FB6 Emplacement System Drawings: June Handling Equipment: September

Delivery from Con-Ops Account TR12FB3 Updates: March, August, September

Delivery from System Studies TR15FB1 Waste Generated Study: September

# 7. Waste Receipt Schedule

Delivery from Waste Qty Mix Throughput Study TR15FB2 Report complete: April

Delivery from System Studies TR15FB1
Waste Package Size Study: September

#### 8. Decontamination Waste Streams

Delivery from System Studies TR15FB1 Waste Generated Study: September

Delivery from Nuclear Facility Design TR46FB2 Secondary Waste Treatement Flow: June

### 9. Hot Cell HVAC

Delivery from Nuclear Facility Design TR46FB2 HVAC Design & Flow Diagrams: September

# 10. Concepts for Radiation Attenuation

Delivery from Subsurface Design Documentation TR42FB5 Radiation Shielding Design Guide: July

Delivery from Radiological Safety TR46FB3 Radiological Safety Design Analyses: June

Delivery from Radiological Design TR47FB7 Radiation Shielding Analyses: September

#### **POST CLOSURE**

Delivery from Requirements Documentation/Verification CDA Updates: March, September

### 1. Areal Mass Loading

Delivery from Near Field Environment TR47FB2 Near Field Design Analysis: July

Delivery from Subsurface Development TR47FB5
Thermal Load Management Analysis: April

### 2. Waste Package Size and Spacing

Delivery from System Studies TR15FB1
Waste Package Size Study: September

Delivery from Subsurface Development TR47FB5 Subsurface Layout Analyses: February Thermal Load Management Analyses: April

Delivery from EB Segment Parts List TR233FB1
Technical Drawings for CF, UCF, & HLW Disposal Container Components: June

Delivery from UCF Disposal Container Design Engineering Sketches: September

#### 3. Drift Size and Excavation Method

Delivery from Subsurface Development TR47FB5
Subsurf Construction & Development Methods: April
Excavation Methods: July

Delivery from Drift Stability Design TR47FB3 Ground Support Designs: April

# 4. Physical and Chemical Characteristics of Inverts/WP Supports

Delivery from Subsurface EB Segment Design TR47FBI Emplacement Drift Invert: January WP Support System: February

Delivery from EB Segment Material Design TR22FB4
Performance & Candidate Materials - EBS Input to TSPA: April
EBS/WP Candidate Materials Selection - IOC to PA: April
Materials Selection Analyses: August

Delivery from EB Segment Parts List TR233FB1
Technical Drawings for Drift Invert Components: June

Delivery from WP Support/Invert Design TR233FB6
Invert/support Evaluations: March
Analyses/sketches: September

Delivery from EMCR Preparation TR251FB9 Provide EMCR Rev 1 Draft to PA: January Issue EMCR Rev. 1: April

# 5. Chemical Characteristics of Other Emplaced Materials

Delivery from Drift Stability Design TR47FB3 Ground Support Materials: December

Delivery from Materials of Construction TR47FB1

Materials of construction database & Delivery to PA: September

Delivery from Subsurface EB Segment Design TR47FBI Emplacement Drift Invert: January WP Support System: February

Delivery from EB Segment Material Design TR22FB4

Performance & Candidate Materials - EBS Input to TSPA: April
EBS/WP Candidate Materials Selection - IOC to PA: April
Materials Selection Analyses: August

Delivery from EB Segment Parts List TR233FB1
Technical Drawings for Drift Invert Components: June

Delivery from WP Support/Invert Design TR233FB6
Invert/support Evaluations: March
Analyses/sketches: September

Delivery from EMCR Preparation TR251FB9
Provide EMCR Rev 1 Draft to PA: January
Issue EMCR Rev. 1: April

Delivery from Basket Material Models TR252FB1
Provide Preliminary Basket Matl Performance Model to PA & Dsgn: July

Delivery from Basket Material Testing TR252FB2
Provide ST Basket Materials Test Data to PA: January
Provide ST Basket Materials Test Data Update to PA: July

Delivery from EB Segment Material Models TR255FB1 Provide Data Input to PA: June

Delivery from EMCR Rev 1TR251FB9
Provide EMCR Rev 1 Draft to PA: January
Issue EMCR Rev. 1: April

### 6. EBS Enhancement Information, including backfill (if any)

Delivery from Subsurface EB Segment Design TR47FBI Backfill Strategy - Preliminary Design: January

Delivery from Additional Barrier Design TR233FB5 Engrg Evaluations/Analyses: March

Options and sketches: September

Delivery from EBS Model Abstractions TR251FA2 EBS Model Abstractions: September

Delivery from EMCR Rev 1 TR 251FB9
Provide EMCR Rev 1 Draft to PA: January
Issue EMCR Rev 1: April

#### 7. Ventilation Plans

Delivery from Subsurface HVAC TR47FB9
Analyses & equipment list: April/May
Final Delivery: September

# 8. Long-term Drift Stability

Delivery from Drift Stability Design TR47FB3

Materials: December Analyses: April

Final Delivery: September

### **WP & MATERIALS**

#### WP MILESTONE COLLECTION POINTS

Integrate Performance Assessment TSPA-VA TR22FA3
Provide EBS Input to TSPA-VA: November 96
Integrate with PA: All year - September

# 1. Thermal Hydrologic and Chemical Characteristics of EBS Materials

Delivery from EBS Model Abstractions TR251FA2 EBS Model Abstractions: September

Delivery from EMCR Rev 1TR251FB9
Provide EMCR Rev 1 Draft to PA: January
Issue EMCR Rev. 1: April

Delivery from Tests of Metal Barriers TR251FBG
Provide 1st Tanks 1st Specimen Results to PA: March

# 7. Technical Basis for Cladding Degradation Models

Delivery from Cladding Degradation Modeling TR22FB2 Submit IOC to PA: March Submit DBF Clad & Models: July

Delivery from Cladding Degradation Testing TR241GBC Perform Degradation Testing: October 97

#### 8. Waste Alteration/Dissolution Rates

Delivery from Waste Form Model Abstractions TR241FA1: September

Delivery from WFCR Preparation TR241FB2 - This is a collection point for Waste Form Models

WFCR Rev 1 Draft to PA: January WFCR Rev 1 Publication: April

Delivery from Process Model Development TR241FB9
Provide Waste Form Response Model Results to PA: June

Delivery from HLW Glass Modeling TR242FB3
Provide HWG Dissolution Rate Model Results to PA: June

# Radionuclide Transport Through Waste Package/EBS

Delivery from Champion Radionuclide Transport Evaluation TR22FAA Assessment of Work: February IOC to PA: September

# **Criticality Evaluations**

Delivery from Probablistic Evaluations of WP Design Criticality Analyses: September

#### PA DELIVERIES TO E&I

#### CANDIDATE DELIVERIES FROM PA TO E&I

#### 1. PA Data Needs

Abstraction/Testing of Waste Pkg Degradation TR542FB2
Provide WP w/PA Data Needs: Dec 96

Near Field Environment Models TR543FB2
Provide Facility Design w/Data Needs: Oct 96

# 2. Support to Systems Engineering

Support to Follow-on Performance Confirmation Study TR541FA2: September 97

Support to Waste Isolation Study TR541FA3: March 97

Support to Requirements Analysis TR541FA4: August 97

Support to Follow-on Performance Confirmation YP5XPP076: September 98

PA Support to Seals Study TR543FA1: April 97

PA Support to DBE's TR543FA2: December 96

PA Support to Classification Analyses TR543FA3: September 97

PA Support to Classification Analyses/Q-List TR543GA1

Initial: December 97 Follow-on: September 98

PA Support to DIE's TR547FA1: September 97

PA Support to DIE's TR547GA1: September 98

# 3. Key Assumptions

VA Methodology TR541FB2
Identify Key Assumptions: August 97

#### 4. Results Feedback

TSPA-VA Chapter 8 TR541FB3

Present Reference Case Results: January 98 Sensitivity Analysis Results: February 98

# Abstraction/Testing of Waste Form Degradation TR542FB1

Cladding Sensitivity: June 97

Waste Form Degradation Sensitivity: September 97

#### Abstraction/Testing of Waste Package Degradation TR542FB2

Waste Package Degradation Sensitivities: October 97

Cathodic Protection Sensitivities: October 97 Documented Sensitivity Analyses: March 98

#### Waste Form Mobilization TR542FB3

Colloid Mobilization Sensitivity Analysis: June 97 Waste Form Mobilization Sensitivity Analysis: Oct 97 Radionuclide Solubility Sensitivity Analyses: July 97

Waste Package Scale Thermal-Hydrologic Sensitivity: September 97 Gaseous Radionuclide Mobility Sensitivity Analysis: August 97

EBS Diffusion Sensitivity Analysis: October 97

#### Preclosure Performance Assessment TR543FB1

Reference Case Results: December 97

Sensitivity/Uncertainty Analyses: February 98

# VA Near Field Environmental Models TR543FB2 – Provide Sensitivity Analyses to Design: June 98

VA Thermal-Hydrologic Models TR543FB3
Provide Thermal-Hydrologic Sensitivity Analyses to Design: November 97

#### 5. Materials Evaluations

Consequences of Cementitious Materials TR543EB030: December 96

#### **E&I DELIVERIES TO SITE**

#### CANDIDATE DELIVERIES FROM E&I TO SITE

#### 1. E&I Data Needs

Not explicitly identified in current schedule: June 97 and June 98

#### 2. Test Requirements

Performance Confirmation Design TR47GBJ
Update Performance Confirmation Parameters: January 98

Project Management Control Documents TR13FB1
Draft VA Test & Evaluation Plan: August 97
VA Test & Evaluation Plan: September 97

Project Management Control Documents TR13GB1 Final VA Test & Evaluation Plan: September 98

System Studies TR15FB1

Performance Confirmation Report: September 97
Waste Isolation Study: April 97

# 3. Radiation Transport

Champion Radiation Transport Evaluations TR22FAA Assessment: September 97

Radionuclide Transport Evaluation TR22GB6: July 99

#### 4. Near Field Feedback

Near Field Environment TR47FB2 Design Analyses: July 97

Test Other EBS Segment Materials TR255FB2
Feedback to Near Field Environment: August 97

Testing Other EBS Materials TR255GB2
Feedback to Near Field Environment: September 98

Near Field Environment Impacts TR22GB7: September 98

Provide Feedback to Near Field Activities TR251GBD

Initial: December 97 Additional: September 98

#### 5. Waste Form Data

WFCR Revision 1 TR241FB2: April 97

WFCR Revision 2 TR241GB2: September 98

### 6. EB Segment Materials

EB Segment Materials Models TR255FB1
Provide to Site: March 97

System Studies TR15GB1
Materials Study: January 98

Drift Stability Design TR47FB3
Ground Support Materials: December 96

Ground Control Design TR47GBE
Update List of Materials: March 98

#### SITE DELIVERIES TO E&I

#### CANDIDATE DELIVERIES FROM SITE TO ENGINEERING

#### 1. Support to System Studies/Reports

Support Systems Engrg OG39FA1D

Performance Confirmation Follow-on Work: September 97

Support Perf Confirmation Study: September 97

Suppt Sys Engrg Reports & Studies TR39BFA1D

Prepare MGDS Cost Est: September 97

Functional/Reqmnts Analysis - Bin 3: September 97 Functional/Reqmnts Analysis - Bin 2: September 97

VA Test & Evaluation Plan: September 97

Waste Isolation Study: March 97

Seals Study: May 97

Performance Confirmation Follow-on: September 97

Support DIE's TR39BFA2D: September 97

Support Systems Engrg TR39BGA1D

MGDS Cost Estimate: September-98

PISA Chapter 11 (Conduct of Ops): April 98

Suppt Funct Analysis/Reqmnts Analysis: September 98

Finalize Bin 3 Functional Analysis/Reqmnts Analysis: September 98 Update Bin 2 Functional Analysis/Reqmnts Analysis: September 98

Develop Technical Performance Measures: September 98

Support ESF Operations: September 98 ESF/MGDS Transition Plan: September 98 E-W Drift Design Requnts Study: January 98

ESF Con-Ops: September 98

Decommissioning Study: September 98

FY98 DIE Suppt TR39BGA2D: September 98

INO3X Account YP3XPP001

Systems Engineering Support: September 01

Systems Functional Analysis/Reqmnts Analysis: September 00

VA & LA Test & Evaluation Plan: March 02

# 2. Seismic Design Inputs

Conduct Prob Seismic Hazard 0G32836FB1

Seismic Workshops: December 96

Final Report: August 97

Seismic Design Inputs: January 98

Seismic Design Inputs TR32835FB1: September 97

# 3. Thermal Test Data/Results

Drift Scale Test Forecast TR3E2FB23: July 97

Drift Scale Test TR3E2GB53 - Heating Phase

Initial Results: July 98

Single Heater Test TR3E2FB2 & TR3E2FB4

Heat-Up Results: July 97

Cool Down Data: February 98

Final Analysis of Single Heater Test Data TR3E2GB1: June 98

Laboratory Thermal Properties TR32711FB1

Thermal Test Report: June 97

Large Block Test Results TR3E1FB2: August 97

Near Field Environment YP3XPP058

Large Block Test Report: April 98

# 4. Geologic/Stratigraphic Information & Models

3-D Model TR395FB1: February 97

PISA Chapter 2.3 OG39BFB1

Geology/Stratigraphy/Seismology/Structure Description: May 97

Geologic System Description (PISA)TR39BFB1

Draft Description: July 97

Final Description: September 97

Geologic Map OG32212FB2: August 97

3-D Site Model TR395FA1: September 97

Confirmatory Update to 3-D Site Model TR395GA1: August 98

#### 5. Rock Properties/Rock Mechanics

Rock Properties TR32222FB1
Draft Description: April 97
Final Description: September 97

T-M Changes in Rock Mass TR3C3FB8: September 97

#### 6. DBE Inputs

Volcanism Data Base TR32711FB1: September 97

Maximum Flood Information

Adverse Weather Projections

#### 7. Near Field Environment Conditions

Infiltration Model OG33121FB1: March 97

Moisture Monitoring Data in ESF OG33124FBA & TR33124FBA: March 97

Moisture Monitoring Data in ESF OG33124FBD & TR33124FBB: September 97

Chlorine-36 Data TR33122FBA: March 97

Chlorine-36 Data in ESF TR33122FBB

Data: February 97

Interpretation of Results: August 97

Percolation Flux Across Repository OG33124FB8 & TR33124FB8: August 97

Percolation Flux Across Repository TR33124GB8: September 98

NFER, Rev 1, Vol 1 TR3C5FB9: August 97

Chemical Composition of Water Before Contact w/Repository TR3C1FB1: December 96

Post-Emplacement Seepage Into Repository TR3C2FB5: July 97

Near Field/AZ Models TR3C5FB54

Report: November 97

Chemical Composition of Water Contacting Waste Packages & Waste Form TR3C5FBB

1st Batch Results: January 97 2nd Batch Results: May 97 3rd Batch Results: September 97

Near Field Environment Description (PISA) TR39BFB5: June 98

Mechanics of Waste Package Environment TR3C3GB8: September 98

Chemistry/Minerology of Waste Package Environment TR3C5GB5: September 98

Large Block Test Results TR3E1FB2: August 97

Near Field Environment YP3XPP058

Confirmatory Testing for Near Field Environment: November 98

Large Block Test Report: April 98

#### 8. Waste Form-Related Testing/Data: EBS Transport

Neptunium Solubility TR34131FB4: June 97

Sorption & Transport TR34122FB2
Man Made Mat'ls & Rn Transport: September 97

Rn Solubility Studies TR34131FBB
Model & Experiment Data: September 97
Updates: September 98

Concentrations of Rns Leaving EBS TR3A31FB3
Limit Rn Solubility in EBS: December 96
Corrosion Transport Experiments: March 97
Transport Through Cement Materials Experiments: June 97

Models for Waste Package Hydrological TR3C2FB6: July 97

#### 9. Materials-Related Testing/Data

Sorption & Transport TR34122FB2

Man Made Mat'ls & Rn Transport: September 97

Effects of Man-Made Mat'ls TR3C5GBB

Initial: February 98 Update: September 98

#### SITE DELIVERIES TO LA

# E&I TO LICENSING CANDIDATE DELIVERIES (Non-PISA Deliveries)

# 1. License Application Plan

Project Management Documents TR13FB1
Draft Compliance Plan: September 97

Project Management Documents TR13GB1
Draft Compliance Plan Update: June 98
Final Compliance Plan: September 98

MGDS Project Engineering TR42FA6
Draft LA Design & Review Plan: September 97

### 2. Progress Report Support

Systems Integration TR142FA1

PR 16 Input: March 97 PR 17 Input: September 97

Systems Integration TR142GA2

PR 18 Input: March 98 PR 19 Input: September 98 PR 20 Input: March 99

PR Preparation - LLNL TR21FA8: September 97

WPD PR Support TR21GA3: July 01

WPM PR Support TR21GA8: September 98

Subsurface Interface Activities TR42FA1

Input to PR 16: March 97 Input to PR 17: September 97

Subsurface Interface Activities TR42GA4

Input to PR 18: March 98 Input to PR 19: September 98 Input to PR 20: March 99

# 3. Miscellaneous

System Studies TR15GB1

LA Strategy for DOE SNF: April 98

Integrate Development of Licensing & Regulatory Documents TR22FA2: September 97

Regulatory & Licensing TR22GA7- Phase II Integrate Regulatory Documents: July 99

#### **E&I DELIVERIES TO PISA**

# CANDIDATE DELIVERIES FROM E&I TO THE PISA

#### General Logic Flow for PISA Deliveries:

In general, the logic flow for capturing engineering information in the PISA should begin with the work scope in each applicable engineering area with deliveries to preparation of System Description Document (SDD) sections. The SDD sections should then deliver the appropriate PISA chapter generation. The PISA chapter generation should then deliver the PISA itself in the 1.2.5 area.

#### 1. General PISA Deliveries

SDD's (Deliver to each Design-related PISA Chapter) TR12GB1

Bin 3 SDD's: March 98 Bin 2 SDD's: June 98

Develop SDD's TR12FB1 Bin 1 SDD's: September 97

Systems Integration TR142GA2
Integrate SDD's: September 97

Systems Integration TR142GA2 Integrate SDD's: Oct 97 - July 99

Support PISA Development TR142GA4
Chapter Integration: Apr 98
Reviews & Completion: August 98

Subsurface Design Documents TR42GB2
Text & Info to PISA Chapters (2 - 11): March 98
Reviews: June 98

# 2. PISA Chapter 1

Support PISA Chapter 1 TR142GA3
Support Development Tasks: April 98

# 3. PISA Chapter 3

Classification Analyses/Q-List TR1BFB2 CA/Q-List: September 97

Classification Analyses/Q-List TR1BGB1 CA/O-List: March 98

Support DBE/Q-List TR46GB2
Q-List Analyses: Oct 97 - July 99

DBE/Q-List TR47GBB: Oct 97 - Sept 98

# 4. PISA Chapter 4

Waste Qty, Mix, & Throughput Study TR15FB2: April 97

System Study Support to SRA/Design TR15GB1 Decommissiongy Study: April 98 - October 98

Support System Studies TR42GB3
Decommisioning: Oct 97 - August 98

Nuclear Facility System Description TR46GBD Analyses: March 98

Diagrams: Feb 98

Emplacement System TR47GB6 Selected Drwgs: May 98

Subsurface Utilities TR47GB7
Evaluations, General Arrangements, Schematics: March 98

Subsurface HVAC TR47GB8
Airlocks, Closure, HVAC: March 98

Ground Control TR47GBE
Materials: March 98
Design Inputs: December 97

Subsurface Facilities TR47GBM Drainage: Jan 98

Ventilation Openings: January 98

# 5. PISA Chapter 5

CF Disposal Design TR231GB1
Design Basis Canister Selection: March 98

System Studies TR15FB1
Waste Package Size Study: September 97

HLS Disposal Container Design TR232GB1

Thermal, Structural, Criticality Evaluations: April 98

EBS Design Probabalistic Evaluations TR233GB7

EBS Performance: Oct 97 - July 99

Probabalistic Evaluations: Oct 97 - July 99

Criticality Analysis Methods TR233GB9: Dec 97

UCF Disposal Container Design TR233GBB

Complete Development: July 98

Design Basis SNF: July 98

Probabalistic Design Methods TR233GBC

Criticality Methodology: August 98

Disposal Criticality Analysis Consequence Model TR233GBE: March 98

Material Test Data (TR251GB1, TR251GB4, TR251GB5, TR251GB7, TR251GBA,

TR251GBC): June 98

Material Degradation Models TR251GBE

Crevice Corrosion Model: May 98

Phase Stability TR251GBK

Accelerated Aging Studies: Jan 98

WPD Input to PISA Ch 5 & 6 TR22GB1

Draft: Feb 98

Final: June 98

WPM Input to PISA Ch 5 & 6 TR22GB2

Draft: Feb 98 Final: June 98

6. PISA Chapter 6

System Studies TR15FB1

Seals Study: May 97

WP Supports/Inverts TR233GB1

Evaluations: April 98

Additional Barriers TR233GB2

Drawing Input Sheets: March 98

Testing of Other EBS Materials TR255GB2
Thermal/Chemical Tests: Oct 97 - Sep 98

Subsurface EBS Design TR47GBD Analyses: June 98

EBS Parts Lists, Drwgs, & Specs TR233GB4: Oct 97 - July 99

Seals/Decommissioning Drwgs & Designs TR47GBA: Feb 98

Subsurface Facilities TR47GBM Shaft Design Guide: Feb 98

WPD Input to PISA Ch 5 & 6 TR22GB1

Draft: Feb 98 Final: June 98

WPM Input to PISA Ch 5 & 6 TR22GB2

Draft: Feb 98 Final: June 98

# 7. PISA Chapter 7

DBE Definition & Analysis TR1BFB1
DBE's: September 97

PISA Chapter 7 TR1BGA2
Chapter Development: September 98

DBE Definition & Analyses TR1BGB2: March 98

EBS DBE Evals TR233GB5
Integrate DBE's: Oct 97 - July 99

DBE/Q-List TR47GBB: Oct 97 - Sep 98

System Studies TR15GB1

LA Strategy for DOE SNF: April 98

DOE-Owned SNF Design TR233GB3 Evaluations: Oct 97 - July 99

Waste Form Data (TR241GB3, TR241GB4, TR241GB5, TR241GB6, TR241GBA, TR241GBB, TR242GB1, TR242GB2): May, June 98

Glass Process Models TR242GB3
Dissolution Rates: June 98

DBE/Q-List TR46GB2 DBE Analyses: May 98

#### 8. PISA Chapter 9

System Studies TR15FB1
Waste Generated Study: September 97

Site-Wide Systems & Structures TR46GBE Site Generated Waste: Feb 98

# 9. PISA Chapter 10

DEB Def n & Analysis TR1BFB1 DBE's: September 97

DBE Def'n & Analysis TR1BGB2: March 98

DBE/Q-List TR46GB2
DBE Analyses: May 98

Rad Safety Design TR46GBC: Oct 97 - July 99

Radiation Safety TR47GB4: Oct 97 - April 01

DBE/Q-List TR47GBB: Oct 97 - September 98

# 10. PISA Chapter 11

MGDS Con-Ops TR12FB3
MGDS Con-Ops Revision 1: September 97

MGDS Con-Ops TR12GA2
Maintain MGDS Con-Ops: September 98

Support PISA Chapter 11 Development TR142GB1 Complete PISA Chapter 11: April 98

Safeguards & Security TR18FB2: June 97

Subsurface Interface Activities TR42FA1 Revise Con-Ops: September 97 į

Waste Handling Systems TR46GB3 Update Config Analyses: Mar 98

Personnel Safety & Warning System TR47GBL Immediate Response Plans: Feb 98

VA Site-Wide Systems & Structures TR46GBE Safety & Security Systems: February 98

#### LA DELIVERIES TO E&I

#### LICENSING TO E&I CANDIDATE DELIVERIES

# 1. Criticality Topical Report

TR524FA1 Support Draft Criticality Control Topical Report: August 97

TR524FA2 Final Topical Report: September 97

TR524GA4 Final Topical Report: August 98

# 2. LA Plan Delivery to Guide Future Design

Prepare LA Plan TR524FB5
Submit Final LA Plan: September 97

License Application Plan YP5XPP089

Finalized: August 98

#### 3. RIB & Genesis Data

RIB Maintenance TR533FB1

Waste Package Materials Properties Data in RIB: July 97 Waste Form Characteristics Data in RIB: August 97

Genesis Data Base Maintenance TR536FB1

EBS Phase I Data: September 97

Repository Phase I Data: September 97

#### MGDS COST ESTIMATES

# MGDS COST ESTIMATE CANDIDATE DELIVERIES (Non-TSLCC)

#### 1. Systems Engineering Cost Estimate Preparation

MGDS Cost Estimate TR17FB1
All Activities (MGDS Cost Estimate)

MGDS Cost Analysis TR17GB1 Cost Models Update: Dec 97

Draft Estimate: Jan 98

Update VA Estimates: Feb 98 Final VA Estimates: Jul 98

Final VA Cost Report & Documentation: August 98

### 2. Waste Package/Engineered Barrier System Cost Estimate Support

EBS Cost Estimate TR234GB4: September 98

Complete Phase I EBS Cost Estimate TR234FB1
Prepare & Provide Cost Estimates: September-97
Obtain Vendor Verification of Material Prices: June 97

Cost of Pedestals & Supports: September 97

Closure Weld Costs: September 97

#### 3. Repository Cost Estimate Support

Cost Estimating TR46FA1: September 97

Cost Estimating TR46GA2

Refine Cost Estimates: Mar 98 - July 99

Cost Estimating TR47FAF: September 97

Cost Estimating TR47GAF: September 98

# 4. Non-E&I Cost Estimating Support

Support Systems Engineering Reports & Studies TR39BFA1D Prepare MGDS Cost Estimate: September 97

Support Systems Engineering TR39BGA1D MGDS Cost Estimate: September 98

#### **E&I DELIVERIES TO NEPA**

#### CANDIDATE DELIVERIES FROM E&I TO NEPA

# 1. Transportation Work

Transportation Studies (All Activities) TR15FB4: September 97

System Studies TR15FB1

Rapid Response: September 98

NV Transportation Policies: November 98 DOE Transportation Meetings: November 98

Nevada Transportation (All Activities) TR46FB1: September 97

Nevada Transportation TR46GBL: April 01

# 2. Safeguards & Security, Land Withdrawal

MGDS Safeguards & Security (Land Withdrawal) TR18FB2: June 97

# 3. Waste Package Support

Integrate Environmental Assessment Performance TR22FA1: September 97

Environmental Assessment Performance TR22GA5: July 99

#### 4. Repository Support

Develop Alternatives Data for NEPA TR46FB8

Engineering Files: March 97

Engineering Files Updates: August 97

Support NEPA Process TR46GA3: July 99

NEPA/Environmental Support TR47FBH

Drawings: June 97

Engineering Files: August 97

NEPA/Environmental Support TR47GBH

New Engineering Files: March 98

Revised Engineering Files: September 98

# **E&I PROGRAM INTERFACES**

# PROGRAM INTERFACES WITH WASTE PACKAGE

1.	Data provided by Waste Package Development to Nuclear Regulatory Commission Summary Account TR233FB9	
	WP150A3 Disposal Criticality Technical Report, Rev. 01	04Sep97
	Summary Account TR233GBD	
	WP100A3 Disposal Criticality Topical Report	30Aug98
2.	Data received by Waste Package Development from various utilities and labs	
	Summary Account TR233FBE	
	WP233A04 Acquire benchmark critical data	29Nov96
	WP233A18 Acquire CRC data - BWR & PWR Fuel	14Mar97
	Summary Account TR233FBF	
	WP233A51 Acquire chemical assay data	30Jun97
3.	Data received by Waste Package Development from various materials suppliers	
	Summary Account TR234FB1	
	WP234704 Obtain verification of materials prices used in cost estimates	27Jun97
4.	Data provided by Waste Package Materials on waste form materials testing and mode	
	the Nuclear Waste Technical Review Board, the Nuclear Regulatory Commission, the Nevada, and other users	ne State of
	Summary Account TR241FB2	
	WP0035A3 Issue Waste Form Characteristics Report Revision 1	03Apr97

5. Data provided by Waste Package Materials on engineered materials testing and modeling to the Nuclear Waste Technical Review Board, the Nuclear Regulatory Commission, the State of Nevada, and other users

Summary Account TR251FB9

WP15A10 Issue Engineered Materials Characteristics Report Revision 1

01Apr97

# **E&I PROGRAM INTERFACES**

#### PROGRAM INTERFACES WITH SYSTEMS ENGINEERING

1. Data received by Systems Engineering from DOE/EM, RSA, or WAST/PM&A

Summary Account TR12FB2: Requirements Documentation/Verification

SE422700 Maintain Top Level Requirements

01Oct96, 30Sep97

SE422705 Update CDA

01Oct96, 31Mar97

SE422710 Update CDA

01Apr97, 30Sep97

Inputs from Program Level Requirements if changes occur.

Flow down of requirements from higher level documents controlled by WAST or PM&A.

Newly imposed requirements on MGDS system such as Other Waste Forms, Waste Acceptance modifications, etc.

Modification of Assumptions to accommodate newly imposed constraints (if any) on system.

Potential Originating Organizations: DOE/EM, RSA, or WAST/PM&A

Data Flow: EM or RSA to WAST/PM&A to DOE/YMP to M&O or WAST/PM&A to M&O/WM&I to M&O/MGDS

Feedback to EM or RSA or WAST/PM&A regarding our assumptions might occur through DOE/YMP to WAST/PM&A.

Summary Account TR12FB3: MGDS Concept of Operations

SE400705 Update Con-Ops

02Dec96, 31Mar97

SE400715 Update Con-Ops

01Jul97, 29Aug97

Inputs from WAST/PM&A or RSA could impact receipt of waste operations or waste processing operations. EM inputs (if any) could affect waste receipt/waste handling operations, requiring adjustments to Con-Ops Document.

Data Flow: EM or RSA to WAST/PM&A to DOE/YMP to M&O, or WAST/PM&A to M&O/WM&I to M&O/MGDS

Summary Account TR12GA1 MGDS Concept of Operations (Post VA)

SE400800 Maintain MGDS Con-Ops

30Nov98, 29Nov99

See TR12FB3. Sufficient time to better plan interface points and need dates (if any) to support LA Design.

Summary Account TR12FB1 Develop System Description Documents

SE405705 Develop Bin 3 SDD's

01Oct96, 30Sep97

SE410700 Develop Bin 2 SDD's

07Apr97, 30Sep97

SE415700 Develop Bin 1 SDD's

01Apr97, 30Sep97

Inputs (if any) from DOE/EM, WAST/PM&A, or RSA could impact receipt of waste operations, waste processing operations, or waste receipt/waste handling operations, requiring adjustments to requirements sections in SDD documents.

Data Flow: EM or RSA to WAST/PM&A to DOE/YMP to M&O, or WAST/PM&A to M&O/WM&I to M&O/MGDS; Data may flow through MGDS RD to SDDs.

Summary Account TR12GB1 System Description Documents (may not support VA)

SE520805 Requirements Analysis (Bin 3 SDDs)

SE521805 Requirements Analysis (Bin 2 SDDs)

SE522810 Requirements Analysis (Bin 1 SDDs)

See TR12FB1. Sufficient time to better plan interface points and need dates (if any) to support LA Design.

Summary Account TR12GB2 Requirements Documents (probably does not support VA)
SE580800 Maintain CDA Document 01Oct97, 30Sep98
SE530800 Maintain Top Level Requirements Docs 26Nov97, 25Nov98
See TR12FB2.

Summary Account TR13GB1: Program and Project Management & Controls (non-VA)
SE450800 Prepare Draft Risk Management Plan
28Jan98, 21Sep98

Input from EM, RSA, and WAST/PM&A in risk areas associated with inputs which will affect MGDS Design or License Application. Plan will lay out approach for managing risks critical to MGDS success.

Data Flow: EM or RSA to WAST/PM&A to DOE/YMP to M&O, or WAST/PM&A to M&O/WM&I to M&O/MGDS

Summary Account TR15FB1: System Studies Support to SRA/Design SE460700 Research for Waste Package Size Study 27May97, 25Jun97 Input desired from WAST, DOE/EM, Navy on sizes/shapes of commercial (odd-ball) and other waste forms and any potential impacts to WP Size.

Summary Account TR15FB4: Transportation Studies
SE456750 System Support to NEPA Activity (non-VA)
01Oct96, 30Sep97
Support to Engineering Files and EIS Transportation work. Input from EM, Navy, Other
Waste Orgs via DOE/WAST/PM&A or DOE/YMP to M&O. Output goes to Jason via
DOE/YMP.

SE457705 Transportation Support (Rapid Response) 01Oct96, 30Sep97 Inputs from RSA via DOE/WAST/PM&A and DOE/YMP necessary to support interface definitions (in 1.2.1.6). Inputs from Transportation portion of WAST with potential impacts to MGDS or Nevada Transportation.

Summary Account TR15GB1: System Studies Support to SRA/Design SE457755 Transportation Support (Rapid Response) 01Oct97, 30Sep98 See TR15FB4, SE457705.

SE516802 ID Issues for LA Strategy for DOE SNF (non-VA) 03Nov97, 14Nov97 Input/Output with EM, Navy, and other Waste Form orgs.

Data Flow is from EM/Navy/Others to DOE/WAST/PM&A or DOE/YMP to M&O.

Summary Account TR16FA1 Interface Management

SE426700 Develop Bin 3 Interfaces

01Oct96, 30Jun97

SE426705 Develop Bin 2 Interfaces

01Oct96, 30Jun97

SE426710 Evaluate Interfaces

01Oct96, 30Jun97

Inputs desired from DOE/EM, DOE/WAST/PM&A, RSA, and Navy to support the evaluation of parameters at the MGDS to Waste Form or MGDS to Transportation interface.

Outputs to these organizations in the form of interfaces reflective of current MGDS capabilities/envelopes. Waste Acceptance Criteria Document developed based on current MGDS capabilities to be added in FY97 Supplemental Funding (TR16FB1) with a draft on June 30, 97 (Level 4) and a Revision 0 on 9-30-97 (Level 3).

Data flow is via DOE/YMP or M&O/WM&I.

Summary Account TR16GA1 Interface Management

SE532810 Update Bin 3 SSC Interface Requirements

01Oct97, 30Jun97

SE532815 Update Bin 2 SSC Interface Requirements

01Oct97, 30Jun97

SE532820 Evaluate Interfaces

01Oct97, 30Jun97

See TR16FA1. Adjustments to Interfaces probable as a result of negotiations with external organizations (through DOE/YMP) in order to accommodate larger percentage of fuels. Potential impacts to design to be reflected in LA design (not VA). Take credit for capability to handle fuel by showing we have approach at VA, but not yet incorporated into design. A continuation of account TR16FB1 added via FY97 Supplemental funding will also likely be required.

# 2. Data received by Systems Engineering from M&O/WM&I

Summary Account TR13FB1 Program & Project Management & Controls

SE449700 Support TMIP Development

02Dec96, 30Sep97

Requires participation (input) from M&O/WM&I to develop/update this document. Minimum participation consists of review, comment, and sign-off on final product. External interfaces involving DOE to other agencies will need to be documented in another forum (IMP?).

Feedback could be provided to M&O/WM&I to provide documented management process for interfacing between East and West.

SE418710 Prepare Draft VA T&EP Plan

01Apr97, 01Aug97

Input from Test Evaluation Master Plan (TEMP) which was received from M&O/WM&I.

Summary Account TR13GB1: Program and Project Management & Controls (non-VA) SE419710 Develop Preliminary Draft LA T&EP 01Apr98, 14Aug98

Input from M&O/WM&I for any changes/update to TEMP. Incorporation of Other Waste Forms, and RSA Interfaces into test requirements (weak relationship).

Summary Account TR15FB1: System Studies Support to SRA/Design

SE436700 Research for Waste Generated Study

01Apr97, 15May97

Input from M&O/WM&I on Waste Stream Characteristics (already received) - may have implications on type, rate, and qty of waste generated.

Summary Account TR15FB2: Waste Qty, Mix, Throughput Study
SE200710 Identify Waste Receipt Schedules
19Nov96, 28Feb97
Inputs received from M&O/WM&I regarding Waste Stream Characteristics (rates and potential surges). Results of study likely to be fed back to M&O/WM&I.

Summary Account TR15GB3 Thermal Management Technical Analysis (non-VA) SE900102 Identify Issues 16Apr98, 15May98 Input from WAST/PM&I via M&O/WM&I on waste receipt schedules and modifications and storage information. Inputs will need to be considered in the context of thermal management.

Summary Account TR17FB1: MGDS Cost Analysis
SE124720 Preliminary Draft MGDS-VA Cost Est. Rpt. 18Mar97, 06May97
Input from M&O/WM&I regarding anticipated assumptions for TSLCC and MGDS Cost
Estimate planned for FY98. Desired input from EM and others (via DOE/WAST/PM&A or DOE/YMP) regarding incorporation of costs associated with other fuels into the baseline & design.

Summary Account TR17GB1: MGDS Cost Analysis (Schedule being revised)
SE124800 Develop VA Case Assumptions 01Oct97, 03Nov97
SE124805 Develop 98 TSLCC Assumptions 06Oct97, 14Nov97
Inputs from M&O/WM&I regarding agreements on assumptions.
Incorporation of Comments June 98, July/Aug 98
Input from M&O/WM&I regarding TSLCC Comments (possibly from ICE). Also provides opportunity to incorporate Design generated adjustments.

Summary Account TR18FB2: Perform MGDS Safeguards & Security Eval SE500700 Perform Safeguards & Security Eval 02Jan97, 25Apr97 Inputs desired from EM & Navy regarding characteristics of other waste forms which may have Safeguards & Security implications. Inputs regarding Pu desired. Data Flow via DOE/YMP or DOE/WAST/PM&A through M&O/WM&I

Summary Account TR18GA3: Safeguards and Security
SE730A Provided Safeguards, Security to SRA/Design
O1Oct97, 26Jul99
See TR18FB2.

Summary Account TR1BFB1: DBE Definition and Analysis
SE310700 DBE FY'97 (1ST HALF)
01Oct96, 31Mar97
SE310705 DBE FY'97 (2ND HALF)
01Apr97, 30Sep97
Input desired from EM, Navy, and other waste forms to consider in DBE analyses. Inputs concerning Pu desired for evaluation also.
Data Flow via DOE/YMP or DOE/WAST/PM&A through M&O/WM&I.

Summary Account TR1BGB2: DBE Definition and Analysis SE310800 DBE FY'98 (1ST HALF)
SE310805 DBE FY'98 (2ND HALF)
See TR1BFB1.

03Nov97, 03Apr98 01May98, 02Nov98

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3. Data provided by Systems Engineering to WAST/PM&A or WM&I

Summary Account TR15GB3 Thermal Management Technical Analysis (non-VA)
SE125AM3 Thermal Management Technical Analysis 30Sep98
Potential Output to WAST via DOE/YMP regarding thermal management techniques to be employed during waste acceptance or storage. Output could affect RSA or ISF constraints.

Summary Account TR17FB1: MGDS Cost Analysis
SE124AM3 Submit Cost Estimate 30Sep97
Output to M&O/WM&I stating assumptions to be used in MGDS contribution to TSLCC and for MGDS and LA Plan Cost Estimates.

Summary Account TR17GB1: MGDS Cost Analysis (Schedule being revised)
SE124805 Develop 98 TSLCC Assumptions 06Oct97, 14Nov97
Cost Input to TSLCC March 98
Output to M&O/WM&I to support TSLCC
Output to M&O/WM&I reflecting revisions resulting from comment incorporation.

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TR42 Requirements and Design Basis (continued)

repository. These activities do not individually warrant seperate level three activity bars, since the effort attributed to each is small. These activities include: Waste Quantity, Mix, and Throughput study; Generated Waste Disposal study; Waste Isolation design group will provide level of effort support for the development of the Viability Assessment Test and Evaluation Plan and the TRAZFAZ - Support SRA - RSI) Ph 7

Provide support to Systems Engineering to complete the functional analysis, develop the system architecture, identify SSCs, prepare the concept of operations, ensure that interfaces are described, maintain/update the requirements documents and the CDA compliance plan. Development of assumptions, requirements and criteria will entail: identifying where functional requirements, and regulatory requirements are in conflict or have multiple solutions to which trade or engineering are quantifiable and measurable to designers, reviewers, and verifiers; assuring that all regulatory requirements have been are iverifiers; and mapping the requirements to the appropriate standards or design guides that will satisfy them. It is expected acidressed in activity RP2405B. Note: providing input to the design and operations description sections of the SDDs is covered to TR42FA4 - INTERFACE ACTIVITES - RSD PAI

under the surface design tasks addressing the system designs.

TR42FA4 - INTERFACE ACTIVITIES - RSD PAI

Provide support to a variety of project/program related activities that require input from and/or coordination and integration with repository design. These activities include the preparation of documents such as the semi-annual NRC progress reports, license application plan, PISA plan, TMIP, BCPs and procedures. This activity also includes interactions with outside agencies such as the NWTRB, EPA, and NRC. Support activities include the reviews, participation in meetings, and preparation of written input, review comments and presentations. Routine project management interface work (e.g., status presentations for DOE) is covered in the summary account for repository management and integration the MGDS Project Engineering Office will serve as a point of contact between the DOE and Design. The Office will be responsible for Engineering and Integration Operations deliverable performance, integrity, and effectiveness of Design products. The Office will assure the integration of those products within Engineering and Integration Operations and with the other elements of the Program (i.e., Scientific Programs, Site Construction, Regulatory & Licensing, Support Operations, and Waste Management & Integration). The Office will participate in the development of budgets, work scope and schedules for Design products. This activity will include the identification of issues and facilitate the resolution of issues. This activity will be responsible to management in monitoring, reviewing and coordinating the products of Design to insure consistency with the other elements of the Program. The Office will organize and facilitate management review sessions for significant Design products and will coordinate budget, schedule, and deliverable status reviews. The MGDS Project Engineering Office will organize and coordinate interactions with the Repository and Waste Package Consultant Boards. The Office will coordinate and pead special assignments as needed, and will coordinate and/or generate white papers and recommendation letters as required The Project Engineering Office will coordinate and integrate the generation of a Viability Assessment Design and Review Plan and a Draft License Application Design and Review Plan. The VA Plan will describe those design-related topics/issues important to the Viability Assessment, the required progress toward resolution of each issue at the time of the Viability Assessment Design completion, which products will be generated, and how these products will illustrate that necessary progress has been accomplished. The plan will include a review checklist to support completion of the Phase I design and a preliminary review checklist to support the completion of the Viability Assessment Design. The plan will include a schedule for completion of design activities which support the VA commensurate with the level of design schedule detail contained in the FY97 Annual Plan. Interfaces between Design and other Project and Program areas willbe defined and coordinated. The Plan will be reviewed internal to the M&O prior to delivery to YMSCO. TR42FB3-PRÉPARE DÉSIGN GUIDE

Application, the required progress toward resolution of each at the time of License Application Design completion, which products will be generated, and how these products will illustrate that necessary progress has been accomplished. The plan will include preliminary review checklists to support completion of the Phase II design and completion of License Application Design. The plan developed under 1.2.5. The plan will include a schedule for completion of design activities which support the LA commensurate with defined. The Plan will be reviewed internal to the M&O prior to delivery to YMSCO Develop repository design guides. In FY97, management (e.g., source terms, secondary waste and remote operations). The activity includes reviewing existing NRC Regulatory Canida.

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PM M TR42 Requirements and Design Basis (continued)

MK and DESI); and translating the most appropriate standards into design guides. New guides will be written where existing documents cannot be adapted. The level of detail provided in guides translated from existing standards will be consistent with the source documents. The level of detail provided in newly written guides will be appropriate to facilitate the Phase I or II design process, or the NRC license review. The level of detail will be expanded as needed in Phase II to facilitate the detail design process planned to begin in Phase III. The product checking group will coordinate design guide development. The purpose of the guides is to establish consistent methods for repetitive design activities that are acceptable to the NRC. The existing Reg. Guides are traceable to 10CFR50 via the NUREG 0800, Standard Review Plan for the Review of SARs for Nuclear Power Plants, and they are based on years of reactor experience. Where possible NRC Regulatory Guides for nuclear power plants will form the foundation for the design guides because these design methods will be most readily accepted by the NRC. Each design guide is expected to address: applicability, relevant RDRD requirements, design objectives, design parameters (e.g., source terms), acceptable analytical methods and sizing basis, recommended design solutions, design product format requirements with examples, and a check list for confirming the quality of the design product. Applicable codes and standards will be quoted or referenced as appropriate. A design guide preparation plan will be developed early in FY97 to establish the format and content of the guides, identify existing standards, and establish a prioritized production schedule.

TR42F34-Support for a variety of System Engineering studies. Preparation and coordination of the studies are the

responsibility of Systems Engineering. Repository design will work with Systems Engineering as members of an integrated team to assess the impacts of alternatives on the surface design, and to provide descriptive material for the report. The relationship of

each study to surface design is provided in the descriptions below.

RP2405B1 Naste Quantity, Mix, & Throughput; Level 3 Task SE200A -Prepare surface design data for establishing requirements for the quantity, mix, and throughput of HLW waste at the repository. This activity includes analyzing the impacts to surface design from various scenarios. The scenarios are expected to include primarily uncanistered spent nuclear fuel with lesser quantities of vitrified HLW, other DOE-owned waste forms, and naval fuel. This study will finalize the scenario. FY96 study Uncanistered Fuel Receipt and Handling Analysis, will be based on a preliminary best-guess waste scenario. The Waste, Quantity, Mix, and Throughput Study will establish the final waste form scenario requirements for the phase II design. RP2405B2 PREtrievability Study; Level 3 Task SE502 -Prepare design data for developing a waste package retrieval strategy for the surface facilities. This activity includes analyzing the impacts to surface facilities from alternate retrieval strategies. Concepts may be required for adding or modifying facilities to cut open waste packages, repackage the waste for shipment or remediation, or process the waste for recovery of a valuable resource. The impact from the addition or expansion of lag storage

-RP2405B3 Seals Study, Level 3 Task SE506 - Prepare surface design data for establishing backfill/seal requirements for subsurface openings including ramps shafts and boreholes. This activity includes analyzing the impacts to surface design from alternate sealing technologies and materials. Surface design impacts are expected to be related to providing the appropriate materials to

RP2405B4 Safeguards, Security to SRA/Design; Level 3 Task SE730 -Prepare design data for developing surface design requirements for safeguards and security. This activity includes analyzing the impacts to surface facilities from various S&S concepts. Concepts may include delay features (e.g., hardened walls and fighting stations), intrusion detection systems (i.e., PIDAS), MC&A access control and tracking, and IAEA inspection facilities.

-RP2405B5 Waste Package Size Study; Level 3 Task SE460 -Prepare design data for establishing an economic waste package size. This activity includes analyzing the impacts to surface facilities from various waste package configurations. Waste package size has a significant impact on the number of units packaged and the design of the in the waste handling facilities.

-RP2405B6 Waste Generated Study; Level 3 Task SE436 -Prepare design data for determining where low-level waste will be disposed (e.g., on-site facility, NTS facility, off-site facility). This activity includes developing a concept and costs for an on-site

RP2405B7 Test Evaluation Plan; Level 3 Task SE504 -Prepare design data for developing requirements for the surface design features needed to verify that the systems will perform during preclosure as designed.

RP2405B8 — Performance Confirmation Follow-on Work; Level 3 Task SE050B - Prepare surface design data for developing detailed performance confirmation requirements. This activity includes analyzing the impacts to surface facilities from alternate

2 9-25-96 RK 9/26/94 RAV 1/26/96

**TR42** 

Requirements and Design Basis (continued)

confirmation strategies. Strategies may consider alternative testing frequencies, and various sampling and testing approaches. This study is a continuation of SE050A.

- TR42FBS - SUBSURFACE DESIGN DORUMENTATION (MO) 2894

Develop preliminary design guides for various aspects of design that are not currently covered by a prescribed set of codes and standards or a specific design guide. Design guides that are currently accepted by the NRC will be reviewed for completeness and application to this project.

Wherever possible, existing material that is acceptable will be modified to incorporate new material that is site specific and design specific. Design guides must be developed in time for license application, but do not necessarilly need to be completed prior to performing design as long as the design conforms to the constraints specified in the design guide. FY 97 activities will be limited in the design quide development arena, but will increase in FY98 and 99.

Tasks included in this activity are as follows:

-The purpose of the proposed Radiation Safety Design Guide is to document the methodology used in Radiation Safety for subsurface design. The guide will describe in detail, the exact procedures used to generate shielding analysis, for example. Generation of such a document ensures the long term survivability of the information basis for the safety as well as satisfying the documentation requirements of the licensing body which governs the process.

- "Drift Design Methodology and Preliminary Application for the Yucca Mountain Site Characterization Project", by SNL (Dec. 1991), needs review, update, or new version to be applicable to current design concept. This document will be the basis for development

of the drift design guide for LAD. (4/15/97 - 9/30/97)

- The development of System Design Description (SDD) documents will be continued in FY1997. SDDs include the specific system design criteria and description and show how the criteria are satisfied by the design. This criteria will be developed and controlled prior to drawing development. SDDs for FY97 will be developed to the extent specified during meetings between the M&O and DOE in FY96. The structure is envisioned at this time to be comprised of six chapters plus a summary and appendices. A preliminary SDD will be produced for all identified systems, but the quantity of material in each chapter will vary with the maturity of design. All SDDs produced in FY97 will have (at least) a summary section, with some (Bin 3) SDDs containing some information through chapter 3. The SDDs will continue to be supplimented as design progresses on that system. Repository design will provide that portion of the SDD content which deals directly with the design for which the repository design department is responsible. This repository SDD development task supports work described within the systems engineering area. Examples of subsurface related SDDs expected to be started during the FY97 are given below:

System

- 1. Ground Control System
- 2. Underground Facility portion of the Engineered Barrier

3. Subsurface HVAC System

- 4. Subsurface Waste Package Handling System
- 5. Performance confirmation Monitoring System

6. Seal System

- 7. Subsurface Repository Area
- 8. Subsurface Accesses
- 9. Retrieval System
- Backfill Emplacement System (if needed)
- 11. Subsurface electrical Power Distribution System
- 12. Subsurface Fire Detection/Suppression System
- 13. Subsurface Radiation Monitoring System
- 14. Excavation/Muck Handling System

The exact tititles and starting date for the above mentioned SDDs are subject to change during the FY 97 as the planning process for SDDs continue to evolve.

Two FY1997 milestones are also supported in this effort. They are:

- o EISE405BM3 Draft SDD Status Report
- o EISE405M3 Phase I SDD Status Report

Product production support is provided by the Product Checking Group as a direct component of quality procedure steps involving product checking. In this capacity, the group will provide the technical check and compliance check on drawings, analyses, and

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Inc. Dollars in Thousands (Esc.)

#### TR42 Requirements and Design Basis (continued)

other technical documents. The group is established to supply an independent checking of products by technically qualified individuals as required by procedure. The efforts of this group completes the formal checking process through comments and response on technical content, and simultaneously reviews each product for compliance with procedures and format that may be specified for special documents.

Summary Account	Title	
TR42FA1	Subsurface Interface Activities	
TR42FA3	Support SRA - RSD Ph I	
TR42FA4	Interface Activities - RSD Ph I	
TR42FA6	MGDS Project Engineering - Repository Phase I	
TR42FA7	Product Production Support	
TR42FB3	Prepare Design Guides - RSD Ph I	
TR 12FB4	Support Systems Studies - RSD Ph I	
TR 12FB5	Subsurface Design Documentation	
TR 12FB6		a . A
- <del>2R 126A1</del>	Suppost SPA - DSD DA FF - BVS 1/23/96	QXV
TR 12CA2	Interface Activities RSD Ph II BTS 1/25/46	10,
TR 126A3	MODE Project Engineering Repository Phase II BIS 9/25/96 11 10 94	1/ /
TR 12001	- Subourface Interface Activities BTS 7/25/96 Mily	4/7/106
TR IZCB2	Subsurface Design Documentation BYS 1/25/9c MM	W
TR 12GB3	Support Systems Studios - RSD Ph II BTS 4/25/96	i
TR 12604		1
	Prepare Design Guides - RSD Ph II - RTS 9/25/96	]

Deliv ID	Description/Completion Criteria	Due Date
RP120M3H	Design Guides	30-sep-1997
	Criteria - Letter of transmittal from the M&O to DOE/Engineering, with attached M&O approved design guides prepared with the appropriate DOE review participation. Documents or cover letter may point to applicable backup documents which provide additional detail and/or supporting information. Included are the following design guides; - Source terms design guides - Remote operations design guid - Drift design guide - Radiation safety design guides	
RP120MG1	VA Design & Review Plan	31-dec-1996
	Criteria - The deliverable contains a description of those design-related topics/issues important to the Viability Assessment (as derived by the M&O and coordinated with DOE Engineering), a description of the planned progress toward resolution of each issue at the time of the Viability Assessment Design completion (which will be defined in this plan), a listing of which products will be generated, and a description of how these products will illustrate that necessary progress has been accomplished. The deliverable contains a review checklist to support completion of the Phase I design and a preliminary review checklist to suppor the completion of the Viability Assessment Design with appropriate DOE review involvement. The deliverable contains a schedule for completion of design activities which support the VA. The level of detail of this schedule is commensurate with the level o design schedule detail contained in the FY97 Annual Plan. The deliverable identifies interfaces between Design and other Projec and Program areas. The deliverable has been reviewed internal to the M&O prior to delivery to YMSCO. The deliverable is signed and transmitted by the Engineering and Integration Operations Manager. This is a non-Q product. The deliverable is considered complete upon transmittal to YMSCO with the contents as described herein.	

ant M&O Data - MOYMP Prepared - 25-SEP-96:00:45:45

Yucca Mountain Sit aracterization Project Planning and www.crol System (PACS) Participant Planning Sheet (PSA03)

Inc. Dollars in Thousands (Esc.)

TR42

Requirements and Design Basis (continued)

	DELIVERABLES	
Deliv ID	Description/Completion Criteria	
RP120MG2	Draft LA Design & Review Plan	Due Date
@120MG2	Criteria — The deliverable contains a description of those design-related topics/issues important to the License Application (as derived by the M&O and coordinated with DOE Engineering), a description of the required progress toward resolution of each issue at the tim of License Application Design completion, a preliminary listing of which products will be generated, and how these products will illustrate that necessary progress has been accomplished. The deliverable contains a preliminary review checklist to support completion of the Phase II design and completion of License Application Design. The deliverable reviews. The level of detail of this schedule is more detailed than the level of design schedule detail reviews. The level of detail of this schedule is more detailed than the level of design schedule detail Project and Program areas. The deliverable has been reviewed internal to the M&O and DOE Engineering Project and Program areas. The deliverable has been reviewed internal to the M&O and DOE Engineering Operations Manager. This is a non-Q product. The deliverable is considered complete upon transmittal to YMSCO with the contents as described herein.	30-sep-199
·	4/26/96	

Date Technical Reviewer - print name Vate QA Reviewer - print name Date

# 8. Describe the steps in a process that the project will use to bring closure on this issue:

No.	Title	Description	Summary Account #
1	Develop Materials of Construction Database (RP500705, RP1206M3, RP47832)	Determine design parameters and properties of selected materials (e.g., concrete and steel) for the expected range of mechanical loads, temperature, and other conditions. Level 4 milestone to deliver engineering data to PA (9/30/97).	TR47FB1 TR47GBE
2	Identify Ground Support Materials (RP506705, RP47824)	Complete assessment and selection of appropriate materials with input from PA studies. Supports level 4 milestone to deliver data to PA.	TR47FB3 TR47GBE
3	Perform thermal/mechanical analysis (RP506710, RP47826)	Complete analysis of alternative ground support methods for thermal/mechanical, seismic, and in-situ load cases. Includes FY98 update to incorporate added data.	TR47FB3 TR47GBE
4	Develop Ground Support Designs (RP506715)	Present three ground support design options based on results of analysis and criteria/constraints developed from findings from PA and PC studies.	TR47FB3
5	Preparation of Drawings (RP506720)	Level 3 milestone for FY97: Drawings - Emplacement Drift Ground Support (09/30/97)	TR47FB3
6	Update Ground Support Design (RP47830)	Reevaluate FY97 work using latest information and results from PA and PC to update emplacement drift ground control and select a reference option.	TR47GBE
7	Near Field Environment (RP510710)	Assess emplacement drift environment conditions under a range of thermal conditions and ventilation scenarios.	TR47FB2
8(1)	Near field environment PA study (Not identified)	Work on cementitious materials is not an identified task but is being included in the activity dealing with evaluation of near-field environmental models for VA.  Deliverables are (1) documentation of a workshop on near-field models (6/30/97) and (2) documentation for near-field models for VA (4/2/98).	TR543FB2
9(2)	Development of mapping strategy (SE050705, SE050710)	Identify requirements, needed geologic parameters, level of confidence needed for data, and predicted data distributions. Develop a mapping strategy and document requirements for mapping.	TR15FB1
10	Select Candidate Materials for WP Support & Invert (WP220746)	Identify candidate materials that are compatible with WP design, and are acceptable for WP support and emplacement drift invert design. (11/1/96 - 4/1/97)	TR22FB4

# 9. Provide a rough schedule of when this issue will be resolved for VA:

			FY97										FY98													
No	POC (Name/Phone)	Date	0	N	D	J	F	М	Α	М	J	J	Α	s	0	N	D	J	F	М	Α	М	J	J	Α	s
1	R. Nolting/5-4450	10/01/96 - 09/30/97 01/02/98 - 03/31/98																								
2	R. Nolting/5-4450	10/01/96 - 12/31/96 11/03/97 - 03/31/98																								
3	R. Nolting/5-4450	10/14/96 - 04/10/97 12/01/97 - 07/31/98																								
4	R. Nolting/5-4450	10/14/96 - 04/01/97																								
5	R. Nolting/5-4450	02/03/97 - 09/30/97																								
6	R. Nolting/5-4450	02/02/98 - 09/30/98																								
7	R. Nolting/5-4450	10/01/96 - 07/31/97																								
8(1)	Sassani/5-4635	10/01/96 - 06/30/98																								
9(2)	Memory/5-3938	03/00/97 - 07/00/97																								
10	D. Stahl/5-4383	11/01/96 - 04/01/97																								

- 10. Describe a process that will be used to measure performance towards closure:

  Performance will be measured in accordance with the process documented in the VA Monitoring Plan.
- 11. Describe how status will be reported during the process of closing this issue:

  Status will be reported in accordance with the process documented in the VA Monitoring Plan.

#### NOTES:

- Further explanation of Step 8 (Near-field environment PA study), Paragraph 8:
  - A report will be issued by PA on 6/30/97 documenting the results of "near-field" model studies that are being done as part of the Introduced Materials program at LLNL. Including in this report will be an assessment of the long-term postclosure behavior of concrete and a determination of the importance of certain concrete characteristics, such as pore solution pH, to the emplacement drift environment.
  - A statement of work is being submitted this month (3/97) outlining a 6-month testing program to investigate certain key mechanisms in concrete that will determine the long-term pH of the drift environment. Results of this testing will be available by the first quarter FY98.
  - A report will be issued by PA on 4/2/98 to complete the documentation of the near-field model studies at LLNL. Results of these and other tests will provide the basis for a final assessment of concrete pH.
- 2 Further explanation of Step 9 (Development of mapping strategy), Paragraph 8:
  - An initial consensus will be developed by the end of April FY97 on a geologic mapping strategy. This strategy will provide a focus for continued assessment through the end of FY97.
  - In early FY98 discussions will be held with the NRC in order to fully understand the regulatory requirements regarding geologic mapping before finalizing a strategy.

# DRAFT DISCLAIMER

This contractor document was prepared for the U.S. Department of Energy (DOE), but has not undergone programmatic, policy, or publication review, and is provided for information only. The document provides preliminary information that may change based on new information or analysis, and is not intended for publication or wide distribution; it is a lower level contractor document that may or may not directly contribute to a published DOE report. Although this document has undergone technical reviews at the contractor organization, it has not undergone a DOE policy review. Therefore, the views and opinions of authors expressed do not necessarily state or reflect those of the DOE. However, in the interest of the rapid transfer of information, we are providing this document for your information.



TRW Environmental Safety Systems Inc.

1180 Town Center Drive Las Vegas, NV 89134 702.295.5400

> WBS: 1.2.4.7 QA : N/A

CONTRACT #: DE-AC01-91RW00134 LV.RD.RS.7/97.031

July 30, 1997

Dr. Stephan J. Brocoum
Assistant Manager for Licensing
Yucca Mountain Site Characterization Office, M\S 523
U.S. Department of Energy
P.O. Box 30307
Las Vegas, NV 89036-0307

Attention: Technical Publications Management

Dear Dr. Brocoum:

Subject:

Transmittal of Deliverable "Subsurface Development Design"

Deliverable RP120M3, WBS 1.2.4.7

Enclosed with this letter are 15 engineering drawings submitted to satisfy the acceptance criteria for the deliverable RP120M3, due to YMSCO on July 31, 1997. The drawings listed below, were developed, reviewed, and approved by the M&O with appropriate participation by YMSCO personnel. These drawings were produced under Summary Account TR47FB5 "Subsurface Development Design."

- 1. Repository Siting Volume Plan BCA000000-01717-2700-81022 Rev 00
- 2. Repository Siting Volume Cross Sections BCA000000-01717-2700-81023 Rev 00
- 3. Subsurface Repository VA Design Layout Plan BCAA00000-01717-2700-81024 Rev 00
- 4. Usable Emplacement Area for 70,000 MTU Plan BCAA00000-01717-2700-81025 Rev 00
- 5. Available Emplacement Expansion Areas w/Geology Lower Block Plan BCAA00000-01717-2700-81026 Rev 00
- 6. Available Emplacement Expansion Areas w/Geology Upper Block Plan BCAA00000-01717-2700-81027 Rev 00

LV.RD.RS.7/97.031 July 30, 1997 Page 2

- 7. Drainage Patterns VA Design Layout Plan BCAA00000-01717-2700-81028 Rev 00
- 8. Typical Ramps and Mains Const/Develop Modes Sections BCAA00000-01717-2700-81029 Rev 00
- 9. Typical Ramps and Mains Emplacement Mode Sections BCAA00000-01717-2700-81030 Rev 00
- 10. Emplacement/Development Shafts and Access Drifts Plans, Elevs, Section BCAA00000-01717-2700-81031 Rev 00
- 11. Operational Alcoves and Support Facilities Plans, Elevations, Sects BCAA00000-01717-2700-81032 Rev 00
- 12. 7.62 m TBM Assembly and Disassembly Chambers Plans, Sections BCAA00000-01717-2700-81033 Rev 00
- 13. Performance Confirmation Facilities for VA Design Plan, Section BCAA00000-01717-2700-81034 Rev 00
- 14. Typical Emplacement Drift and Ventilation Raise Sections, Elevations BCAA00000-01717-2700-81035 Rev 00
- 15. Emplacement Drift Turnouts Plans, Sections BCAA00000-01717-2700-81036 Rev 00

Six design analyses were also prepared as a part of this workscope. These analyses provided the primary input for the drawings listed above. The analyses are:

- Determination of Available Volume for Repository Siting BCA000000-01717-0200-00007 Rev 00
- 2. Repository Thermal Loading Management Analysis B00000000-01717-0200-00135 Rev 00
- 3. Subsurface Repository Slopes BCAA00000-01717-0200-00007 Rev 00
- 4. Repository Subsurface Layout Configuration Analysis BCA000000-01717-0200-00008 Rev 00
- Subsurface Construction and Development Schedule Analysis BCA000000-01717-0200-00013 Rev 00
- 6. Subsurface Construction and Development Analysis BCA000000-01717-0200-00014 Rev 00

Members of your staff were involved in appropriate reviews of all drawings and analyses listed above as required in the Deliverable Acceptance Criteria. Controlled or Information copies of these documents are available through the Document Control Center. Informal "Information Only" copies may also be obtained by contacting the personnel listed below.

If you or your staff have any questions regarding these deliverables please contact Dr. Kalyan K. Bhattacharyya, Repository Design Manager, at 295-4414.

Sincerely,

Richard D. Snell, Manager

Engineering and Integration Operations
Management & Operating Contractor

#### Enclosures:

- 1. YAR for Deliverable RPI20M3
- 2. Participant Planning Sheet For Deliverable RP120M3
- 3. Subsurface Development Design (15 Drawings)

#### cc w/o enclos:

- W.E. Barnes, DOE\YMSCO, Las Vegas, NV
- H.A. Benton, M&O, Las Vegas, NV
- V.A. Dulock, M&O, Las Vegas, NV
- L.D. Foust, M&O, Las Vegas, NV
- J.T. Gardiner, DOE\YMSCO, Las Vegas, NV
- J.A. Gonzales, DOE\YMSCO, Las Vegas, NV
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- A.M. Segrest, M&O, Las Vegas, NV
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- P.D. McComb, M&O, Las Vegas, NV