

# CURRENT PLANNING - WORK CONTINUING

9801210005 - PART 2

## **DRAFT DISCLAIMER**

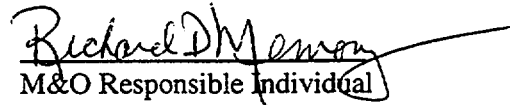
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**Key VA Issue  
Resolution Plan**

1. **Issue #13: Repository Seals Requirements and Concepts** February 3, 1997 Rev. #01A

2. **Assigned to:** M&O Responsible Individual: Richard Memory Phone: 5-3938  
DOE Contact: Paul Harrington Phone: 4-5415

  
M&O Manager

  
M&O Responsible Individual

3. **Issue Description:**

Establish requirements for permanent sealing of boreholes, ramps, and shafts. The challenge of this issue is to identify the proper requirements for the repository seals. The objective of sealing these openings is to prevent the creation of preferential pathways allowing significant amounts of surface or ground water from reaching emplaced waste, and to prevent significant amounts of gaseous radionuclides from escaping through these artificially created preferential pathways to the accessible environment. The seals need not provide any greater performance than would have been provided by the mountain had the boreholes, ramps, and shafts not been created.

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

Sealing of abandoned boreholes and shafts is required by state of Nevada laws. The federal regulations (10 CFR 60 with further guidance in NUREG-1373) requires that sealing be done so that the ability to isolate radioactive wastes will not be degraded. A significant amount of effort was done on this problem in the 1984 to 1991 time frame to evaluate the technical aspects of sealing and sealing material performance. The results of these studies indicate that available technology exists to seal boreholes and a variety of materials can be used. The sealing methodology and evaluation of performance will be an important issue in License Application and it needs to be incorporated into the designs. Interfaces: Resolution of this issue will require interfacing with the Performance Assessment and scientific programs organizations.

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

The VA design will need to incorporate a sealing plan as part of the overall design of the subsurface system and the license application plan. In order to develop this sealing plan requirements on which to base this design must be developed.

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

The presence and type of seals must be considered in the TSPA work. The MGDS cost estimate will need this information since the costs will depend on whether or not a fairly costly sealing methodology is needed or whether much less costly methodologies would be adequate. In addition to the above, it will be necessary to define what set of testing is needed to support the sealing methods in LA and this will need to be incorporated in the LA planning.

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

A study is underway to evaluate the issues related to seals and to develop recommendations for sealing requirements. This study will first examine performance issues to determine what performance the seals must achieve. The latest site information will be used in this evaluation. Secondly the study will examine whether or not the sealing methodology recommended meets the expectations in the regulatory guidance. Seals should not need to be any more sophisticated than what is necessary to achieve the desired performance, including longevity. If the recommended

methodology is not in keeping with the regulatory expectations then it may be necessary to conduct discussions with the NRC. Additionally, there will likely need to be some testing prior to LA and some testing during performance confirmation. Closure of this issue sufficient for VA will be the identification of what the seals need to do (considering technical and regulatory concerns) and recommendations produced in the study (completion April 30, 1997) for requirements as to what to seal, how to seal, and when to seal. Based on the requirements established, design will produce sealing designs which will be completed in February 1988 to support VA. Any testing recommendations to support LA will be incorporated in test plans.

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

No.	Title	Description	Summary Account #
1	Identify sealing options	Using previous studies and current information, the options for sealing boreholes, shafts, and ramps will be identified.	97 Seals Study SE506705
2	Establish evaluation criteria	The evaluation criteria that will be used to evaluate the various sealing options will be established.	97 Seals study SE506715
3	Conduct performance analysis	Performance assessments will be done to evaluate the need for seals and the performance that those seals must have.	97 Seals Study SLSE5061
4	Evaluate sealing requirements options	Utilize the performance assessments and the criteria established to identify the sealing performance that must be achieved.	97 Seals Study SE506720
5	Develop recommendation for sealing	The study will develop a recommendation for requirements to seal the boreholes, shafts, and ramps.	97 Seals Study SE506M3
6	Establish requirements	Establish requirements in the Controlled Design Assumptions Document.	Requirements SE530800
7	Produce VA sealing design	Preliminary designs will be developed for VA for sealing the boreholes, shafts, and ramps which meet the criteria established.	Seals/decom-missioning RP47954

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

			FY97												FY98											
No	POC (Name/Phone)	Date	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
1	J. Fernandez	11/15/96-12/30/96																								
2	S. Saterlie	12/31/96-2/13/97																								
3	J. Fernandez	12/21/96-3/30/97																								
4	S. Saterlie	2/14/96-4/30/97																								
5	S. Saterlie	4/1/97-5/30/97																								
6	B. Thom	6/1/97-9/30/97																								
7	K. Bhattacharyya	10/1/97-2/27/98																								

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

Performance will be measured by tracking to the schedule identified in item #9 above. As each of the activities is completed the issue will be progressing toward closure sufficient for VA.

**11. Describe how status will be reported during the process of closing this issue:**

Status will be reported monthly and as each activity is scheduled for completion. A deliverable document will be produced documenting the outcome of the system study in May 1997, the CDA will be updated in September 1997, and designs will be included in the VA design in 1998.

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## WBS 1.2.2 Waste Package Products (Rev 0, 12/18/96)

							VA COMPONENT			
P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.1	TR21FA5	WP21702	12-Sep-97	Statement that the EBS/WP Phase I design work is done	WP21704	Ltr				
1.2.2.2	TR22FA1	WP22FA1	30-Sep-97	Initial engineering file for Waste Package and EBS		IOC				
				Final engineering file for Waste Package and EBS		IOC				
	TR22FA5	WP22FA5	30-Dec-97	WP Heat Evaluation Large Scale Thermal Analysis		Anal	X			
				Engineering sketches for WP heat evaluation large scale thermal analysis		IOC	X			
				Design input sheets for WP heat evaluation large scale thermal analysis		IOC	X			
	TR22FB2	WP220724	31-Mar-97	Documentation of available data and models for cladding degradation		IOC		X		
		WP220728	31-Jul-97	Statement of design basis cladding		IOC		X		
	TR22FB3	WP220733	17-Mar-97	Revised WP Off-Normal and Accident Scenario Report		Tech Doc	X	X		
		WP220731	01-Apr-97	Estimate of frequency of MGDS DBEs		Ltr Rept	X	X		
		WP220735	01-Jul-97	Identification of which WPs need DBE design analysis		Ltr Rept	X			
		WP220737	30-Sep-97	Definition of WP DBE parameters evaluation		Ltr Rept	X	X		
	TR22FB4	WP220756	01-Apr-97	Documentation of candidate materials and reference materials for EBS		IOC	X	X		X
		WP220752	15-Aug-97	EBS/WP Materials Selection Analysis	WP220754	Anal	X	X		X
	TR22FB5	WP220764	29-Jul-96	Description of effects of near field environment on degradation of EBS		IOC		X		
	TR22FB6	WP220701	30-Sep-97	WBS 1.2.2 WPD writeups for PR #16		IOC				
				WBS 1.2.2 WPD writeups for PR #17		IOC				
		WP220711	30-Sep-97	Comments on issues raised during reviews of PR #15		IOC				
				Comments on issues raised during reviews of PR #16		IOC				
1.2.2.3.3	TR233FB1	WP233703	13-Dec-96	Parts List for 21 PWR UCF Disposal Container	WP233735	Ltr	X			
				Parts List for 12 PWR UCF Disposal Container	WP233735	Ltr	X			
				Parts List for 44 BWR UCF Disposal Container	WP233735	Ltr	X			

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							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.3.3 Cont'd	TR233FB3 Cont'd	WP233703 Cont'd		Parts List for 4 Pack DHLW Disposal Container	WP233735	Ltr	X			
				Parts List for 5 Pack DHLW Disposal Container	WP233735	Ltr	X			
		WP233738	20-Sep-97	Sketch for closure weld mockup		IOC	X			
		WP233730	30-Jun-97	21 PWR UCF disposal container overall drawing		Dwg	X	X		X
				21 PWR UCF disposal container outer barrier drawing		Dwg	X	X		X
				21 PWR UCF disposal container inner barrier drawing		Dwg	X	X		X
				21 PWR UCF disposal container internals drawing		Dwg	X	X		X
				12 PWR UCF disposal container overall drawing		Dwg	X	X		X
				12 PWR UCF disposal container outer barrier drawing		Dwg	X	X		X
				12 PWR UCF disposal container inner barrier drawing		Dwg	X	X		X
				12 PWR UCF disposal container internals drawing		Dwg	X	X		X
				44 BWR UCF disposal container overall drawing		Dwg	X	X		X
				44 BWR UCF disposal container outer barrier drawing		Dwg	X	X		X
				44 BWR UCF disposal container inner barrier drawing		Dwg	X	X		X
				44 BWR UCF disposal container internals drawing		Dwg	X	X		X
				4 Pack DHLW disposal container overall drawing		Dwg	X	X		X
				4 Pack DHLW disposal container outer barrier drawing		Dwg	X	X		X
				4 Pack DHLW disposal container inner barrier drawing		Dwg	X	X		X
				4 Pack DHLW disposal container internals drawing		Dwg	X	X		X
				5 Pack DHLW disposal container overall drawing		Dwg	X	X		X
				5 Pack DHLW disposal container outer barrier drawing		Dwg	X	X		X
				5 Pack DHLW disposal container inner barrier drawing		Dwg	X	X		X

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							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.3.3 Cont'd	TR233FB3 Cont'd	WP233730 Cont'd		5 Pack DHLW disposal container internals drawing		Dwg	X	X		X
	TR233FB2	WP233745	28-Feb-97	Identification of prior analyses/configurations needing refinement/update		Ltr Rept	X	X		
		WP233746	06-Jun-97	Internal WP Criticality 3rd Probabilistic Analysis		Anal	X	X		
		WP233753	16-Sep-97	WP Probabilistic Criticality Analysis	WP233755	Anal	X	X		
		WP233752	06-Jun-97	External Criticality 2nd Probabilistic Analysis		Anal	X	X		
	TR233FB3	WP233756	31-Mar-97	Draft design sections for the non-fuel components waste container SDD		IOC	X			
				Draft design sections for the waste package supports SDD		IOC	X			
				Draft design sections for the UCF waste container SDD		IOC	X			
		WP233758	30-Sep-97	Final design sections for the non-fuel components waste container SDD		IOC	X			
				Final design sections for the UCF waste container SDD		IOC	X			
				Final design sections for the waste package supports SDD		IOC	X			
	TR233FB5	WP233712	30-Sep-97	Study of benefits of additional barriers and material selection recommendations		Ltr Rept	X			X
		WP233714	30-Sep-97	Engineering sketch package for additional barriers evaluations		IOC	X			X
	TR233FB6	WP233702	28-Mar-97	WP Support and Pier Static Analysis		Anal	X	X		
				WP Support and Pier Seismic/Vibration Loading Analysis		Anal	X	X		
				WP Support and Pier 21 PWR Drop Onto Support Analysis		Anal	X	X		
				Design Input sheets for WP support and pier design analyses		IOC	X			
				EBS Temperature Distributions Thermal Analysis		Anal	X	X		
				EBS Emplacement Scale Thermal Update Analysis		Anal	X	X		
				Design Input sheets for EBS thermal analyses analyses		IOC	X			
				Primary PWR Waste Package Thermal Analysis		Anal	X	X		
				Primary BWR Waste Package Thermal Analysis		Anal	X	X		

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							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.3.3 Cont'd	TR233FB6 Cont'd	WP233710	30-Sep-97	Engineering sketches for WP support and pier design analyses		IOC	X			X
				Engineering sketches for EBS thermal analyses		IOC	X			X
	TR233FB7	WP233A29	01-Jul-97	Secondary PWR Waste Package Thermal Analysis		Anal	X	X		
				Multiple WP Emplacement Scale Thermal Analysis		Anal	X	X		
	WP233A30	30-Sep-97		UCF WP Static Loads, Thermal Expansion Loads, and Internal Pressure Analysis		Anal	X	X		
				UCF Waste Package 2-meter Drop Analysis		Anal	X	X		
				WP Handling/Lifting Analysis		Anal	X	X		
				UCF WP Slap Down Related Events Analysis		Anal	X	X		
				UCF WP 21 PWR Response to Slap Down Analysis		Anal	X	X		
				Statement of WP residual stresses for welding		Ltr Rept	X	X		
				UCF WP Basket Assembly Analysis		Anal	X	X		
				Missile from Failure of Pressurized Component DBE Analysis		Anal	X	X		
	WP233A32	09-Apr-97		WP Design Basis Fuel Analysis		Anal	X	X		
				Waste Package Design Basis Fuel Analyses		Anal	X	X		
				UCF WP Criticality Analysis		Anal	X	X		
				UCF WP PWR, BWR and DHLW Source Term Analysis		Anal	X	X		
				WP Radiolysis /Shielding Analysis		Anal	X	X		
	WP233A34	09-Apr-97		Design input sheets for UCF WP slap down evaluations		IOC	X			
				Design Input sheets for primary and secondary WP thermal analyses analyses		IOC	X			
				Design input sheets for WP DBE static evaluations		IOC	X			
				Design input sheets for UCF WP static evaluations		IOC	X			
				Design input sheets for UCF WP drop evaluations		IOC	X			



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							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.3.3 Cont'd	TR233FB7 Cont'd	WP23A34 Cont'd		Design input sheets for UCF WP miscellaneous components evaluations		IOC	X			
		WP233A36	30-Sep-97	Engineering sketches for primary and secondary WP thermal analyses		IOC	X			
				Engineering sketches for UCF WP drop evaluations		IOC	X			
				Engineering sketches for UCF WP miscellaneous component evaluations		IOC	X			
				Engineering sketches for UCF WP slap down evaluations		IOC	X			
				Engineering sketches for UCF WP static evaluations		IOC	X			
				Engineering sketches for WP DBE evaluations		IOC	X			
	TR233FB8	WP233782	13-Dec-96	List of available computer codes acquired		IOC	X			
		WP233786	12-Mar-97	Consequence model algorithms & codes		Ltr Rept	X	X		
		WP233784	14-May-97	Criticality consequence model		Ltr Rept	X	X		
	TR233FB9	WP233784	04-Sep-97	Disposal Criticality Technical Report, Rev. 1	WP150A3	Tech Doc	X	X	X	
	TR233FBC	WP233780	19-Dec-96	Algorithms and codes for identifying critical configurations		Ltr Rept	X	X		
		WP233792	01-May-97	Probabilistic criticality methodology		Ltr Rept	X	X		
	TR233FBE	WP233A02	28-Mar-97	PWR CRC Reactivity Analysis		Anal	X	X		
				BWR CRC Isotopic Analysis		Anal	X	X		
				PWR Isotopic Concentration Analysis		Anal	X	X		
				BWR CRC Reactivity Analysis		Anal	X	X		
				BWR Isotopic Concentration Analysis		Anal	X	X		
				PWR CRC Isotopic Analysis		Anal	X	X		
		WP233A06	28-Mar-97	Results of benchmark critical evaluations		Tech Doc	X	X		
				Benchmark Critical Analysis		Anal	X	X		
		WP233A18	13-Dec-97	Summary of BWR CRC data		Tech Doc	X	X		

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							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.3.3 Cont'd	TR233FBE Cont'd	WP233A18 Cont'd		Summary of PWR CRC data		Tech Doc	X	X		
1.2.2.3.4	TR234FB1	WP234702	30-Sep-97	Cost estimates for disposal containers		IOC				X
				Cost estimates for pedestal and supports		IOC				X
				Cost estimate for closure weld equipment		IOC				X
	TR234FB2	WP234708	18-Dec-96	Closure weld Technical Guidelines Document		Tech Doc	X			
				TDPP for closure weld TGD		IOC	X			
		WP234715	24-Mar-97	Closure weld mockup for NDE testing		Hardware	X			
		WP234720	29-Aug-97	WP Closure Methods Report	WP234721	Tech Doc	X			
				TDPP for WP Closure Methods Report		IOC	X			
		WP234722	30-Dec-96	Weld equipment envelope		IOC	X			
		WP234724	30-Sep-97	Weld equipment envelope update		IOC	X			
	TR234FB3	WP234727	13-Dec-96	TDPP for NDE Technical Guidelines Document		IOC	X			
				NDE Technical Guidelines Document		Tech Doc	X			X
		WP234734	15-Sep-97	TDPP for WP NDE Methods Report		IOC	X			
				WP NDE Methods Report	WP234736	Tech Doc	X			X
	TR234FB4	WP234738	30-Sep-97	Package of 5 fabrication sketches		IOC	X			X
		WP234740	29-Aug-97	Fabrication Report		Ltr Rept	X			X
1.2.2.4.1	TR241FB2	WP035A3	08-Apr-97	Waste Forms Characteristics Report	WP035A3	Tech Doc	X	X		
		WP35A05	22-Jan-97	WFCR Rev 1 Draft to Performance. Assess.		Draft Rpt.		X		
		WP35A07	26-Feb-97	Draft WFCR Rev 1 to YMSCO for Review		Draft Rpt.		X		
	TR241FB4	WP08522	15-Nov-96	TGA Oxidation Data to Oxidation Models		IOC		X		
		WP08523	02-Dec-96	Input to Models, GENISIS		IOC		X		

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							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.4.1 Cont'd	TR241FB4 Cont'd	WP08524	02-Dec-96	TGA Oxidation Test Data to GENISIS		IOC		X		
		WP08525A	12-Dec-96	Oxidation Test WFCR Rev 1 Chapter		IOC		X		
		WP08527	12-Jun-97	TGA Oxidation Test Data to Oxidation Mod		IOC		X		
	TR241FB5	WP085301	15-Nov-96	SF Diss Flow Thru Data to Models		IOC		X		
		WP085302	02-Dec-96	SF Diss Flow Thru Test Data to GENISIS		IOC		X		
		WP085305	25-Jun-97	SF Diss Flow Thru Test Data to Models		IOC		X		
		WP085303A	20-Dec-96	SF Diss Flow Thru Test Chap to WFCR-R1		IOC		X		
	TR241FB8	WP0862A	13-Jun-97	Spent Fuel ATM Procurement Report	WP0862A	Ltr Report		X		
	TR241FB9	WP122401	12-Dec-96	Waste Form Model Chap to WFCR-R1		IOC		X		
		WP122403	25-Jun-97	Response Models Results to PA		IOC		X		
	TR241FBA	WP122201	15-Nov-96	Unsaturated SF Drip Data to Models		IOC		X		
		WP122202	13-Dec-96	Unsaturated SF Drip Test Data to GENISIS		IOC		X		
		WP122205	25-Jun-97	Unsaturated SF Drip Test Data to Models		IOC		X		
	TR241FBB	WP122101	15-Nov-96	Dry Bath Oxidation. Data to SF Oxidation Model		IOC		X		
		WP122102	16-Dec-96	Dry Bath Oxidation Data to GENISIS		IOC		X		
		WP122105	25-Jun-97	Dry Bath Oxidation Data to Oxidation Mod		IOC		X		
	TR241GB2	WP110A05	29-Jul-98	Provide WFCR Rev 2 Draft to Performance. Assess.		IOC		X		
		WP110A07	22-Sep-98	WFCR Rev 2 to YMSCO for Review		IOC		X		
		WP110A3	27-Oct-98	Waste Form Char. Report. Rev 2		IOC		X		
	TR241GB3	WP08567	23-Dec-97	Activity Plan		Tech. Doc.		X		
		WP08572A	21-May-98	SF C-14 Release Data to GENISIS		IOC		X		
		WP08574	31-Jul-98	SF C-14 Release Test Data Report/WFCR2		IOC		X		

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							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.4.1 Cont'd	TR241GB4	WP08529	29-May-98	TGA Oxidation Data to Oxidation Models		IOC		X		
		WP08534	30-Jun-98	TGA Oxidation Chapter to WFCR Rev 2		IOC		X		
	TR241GB5	WP085307	11-Jun-98	SF Diss Flow Thru Data to Models		IOC		X		
		WP085309	14-Jul-98	SF Diss Flow Thru Chapter to WFCR Rev 2		IOC		X		
		WP085311	11-Jun-98	SF Diss Flow Thru Test Data to Models		IOC		X		
	TR241GB6	WP08552	30-Sep-98	SF Hardware Release Test Report		Tech Doc		X		
	TR241GB8	WP08616	30-Jun-98	Letter Report to YMSCO	WP08616	Ltr report		X		
	TR241GB9	WP122406	31-Aug-98	Response Model to PA & WFCR-Rev 2		IOC		X		
	TR241GBA	WP122207	11-Jun-98	Unsaturated SF Drip Data to Models		IOC		X		
		WP122209	14-Jul-98	Drip Test Chapter to WFCR Rev 2		IOC		X		
		WP122211	14-Oct-98	Unsaturated SF Drip test Data to Models		IOC		X		
	TR241GBB	WP122107	11-Jun-98	Dry Bath Data to Oxidation Models		IOC		X		
		WP122109	14-Jul-98	Dry Bath Oxidation Chap to WFCR Rev 2		IOC		X		
		WP122111	30-Sep-98	Dry Bath Data to Oxidation Models		IOC		X		
	TR241GBC	WP241800	30-Jan-98	Activity Plan		Tech Doc		X		
1.2.2.4.2	TR242FB1	WP085600	31-Jan-97	Activity Plan		Tech Doc		X		
	TR242FB2	WP122301	15-Nov-96	HLWG Drip Data to Models		IOC		X		
		WP122302	02-Dec-96	Unsaturated HLWG Drip Test Data to GENISIS		IOC		X		
		WP122307	12-Jun-97	HLWG Drip Test Data to Models		IOC		X		
	TR242FB3	WP085101	12-Dec-96	HWG Dissolution Rate Model Chap to WFCR-R1		IOC		X		
		WP085103	13-Jun-97	HWG Dissolution Rate Model Results to PA		IOC		X		
	TR242GB1	WP085620	30-Jun-98	HLWG Flow Thru Test Chap to WFCR Rev 2		IOC		X		

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WBS 1.2.2 Waste Package Products (Rev 0, 12/18/96)							VA COMPONENT					
							PRELIMINARY DESIGN CONCE					
							TSPA-VA		LA PLAN		ESTIMATE OF COST	
P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE						
1.2.2.4.2 Cont'd	TR242GB1 Cont'd	WP085625	29-Jan-89	HLWG Flow Thru Test Data to Models		IOC		X				
		WP085630	30-Nov-88	Data to Model		IOC		X				
		WP085631	29-Dec-88	Data to GENESIS		IOC		X				
	TR242GB2	WP122309	09-Apr-88	HLWG Drip Test Chapter to WFCR Rev 2		IOC		X				
		WP122311	10-Jul-88	HLWG Drip Test Data to Models		IOC		X				
		WP085105	29-Jun-88	HWG Dissolution Rate Model Results/WFCR-R2		IOC		X				
	TR242GB3	WP085106	29-Jun-88	HWG Dissolution Rate Model Results to PA		IOC		X				
	1.2.2.5.1	TR251FB1	WP26708	16-Jan-87	Statement of Initiation of Abiotic & Biotic MIC tests	WP26708	Ltr report		X			
			WP26709	31-Jul-87	MIC Data Input Update to PA		IOC		X			
			WP26713	16-Jan-87	MIC Data Input to PA		IOC		X			
TR251FB4		WP26305	29-Aug-87	Critical Pot. Measurement Update Data to PA		IOC		X				
		WP26309	15-Jan-87	Critical. Pot. Measurements Data to PA(1)		IOC		X				
		TR251FB5	WP26505	15-Jan-87	Thermogravimetric Anal. Data to PA		IOC		X			
		WP26506	30-Sep-87	Thermogravimetric Anal Update to PA		IOC		X				
		TR251FB7	WP26203	14-Jan-87	Critical Potential Test Data to PA		IOC		X			
		TR251FB9	WP26204	31-Jul-87	Diff Area Ratios Test Update Data to PA		IOC		X			
			WP015A3	28-Feb-87	Engineered Materials Characterization Report	WP015A3	Tech Doc		X			
	WP15A05		15-Jan-87	EMCR Rev 1 Draft to Performance Assess.		IOC		X				
	TR251FBA	WP15A10	01-Apr-87	EMCR Rev. 1		Draft Rpt		X				
		WP26402	10-Feb-87	Statement of Initiation of controlled electrochemical potential tests	WP24602	Ltr Report		X				
		WP26403	30-Jun-87	Potential Control Data Update to PA		IOC		X				
		WP26404	16-Jan-87	Potential Control Data to PA		IOC		X				

## WBS 1.2.2 Waste Package Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.5.1 Cont'd	TR251FBB	WP60801	11-Aug-97	Startup 3B Tanks	WP60801	Ltr Report		X		
		WP60801A	30-Jul-97	Statement of initiation of LT galvanic corrosion testing	WP60801A	Ltr Report		X		
	TR251FBC	WP60703A	16-Jan-97	Letter Rep Initiation of Crack Growth Rate Testing	WP60703A	LTR		X		
		WP60705B	30-Jun-97	Data to PA		IOC		X		
	TR251FBE	WP60504	18-Jul-97	Crevice Corrosion Data to PA		IOC		X		
		WP60508	30-Sep-97	Prelim SCC/HE Model Info to EMCR-R2		IOC		X		
		WP60509	30-Sep-97	SCC/HE/Prelim. Galvanic Corrosion. Model Data to PA		IOC		X		
	TR251FBG	WP60103	31-Mar-97	1st Tanks 1st Specimen Results to PA		IOC		X		
		WP60107	30-May-97	1st Specimen (1st Tanks) Report to EMCR-R2		IOC		X		
		WP60116	08-Jul-97	Startup 2A Tanks	WP60116	LTR		X		
		WP60118	08-Jul-97	Startup 2B Tanks	WP60118	LTR		X		
	TR251FBH	WP61607	13-Jan-97	Initiation of Rel Humidity Chamber Corrosion Tests	WP61607	LTR		X		
		WP61613	30-Jul-97	1st Batch Report to PA		IOC		X		
	TR251FBK	WP26904	31-Jul-97	Data input to PA		IOC		X		
	TR251GB2	WP20A01	30-Oct-98	EMCR Rev 2 Prelim Draft		IOC		X		
		WP20A04	02-Dec-98	EMCR Rev 2 Draft to Performance. Assess.		IOC		X		
		WP27005	31-Aug-98	Input to EMCR-R2		IOC		X		
	TR251GB4	WP26303	31-Jul-98	Critical. Pot. Measurements Report. to EMCR-R2		IOC		X		
	TR251GB5	WP26511	30-Sep-98	Input to EMCR Rev. 2		IOC		X		
	TR251GB6	WP25810	30-Sep-98	Input to EMCR-R2 2		IOC		X		
	TR251GB7	WP25206	30-Sep-98	Input EMCR-R2		IOC		X		
		WP26209	29-Sep-98	Data to Model Activity		IOC		X		

## WBS 1.2.2 Waste Package Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.5.1 Cont'd	TR251GB8	WP25860	30-Sep-98	Results to EMCR Rev 2		IOC		X		
	TR251GBA	WP60908	31-Jul-98	Electrochemical Potential Report to EMCR-R2		IOC		X		
	TR251GBB	WP60810	05-Dec-97	3rd Tank/1st Batch Report to EMCR-R2		IOC		X		
	TR251GBC	WP60707	31-Aug-98	Self Loaded SCC Growth Report to EMCR-R2		IOC		X		
	TR251GBD	WP26826	30-Sep-98	Input to EMCR-R2		IOC		X		
		WP26829	04-Dec-97	Data to Performance Assessment		IOC		X		
		WP26831	30-Mar-98	Planning Input to Longer Term Testing		IOC		X		
		WP26833	30-Sep-98	Additional Input to Near Field environment		IOC		X		
	TR251GBE	WP60503	20-Jul-98	Preliminary Crevice Corrosion Update to EMCR-R2		IOC		X		
		WP60516	27-Jul-98	Preliminary Galvanic Corrosion Info to EMCR-R2		IOC		X		
		WP60518	27-Jul-98	Preliminary Galvanic Corrosion Info to PA		IOC		X		
		WP60524	30-Sep-98	MIC Model Info to EMCR-R2		IOC		X		
		WP60526	30-Sep-98	MIC Model Info to PA		IOC		X		
		WP60532	31-Aug-98	Phase Stability Model Update to EMCR-R2		IOC		X		
		WP60534	31-Aug-98	Phase Stability Model Update to PA		IOC		X		
		WP60538	30-Sep-98	Pitting Corrosion Model Update to EMCR-R3		IOC		X		
		WP60539	30-Sep-98	Pitting Corrosion Model Update to PA		IOC		X		
		WP60543	31-Aug-98	Oxidation/General Corrosion Update to EMCR-R2		IOC		X		
		WP60544	31-Aug-98	Oxidation/General Corrosion Model Update to PA		IOC		X		
	TR251GBG	WP60109	28-Sep-98	1st Tanks 2nd specimen Results to PA		IOC		X		
		WP60111	30-Jun-98	Analytical/Biological Feedback to NFE		IOC		X		
		WP60113	02-Dec-98	2nd Specimen (1st Tanks) Report to EMCR-R2		IOC		X		

## WBS 1.2.2 Waste Package Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.2.5.1 Cont'd	TR251GBG Cont'd	WP60126	22-May-98	Analytical/Biological Samples to NFE		IOC		X		
		WP60130	22-Jul-98	1st Batch (2nd Tanks) Report to EMCR-R2		IOC		X		
	TR251GBH	WP61609	03-Aug-98	2nd Batch Report for EMCR-R2		IOC		X		
	TR251GBK	WP26906	31-Aug-98	Input to EMCR-R2		IOC		X		
		WP26909	31-Aug-98	Input Conditions-Long Term Aging Tests		IOC		X		
	TR251FB1	WP61004	31-Jul-97	Prelim. Basket Material Performance. Model to PA & Design.		IOC		X		
1.2.2.5.2	TR252FB2	WP27210	15-Jan-97	ST Basket Materials Test Data to PA		IOC		X		
		WP27211	31-Jul-97	ST Basket Materials Test Data Update to PA		IOC		X		
	TR252GB1	WP61003	31-Jul-98	Input to EMCR-R2		IOC		X		
	TR252GB2	WP27209	30-Sep-98	Input to EMCR-R2		IOC		X		
1.2.2.5.5	TR255FB1	WP60404	30-Jun-97	Data Input to PA		IOC		X		
	TR255FB2	WP26809	29-Aug-97	Feedback to Near-Field Environment		IOC		X		
		WP26815	29-Aug-97	Data to Performance Assessment		IOC		X		
	TR255GB1	WP60408	30-Sep-98	Input to EMCR-R2		IOC		X		
	TR255GB2	WP26807	30-Sep-98	Input to EMCR-R2		IOC		X		
		WP26811	31-Dec-97	Planning Input to Longer Term Testing		IOC		X		
1.2.2.5.6	TR256FB1	WP60413	30-Jun-97	Data Input to PA		IOC		X		
	TR256FB2	WP60301	30-Jun-97	Into LA, Design		IOC		X		
		WP60315A	13-Jun-97	Ceramic Feasibility/Mech. Tests & Evaluation	WP60315A	Ltr. Rpt.		X		
	TR256GB1	WP60417	30-Apr-98	Inputs to PA, Design		IOC		X		
		WP60420	30-Sep-98	Input to EMCR-R2		IOC		X		
	TR256GB2	WP60320A	31-Jul-98	Input to EMCR Rev 2		IOC		X		



## **APPENDIX D**

### **REPOSITORY SURFACE AND SUBSURFACE PRODUCTS**

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 D. Stahl. For suggested changes to the contents, contact A. Segrest.

## **REPOSITORY SURFACE AND SUBSURFACE PRODUCTS**

A list of products to be developed by the Repository Surface and Subsurface Products organization is provided. The planning and summary account number, summary account number, work breakdown structure, and activity number are provided for each product. If the product is part of a deliverable, the deliverable number is provided. The product type and the estimated end date are also provided. If the product is directly related to any of the four VA components, that information is also provided.

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.2	TR42FA6	RP100702	31-Dec-96	VA Design & Review Plan	RP120MG1	Tech Doc	X	X		X
			30-Sep-97	Draft LA Design & Review Plan	RP120MG2	Tech Doc			X	
	TR42FB3	RP2402D1	05-Nov-97	Design Guide Plan		Plan				
		RP2402D2	29-May-97	Source Terms Design Guide	RP120MBH	Guides	X			
		RP2402D4	30-Sep-97	Remote Operations Design Guide	RP120MBH	Guides	X			
	TR42FB4	RP2405B1	31-Mar-97	Input to WAST, Quantity, Mix/Thruput SE200A		Input	X			
		RP2405B2	31-Mar-97	Input to Support Retrieval Strategy, SE502		Input	X			
		RP2405B3	07-Apr-97	Input to Seals Closure, SE506		Input	X			
		RP2405B4	30-Sep-97	Input to S&S Requirements, SE730		Input	X			
		RP2405B5	30-Sep-97	Input to Waste Package Size, SE460		Input	X			
		RP2405B6	30-Sep-97	Input to Waste Generated (Disp.), SE436		Input	X			
		RP2405B7	25-Jul-97	Input to Test & Evaluation Plan, SE 504		Input	X			
		RP2405B8	30-Sep-97	Input to Perform. Confirmation, SE050B		Input	X			
	TR42FB5	RP120700	15-Jul-97	Radiation Design Guide	RP120M3H	DG	X			
		RP120710	30-Sep-97	Drift Design Guide.	RP120M3H	DG	X			
		RP120715	30-Sep-97	Ground Control SDD		Tech Doc	X			
				EBS SDD		Tech Doc	X			
				SS HVAC SDD		Tech Doc	X			
				WP Handling SDD		Tech Doc	X			
				PC Monitoring SDD		Tech Doc	X			
				Seal System SDD		Tech Doc	X			
				SS Repository Area SDD		Tech Doc	X			

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.2 Cont'd	TR42FB5 Cont'd	RP120715 Cont'd		Subsurface Accesses SDD		Tech Doc	X			
				Retrieval System SDD		Tech Doc	X			
				Backfill Emplacement SDD		Tech Doc	X			
				SS Electrical Power Distribution SDD		Tech Doc	X			
				SS Fire Suppression SDD		Tech Doc	X			
				SS Radiation Monitoring SDD		Tech Doc	X			
				Excavation/Muck Handling SDD		Tech Doc	X			
1.2.4.6	TR46FB2	RP2403A1	14-Jun-97	Space Allocation Analysis Input		Space	X			
		RP2403A2	29-Jan-97	System Configuration Analysis/ Model	RP243AMA	Anal	X			
		RP2403A2	29-Jan-97	Qualification of Witness		V&V	X			
		RP2403A3	30-May-97	Waste Handling Overview	RP243AMB	Dwg	X			X
				Carrier Unloading & Cask Preparation	RP243AMB	Dwg	X			X
				DPC Removal and Opening	RP243AMB	Dwg	X			X
				Spent Fuel Assembly Handling	RP243AMB	Dwg	X			X
				Waste Canister Handling	RP243AMB	Dwg	X			X
				Unloaded Cask Prep & Carrier Loading	RP243AMB	Dwg	X			X
				DC Welding and Transfer	RP243AMB	Dwg	X			X
				Equipment Drawings (4)			X			
		RP2403A3	15-May-97	Horizontalizer			X			
				DPC Delidding System			X			
				Fuel Transfer System			X			
				Fuel Staging Rack			X			

# WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.6 Cont'd	TR246FB2 Cont'd	RP2403A3 Cont'd		Space Allocation Analysis Input		Input	X			
		RP2403A3	30-May-97	Recovery Operations		Anal	X			
				Fuel Transfer System		Anal	X			
				DPC Transfer & Opening		Anal	X			
		RP2403A4	30-May-97	Cask Handling Operations	RP243AMB	Dwg	X			X
				Cask Decontamination	RP243AMB		X			X
				Pool Purification	RP243AMB	Dwg	X			X
				Cask Cleaning	RP243AMB	Dwg	X			X
				Space Allocation Analysis Input		Anal	X			
		RP2403A5	01-Jul-97	Liquid LLW Processing (11 Sheets)	RP243AMC	Dwg	X			X
				Liquid and Solid LLW Material Balance	RP243AMC	Dwg	X			X
				DPC Processing (2 sheets)	RP243AMC	Dwg	X			
				Solid LLW Processing (8 sheets)	RP243AMC	Dwg	X			X
				Space Allocation Analysis Input		Dwg	X			X
				Secondary Waste Generation Analysis		Anal	X			
				LLW Treatment Systems			X			
				DPC Disposition System		Anal	X			
		RP2403A6	11-Jul-97	Functional Relationship Diagram		Anal	X			
				WHO EL. 100+0		Drft GAs	X			
				WHO EL. 116+0		Drft GAs	X			
				WHO EL. 130 +0		Drft GAs	X			
				WHO EL. 143 + 0		Drft GAs	X			

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.6 Cont'd	TR246FB2 Cont'd	RP2403A8 Cont'd		WHO EL. 160 + 0		Drft GAs	X			
				WHO EL. 100 + 0		Drft GAs	X			
				WHO EL. 115 +0		Drft GAs	X			
				WHO (2 sheets)		Drft GAs	X			
				WTO		Drft GAs	X			
				WHO		Drft GAs	X			
				WTO		Drft GAs	X			
				WHO		Drft GAs	X			
				WTO		Drft GAs	X			
				WHO		Drft GAs	X			
				WTO		Drft GAs	X			
		RP2403A7	30-Sep-97	WHO		Anal	X			
				WTO		Anal	X			
				WHO (2 sheets)		Dwg	X			
				WTO		Dwg	X			
				WHO (2 sheets)		Dwg	X			
				WTO		Dwg	X			
		RP2403A8	30-Sep-97	Composite Key	'RP243AMD	Dwg	X			X
				Carrier Bay/HVAC Equipment Room	'RP243AMD	Dwg	X			X
				Primary Confinement Supply Air	'RP243AMD	Dwg	X			X
				Secondary & Tertiary Confinement Supply Air	'RP243AMD	Dwg	X			X
				Primary Confinement Areas	'RP243AMD	Dwg	X			X
				Secondary & Tertiary Area (EL. 100+0)	'RP243AMD	Dwg	X			X
				Secondary & Tertiary Area (EL. 116+0)	'RP243AMD	Dwg	X			X

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

			FY97												FY98											
No	POC (Name/Phone)	Date	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
1	R. Saunders/5-4380	10/01/97 - 01/31/98																								
2	P. Gehner/4-7503	11/08/96 - 01/10/97																								
3	F. Bierich/5-9686	10/01/96 - 07/14/97																								
4	R. Saunders/4-1865	10/15/96 - 02/11/97																								
5	F. Bierich/5-9686	10/01/96 - 06/13/97																								
6	R. Saunders/4-1865	10/01/96 - 04/30/97																								
7	R. Saunders/4-1865	11/01/96 - 02/28/97																								
8	R. Nolting/4-1833	10/01/96 - 07/31/97																								
9	D. McAfee/5-9656	05/01/97 - 09/30/97																								
10	M. Haas/5-9631	10/01/96 - 09/30/97																								
11	F. Bierich/5-9686	10/01/97 - 02/27/98																								
12	F. Bierich/5-9686	12/15/97 - 09/30/98																								
13	F. Bierich/5-9686	12/01/97 - 05/29/98																								

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.

CURRENT PLANNING  
WORK CONTINUING



**Key VA Issue  
Resolution Plan**

1. **Issue #7:** Confirmation of High Volume and Long Period Waste Handling Capability and DBE Consequence (wet vs dry)

March 11, 1997

Rev. #01A

2. **Assigned to:** M&O Responsible Individual: Steven Meyers  
DOE Contact: Bernie Verna

Phone: 5-4392

Phone: 4-1374

  
M&O Manager

 3-12-97  
M&O Responsible Individual

3. **Issue Description:**

The repository will annually package about 11,000 commercial spent nuclear fuel assemblies into about 420 large disposal containers. Fuel handling operations at commercial reactors are conducted wet, using pools and readily accessible equipment. It is expected that for the repository the disposal containers will not be loaded in a pool because the presence of water negatively impacts the design of the waste packages. As a result, the waste handling operations are expected to be performed dry in remotely operated hot cells. The technical challenge is designing reliable systems to remotely handle large containers (e.g., 60 tons), and large numbers of spent fuel assemblies.

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

The ACD included dry handling systems to transfer spent fuel assemblies from shipping casks to disposal containers. In this design, 98% of the assemblies remained within MPCs. The VA design will be based on transferring 100% fuel as individual uncanistered assemblies. This will require significantly more transfer operations and higher secondary waste generation rates than in the ACD. Design analyses have not been prepared to establish the type of handling system (i.e., wet or dry) or number of operating lines/stations; demonstrate that the dry design will be reliable, available, and maintainable; or determine the quantity of low-level waste generated from equipment/cell decontamination operations.

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

Resolution of this issue could significantly impact the size, configuration and operations of the waste handling and secondary waste treatment facilities. VA effects are described in Paragraph 6.

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

TSPA is not impacted by this issue. The MGDS cost estimate may be significantly impacted by this issue as the waste handling and secondary waste treatment facilities are cost drivers. LA planning is impacted because the schedule may need to accommodate a dry handling prototype program. This program would be executed during detail design and would be required to lower program risk. The key products required to resolve this issue are design analyses (see Paragraph 7) and drawings (flow, equipment and general arrangement).

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

Design analyses will be performed in to establish a defensible basis for the waste handling and secondary waste treatment operations design. A key analysis in early FY97 will select the type of waste handling systems, establish the number operating lines, and size of the in-process staging areas. This analysis will be based on the Revision 4 of the CDA, which assumes: the repository must be capable of emplacing 70,000 MTHM of waste over 24 years starting in 2010, 100% of the

commercial SNF will at times be received as uncanistered fuel or in canisters that are not suitable for disposal, at other times a significant portion of the commercial SNF may be received in disposable canisters, other wastes (will be received in disposable canisters. Other key assumptions used for this analysis include: waste will be received in approximately the same order it is emplaced, empty DPCs will be packaged and shipped off-site for disposal/recycle, and uniformity of waste shipments will be similar to what is found with commercial transportation networks. A waste mix and throughput study will be conducted in mid FY97 by systems to confirm or update the assumptions related to waste receipt form and schedule. The impact of this study on the waste handling facility design will be assessed and if necessary updated. Other key analyses will address failed equipment recovery strategies, waste handling systems design, space allocation, and secondary waste generation and treatment.

This issue will be closed when general arrangements that describe the selected concept are issued.

CURRENT PLANNING  
WORK CONTINUING

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

No.	Title	Description	Summary Account #
1	Finalize Waste Handling Concept (RP2403A2)	Establish the basic concept for the waste handling operations including technology selections, the number of operating trains and capacity of in-process staging areas. Analysis deliverable is due January 30, 1997.	TR46FB2
2	Size Waste Handling Equipment/Areas (RP2403A3)	Prepare flow diagrams, selected equipment drawings, preliminary equipment layout drawings, supporting design analyses, and design description for the waste handling systems. Flow diagram deliverable is due May 30, 1977.	TR46FB2
3	Size Waste Treatment Equipment/Areas (RP2403A5)	Determine the quantity of secondary waste generated, and adjust/add features to minimize waste and the spread of contamination. Flow diagram deliverable with waste rates is due June 30, 1997.	TR46FB2
4	Develop Initial Integrated Facility Layout (RP2403A6)	Develop a preliminary general layout of the Waste Handling Building based on the space requirements and design concept.	TR46FB2
5	Complete Throughput Study (SE200M3)	Confirm or update the Revision 4 of the CDAs related to waste receipt form and schedule.	TR15FB2
6	Provide RAM Support to SRA/Design (SE724700)	Provide Reliability, Availability, and Maintainability (RAM) data and review input.	TR18FA1
7	Prepare Space Summaries and General Arrangements (RP2403A9)	Update the general arrangements, to incorporate revised support area room sizes, structural member sizes, HVAC space requirement, and the results of a RAMI review. GA deliverable is due September 30, 1997.	TR45FB2
8	Complete Design Descriptions (RP2403AA)	Prepare input to SDDs and a letter report that outlines the requirements for prototype testing.	TR46FB2
9	Prepare/Update Configuration Analyses (RP7402A1)	Prepare additional analyses to resolve lower tier issues that are required for LA and will provide additional credibility for VA.	TR46GB3
10	Provide RAM Support to SRA/Design (SE724A)	Provide additional RAMI data and review input.	TR18GA1

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

No	POC (Name/Phone)	Date	FY97												FY98											
			O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
1	Meyers/5-4392	10/12/96 - 01/30/97																								
2	Meyers/5-4392	11/18-96 - 04/11/97																								
3	Meyers/5-4392	04/14/97 - 06/13/97																								
4	Meyers/5-4392	06/16/97 - 07/11/97																								
5	Lev/5-4029	10/01/96 - 04/11/97																								
6	Robertson/4-7611	10/01/96 - 09/30/97																								
7	Meyers/5-4392	08/01/97 - 09/30/97																								
8	Meyers/5-4392	04/14/97 - 09/30/97																								
9	Meyers/5-4392	10/01/97 - 03/31/98																								
10	Robertson/4-7611	10/01/97 - 07/26/99																								

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.

CURRENT PLANNING -  
WORK CONTINUING

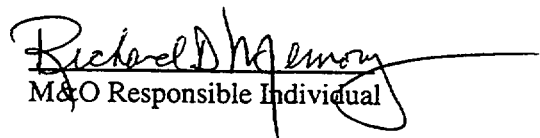
CURRENT PLANNING -  
WORK CONTINUING

**Key VA Issue  
Resolution Plan**

1. **Issue #8: Disposal of Site Generated Waste** November 6, 1996 Rev. #01A

2. **Assigned to:** **M&O Responsible Individual:** Richard Memory **Phone:** 4-7247  
**DOE Contact:** Bernie Verna **Phone:** 4-1374

  
M&O Manager

  
M&O Responsible Individual

3. **Issue Description:**

This issue deals with the types and quantities of waste expected to be generated during construction and operation of the repository as well as with the disposal location (on-site vs. off-site) of this waste. A feasible plan for disposing of the site-generated waste should be in place by the time of the VA.

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

A draft of REV 03 of the Civilian Radioactive Waste Management System Requirements Document, paragraph 3.2.2 D states that "site generated hazardous, low-level radioactive and mixed waste shall be transported to government-approved off-set facilities for disposal." However, at this time, the off-site location for the site generated waste has not been identified. This issue requires identification of feasible off-site disposal locations for this waste or identification of feasible on-site disposal options. Depending on the quantity of waste generated this issue could have significant impacts on cost, schedule, and/or repository licensing strategy. The resolution of this issue will require working with the licensing, PA, and environmental, safety, and health organizations. The resolution of this issue will support both VA and LA.

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

This issue is directly related to the cost, license application plan, and design portions of the VA. This is a question that must have a clear plan for resolution by the VA in order to provide closure to this unanswered question.

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

The amount of waste generated and the disposal location both have the potential to significantly impact the MGDS cost. Cost may be impacted by waste packaging requirements as well as disposal and/or transportation requirements. If the waste is disposed of on-site, then a new section of the LA plan may be required to address LLW disposal regulations.

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

Identify the types and quantify the amounts of wastes that will potentially be generated at the repository for several different waste stream scenarios, identify options for disposal of site-generated waste for each of the scenarios, and evaluating these scenarios in terms of licensing requirements, costs, local government review requirements, schedule, etc. Criteria for resolution closure sufficient for VA will identify viable options for the disposal of the site-generated waste and produce a plan for implementation of those options. This will be completed by October 1997.

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

No.	Title	Description	Summary Account #
1	Identify and quantify the types of wastes generated	Using the range of potential waste streams, including anticipated DPCs, identify the types of wastes generated, the quantities and its sources.	Waste Gen Study 97
2	Identify the Options available for disposal	Determine where the waste may be disposed, i.e. on-site, at the NTS, another DOE facility, or a commercial (non DOE) facility. Assess the likelihood of the availability of the off-site disposal options.	Waste Gen Study
3	Identify the regulatory issues associated with each waste type and disposal option	NRC regulates the disposal of LLW on-site per 10CFR60.135(d). DOE regulates the disposal LLW generated at DOE sites. The states are involved in the regulation of mixed and hazardous waste disposal. Document the roles and responsibilities of the potential regulators associated with each disposal option	Waste Gen Study
4	Assess Performance Assessment impacts	Given the potential interaction between the organics in the LLW, mixed, and hazardous wastes and the additional sources of RNs or chemical pollutants determine the feasibility and complexity of developing reasonable assurance arguments for each of the disposal options.	Waste Gen Study
5	Consider Impacts on the Repository EIS	Determine the impacts, in terms of cost, schedule, and content, on the repository EIS.	Waste Gen Study
6	Assess the costs of the disposal options	Determine costs to the repository and to society associated with each of the disposal options.	Waste Gen Study
7	Develop a recommendation	Utilize the information generated to recommend a viable approach for disposal of site generated wastes	Waste Gen Study
8	Develop a plan for implementation	Develop a plan which demonstrate the feasibility of the option(s) recommended.	Waste Gen Plan 98



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

			FY97												FY98											
No	POC (Name/Phone)	Date	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
1	Kal Bhattacharrya	04/15/97 - 05/15/97																								
2	R. Memory	04/15/97 - 05/30/97																								
3	Ken Ashe	06/01/97 - 06/30/97																								
4	Bob Andrews	05/01/97 - 06/30/97																								
5	Ed Mc Cann (Environmental)	07/01/97 - 07/30/97																								
6	Kal Bhattacharrya	06/01/97 - 07/30/97																								
7	R. Memory	08/01/97 - 09/30/97																								
8	R. Memory	10/01/97 - 11/30/97																								

10. **Describe a process that will be used to measure performance towards closure:**  
Performance will be measured by tracking to the schedule identified in item #9 above. As each of the activities is completed the issue will be progressing toward closure sufficient for VA.
11. **Describe how status will be reported during the process of closing this issue.**  
Status will be reported monthly and as each activity is scheduled for completion. A deliverable document will be produced documenting the outcome of this issue resolution activity at the end of FY97.

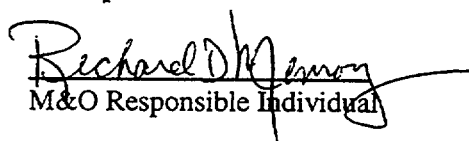
CURRENT PLANNING -  
WORK CONTINUING

**Key VA Issue  
Resolution Plan**

1. **Issue #9:** Strategy for Mapping Repository Subsurface      December 18, 1996      Rev. #01A

2. **Assigned to:**      **M&O Responsible Individual:** Richard Memory      **Phone:** 4-7247  
                         **DOE Contact:** William Boyle      **Phone:** 4-5506

  
\_\_\_\_\_  
M&O Manager

  
\_\_\_\_\_  
M&O Responsible Individual

3. **Issue Description:**

The extent of geologic mapping of emplacement drift wall surfaces required for performance confirmation activities or for other reasons could significantly impact the design and emplacement method of the emplacement drift ground support system. At this time the amount of drift wall mapping required to satisfy scientific needs, repository construction needs, and regulatory needs has not been determined.

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

The Performance Confirmation Concepts Study made recommendations for the type of parameters that need to be collected during emplacement drift construction and that must be acquired through subsurface geologic mapping. The study recommended a requirement that states "Any ground support system (i.e., shotcrete or concrete) that covers the emplacement drift rock wall surface shall not be installed until after any necessary rock mapping is complete." The amount of mapping that is necessary has yet to be specified. A currently favored method for providing ground support is with the use of a reinforced precast concrete lining. This lining is most economically emplaced immediately after the drift is excavated, allowing no time for geologically mapping the drift walls. If a large portion of the drift walls must be mapped then the advantages of this type of ground support system is reduced and the overall cost of the ground support system could be significantly increased. Interfaces: Resolution of the mapping issue will require interfacing with the scientific programs, licensing, and Performance Assessment organizations.

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

The amount of mapping that is necessary prior to emplacement of the ground support system could affect the ground control system selected, its cost, its installation, and overall effectiveness. This unresolved issue could have significant impact on the VA MGDS cost estimate and as well as on the VA LA plan.

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

This issue ties directly to cost and LA planning, however, it is not expected to affect the post closure performance of the repository.

7. **Describe the strategy and criteria for achieving a degree of closure sufficient for VA:**  
The strategy for achieving closure of this issue will be to identify the parameters and features that require observation through geologic mapping. In addition, the exact use to be made of this information will be identified in order to facilitate determination of the incremental value of mapping anywhere from a few drift walls, several drift walls, most of the drift walls, to all of the emplacement drift walls. Finally, a licensing analysis will be conducted in order to identify the anticipated regulatory based mapping requirements. The technical and programmatic requirements will then be considered in the development of a mapping implementation strategy. Closure of the issue deemed sufficient for VA will be the identification of the minimum amount of mapping required to support engineering, scientific, and licensing needs.

CURRENT PLANNING -  
WORK CONTINUING

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

No.	Title	Description	Summary Account #
1	Identify Data Needs To Be Acquired by Mapping (SE050710)	Identify those parameters or features which are needed that can be acquired through mapping. Requests for data needs from the following affected organizations will be solicited: Repository Subsurface Design, Site Evaluation, Performance Assessment, and Regulatory and Licensing.	TR15FB1, TR39BFA1D, TR523FA1, TR541FA2
2	Perform a Regulatory and Licensing Analysis to Develop Mapping Design Inputs	An regulatory and licensing analysis will be performed and documented to establish a regulatory and licensing position on mapping requirements as input to a broader analysis considering design, site evaluations, and model verification and performance confirmation.	TR523FA1
3	Establish Current Level of Significance or Confidence in Data Needs (SE050705)	Documentation will be identified or referenced which provide the existing information on the parameters or features to be acquire by mapping. Summaries this information on the parameters and features will be established. An assessment of the significance or level of confidence in the data will be developed.	TR15FB1, TR39BFA1D, TR523FA1, TR541FA2
4	Identify Assumptions and/or Establish Expected Values for Data Needed (SE050705)	Current assumptions or predicted distributions (e.g., expected values and uncertainties) used in design, process modeling, or performance assessments related to the parameters and features will be documented.	TR15FB1, TR39BFA1D, TR523FA1, TR541FA2
5	Establish Confidence Level Needed for Data (SE050710)	A level of confidence in the assumptions or predicted parameter distributions will be established based on sensitivity of the parameters to design or performance.	TR15FB1, TR39BFA1D, TR523FA1, TR541FA2
6	Develop Minimum Mapping Requirements (SE050710)	Establish the minimum mapping requirements based on the current information, assumptions, predictions, and confidence level needed. Consideration of the regulatory and licensing input will be assess to determine the driving requirements.	TR15FB1
7	Develop Mapping Strategy (SE050710)	Develop a strategy for mapping to meet the minimum mapping requirements.	TR15FB1, TR39BFA1D, TR47FB3, TR523FA1, TR541FA2
8	Document Analysis (SE050710)	Document the results.	TR15FB1

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

			FY97												FY98											
No	POC (Name/Phone)	Date	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
1	Brent Thomson/4-7708	03/01/97 - 03/14/97																								
2	Ken Ashe/5-5563	03/01/97 - 03/14/97																								
3	Brent Thomson/4-7708	03/07/97 - 03/31/97																								
4	Brent Thomson/4-7708	03/15/97 - 04/07/97																								
5	Brent Thomson/4-7708	03/15/97 - 04/07/97																								
6	Brent Thomson/4-7708	04/07/97 - 04/21/97																								
7	Brent Thomson/4-7708	04/07/97 - 04/21/97																								
8	Brent Thomson/4-7708	04/15/97 - 04/30/97																								

10. **Describe a process that will be used to measure performance towards closure:**  
Performance will be measured by tracking to the schedule identified in item #9 above. As each of the activities is completed the issue will be progressing toward closure sufficient for VA.
11. **Describe how status will be reported during the process of closing this issue:**  
Status will be reported monthly and as each activity is scheduled for completion. The results of the analysis will be captured in a deliverable document will be produced documenting the outcome of this issue resolution activity at the end of FY97.

**CURRENT PLANNING -  
WORK CONTINUING**

CURRENT PLANNING  
WORK CONTINUING



**Key VA Issue  
Resolution Plan**

1. **Issue #10:** Post Closure Performance Standard November 21, 1996 Rev. #01A

2. **Assigned to:** M&O Responsible Individual: Hemi Kalia Phone: 5-4734  
DOE Contact: Abe VanLuik Phone: 4-1424

  
M&O Manager

  
M&O Responsible Individual

3. **Issue Description:**

Final post closure standards are not available to the Yucca Mountain project. The VA design is based on interim DOE post closure guidance. The DOE guidance may or may not be consistent with the standards to be issued in the future by the EPA. Because of this the VA design and the TSPA are being developed at risk.

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

For the VA design, the Yucca Mountain Project (YMP) is using the Department of Energy (DOE) recommended interim guidance for the postclosure standards. No NRC approved guidelines are available to the DOE. The DOE guidance is a 10,000 year peak dose standard measured against a critical group living 20 to 30 km down gradient from the Yucca Mountain. The guidance also requires that the engineered measures that have the potential of significantly reducing the peak dose, and could be implemented at reasonable cost, be evaluated for possible inclusion in the reference design. Therefore, the VA design is required to carry options for some segments of the design. The VA design should interface with the Performance Assessment organizations, Regulatory and Licensing and Systems engineering.

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

Because of the lack of final post closure standards, the MGDS design, by necessity, will be based on the DOE Interim guidance. Furthermore the VA design will be required to carry alternate design options for segments of the design most vulnerable to the post closure standards. Any significant change in standards such as from dose to risk base or from 10,000 years to whenever peak occurs or change in location of the focus group from 20-30 km to 5 km such as at the WIPP site could have a significant impact on the VA design.

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

The TSPA must evaluate the VA design and its performance consistent with the EPA issued post closure standards. However, since the formal published standards are not available, the TSPA will be based on the interim DOE guidance. Significant deviation from this guidance could result in major impact on the costs. It should have no impact on the LA design. It is assumed that the postclosure standards will have been published by the time the LA design is started.

Depending on when the postclosure standards are published by the accepted by the EPA and adapted by the NRC and they differ from the DOE guidance the impact on the VA may or may not be significant. The overall VA schedule may or may not be impacted. It will depend on the published standards. The MGDS cost estimates will be at risk. The measures required to satisfy the standards may impact the construction schedule for the repository and the emplacement duration thus impacting the overall MGDS costs.

The lack of standards may not impact the LA planning. It is expected that the standards will be published within FY 97. However, should the standard not be released before the LA design is initiated could have some impact on the LA planning.

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

Strategy: (1) DOE will continue discussions with the EPA and the NRC to ascertain the most likely date for the release of the post closure standards. These discussions will include the DOE interim guidance that the Project is currently using to get some response as to the acceptability of these standards; (2) the VA design and the PA will be kept apprised of any further developments as the DOE interactions with the EPA and the NRC on the standards, especially if they appear to be substantially different from the interim DOE guidance; (3) the DOE will incorporate into the CDA, as additional consideration, risk base standards and 5 km down stream focused group requirement for the purposes of evaluating their impact on the VA design; (4) to mitigate the impact of any deviation from the DOE guidance, the VA the design will include alternate design concepts for most impacted segments of the design.

Criteria for Closure. 1. Release of post closure standards by the EPA and acceptance of these standards by the NRC will close this issue. 2. In the interim include in the CDA as additional design requirements to consider risk based standard whenever peak occurs and focus group at 5 km down stream from the repository.

CURRENT PLANNING  
WORK CONTINUING

## **APPENDIX C**

### **WASTE PACKAGE DEVELOPMENT AND MATERIALS PRODUCTS**

**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 PRODUCTS

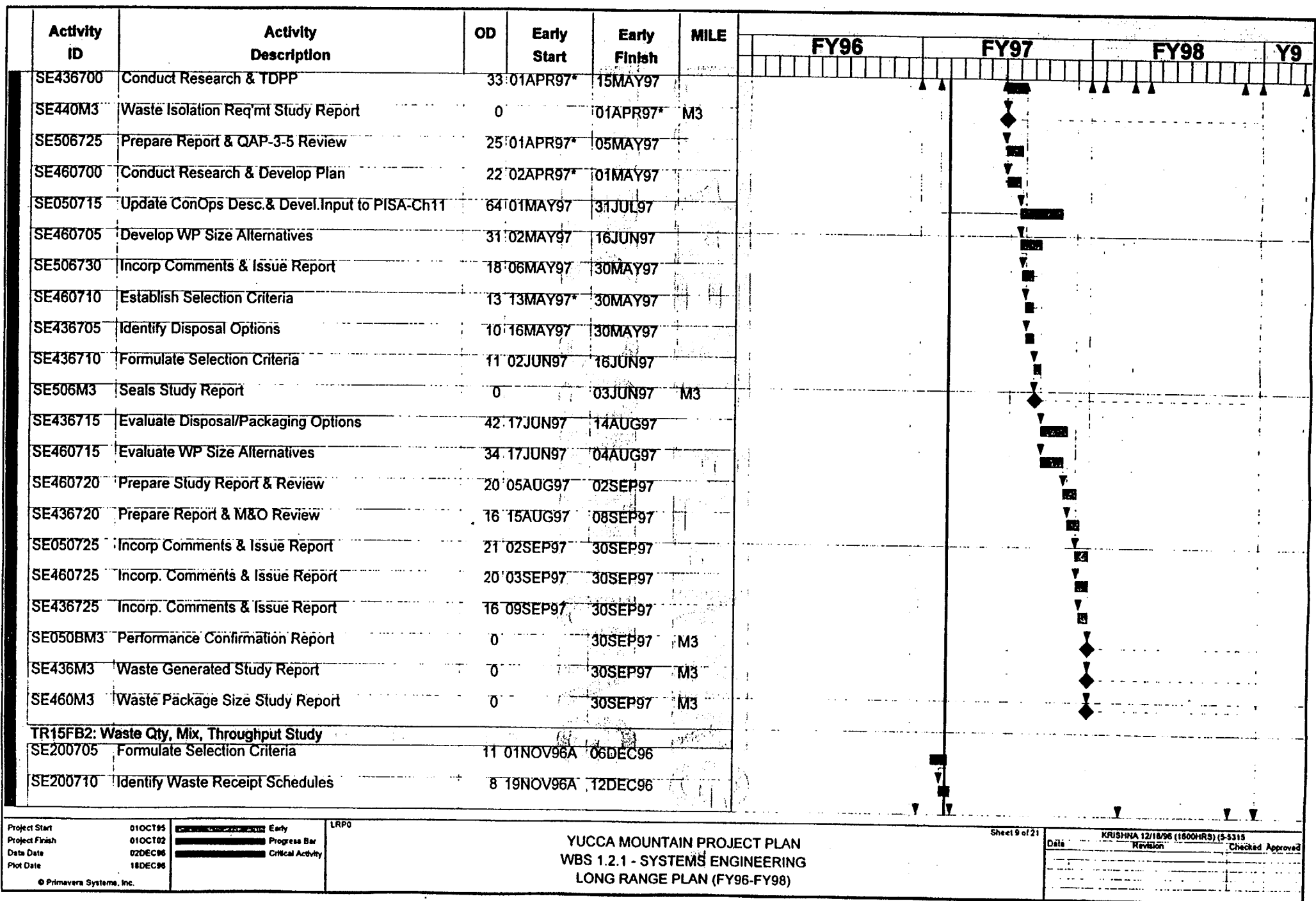
A list of products to be developed by the Waste Package Development and Materials Products organization is provided. The planning and summary account number, summary account number, work breakdown structure, and activity number are provided for each product. If the product is part of a deliverable, the deliverable number is provided. The product type and the estimated end date are also provided. If the product is directly related to any of the four VA components, that information is also provided.

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.6 Cont'd	TR246FB2 Cont'd	RP2403A8 Cont'd		Secondary & Tertiary Area (EL. 130+0)	'RP243AMD	Dwg	X			X
				Secondary & Tertiary Area (EL. 143+0)	'RP243AMD	Dwg	X			X
				HVAC Equipment Room	'RP243AMD	Dwg	X			X
				Primary Confinement Exhaust Air	'RP243AMD	Dwg	X			X
				Secondary & Tertiary Exhaust Air	'RP243AMD	Dwg	X			X
				HVAC Exhaust Stacks	'RP243AMD	Dwg	X			X
				Neutral Areas	'RP243AMD	Dwg	X			X
				Plan at EL. 100+0		Dwg	X			
				Plan at EL. 116+0		Dwg	X			
				Plan at EL. 130+0		Dwg	X			
				Plan at EL. 143+0		Dwg	X			
				Plan at EL. 160+0		Dwg	X			
				WHO		Anal	X			X
				WTO		Anal	X			X
				WHO		Anal	X			X
				WTO		Anal	X			X
		RP2403A9	11-Jul-97	Space Allocation Analysis		Anal	X			X
				WHO EL. 116+0	RP243AME	Final GAs	X			X
				WHO EL. 130+0	RP243AME	Final GAs	X			X
				WHO EL. 143+0	RP243AME	Final GAs	X			X
				WHO EL. 160+0	RP243AME	Final GAs	X			X
				WTO EL. 100+0	RP243AME	Final GAs	X			X

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.6 Cont'd	TR246FB2 Cont'd	RP2403A9 Cont'd		WTO EL. 115+0	RP243AME	Final GAs	X			X
				WHO (2 sheets)	RP243AME	Final GAs	X			X
				WTO	RP243AME	Final GAs	X			X
				WHO	RP243AME	Final GAs	X			X
				WTO	RP243AME	Final GAs	X			X
				WHO	RP243AME	Final GAs	X			X
				WTO	RP243AME	Final GAs	X			X
		RP2403AA	30-Sep-97	Waste Handling Prototype Study		Ltr	X			X
				Carrier Staging Shed		Input	X			
				Carrier Staging Shed Material Handling		Input	X			
				Waste Handling Facility		Input	X			
				Waste Handling Facility Ventilation		Input	X			
				Cask/Canister Handling		Input	X			
				Uncanistered Waste Transfer		Input	X			
				Canistered Waste Transfer		Input	X			
				Disposal Container Handling		Input	X			
				Waste Package Remediation		Input	X			
				Cask Maintenance Facility		Input	X			
				Cask Handling, Maintenance and Certification		Input	X			
				Cask Maintenance Facility Ventilation		Input	X			
				Radiological Waste Treatment Facility		Input	X			
				Site Generated Radiological Waste Handling		Input	X			



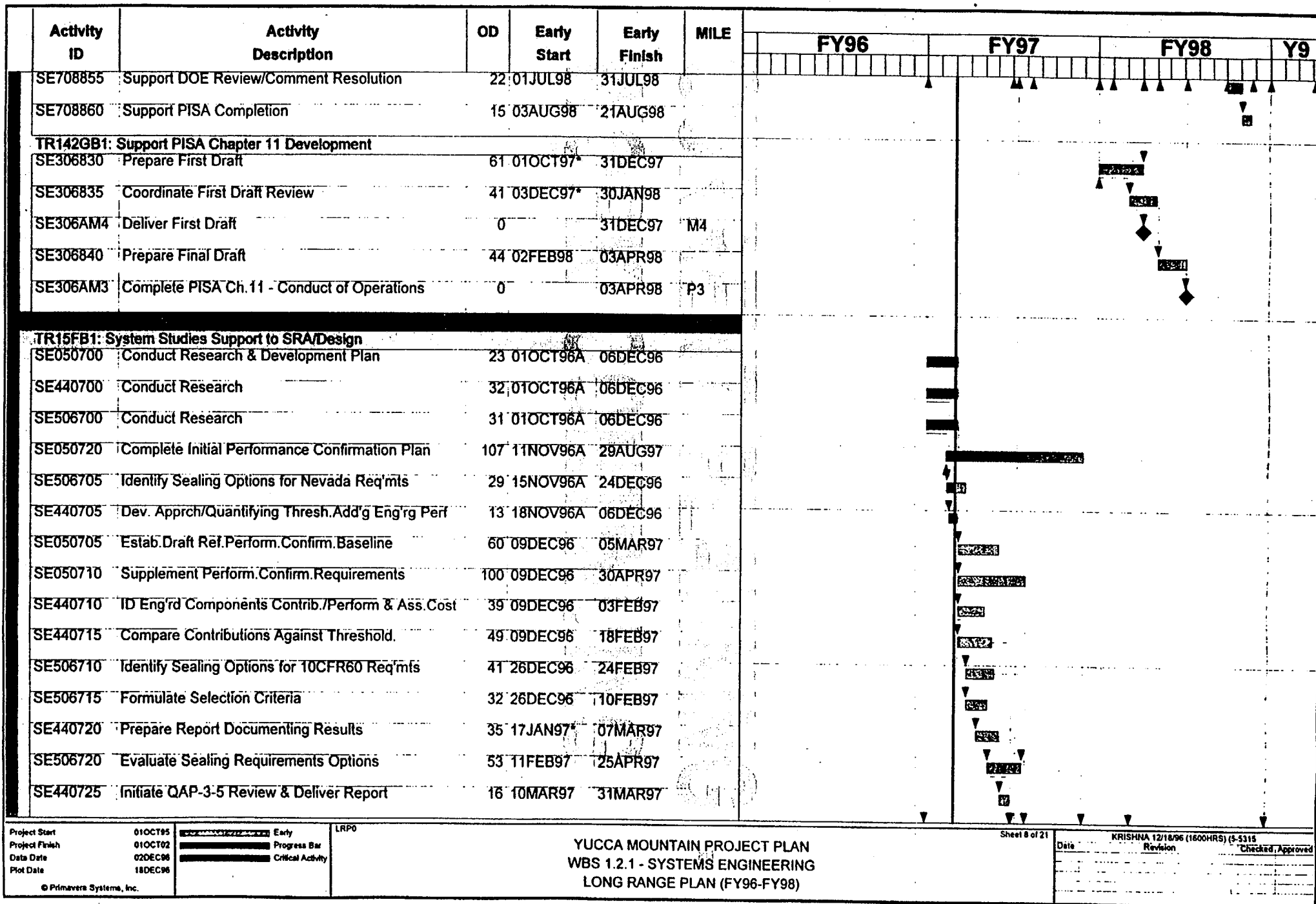
Project Start 01OCT95  
 Project Finish 01OCT02  
 Data Date 02DEC96  
 Plot Date 18DEC96

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

Sheet 9 of 21

KRISHNA 12/18/96 (1800HRS) (5-5318)  
 Revision  
 Checked Approved



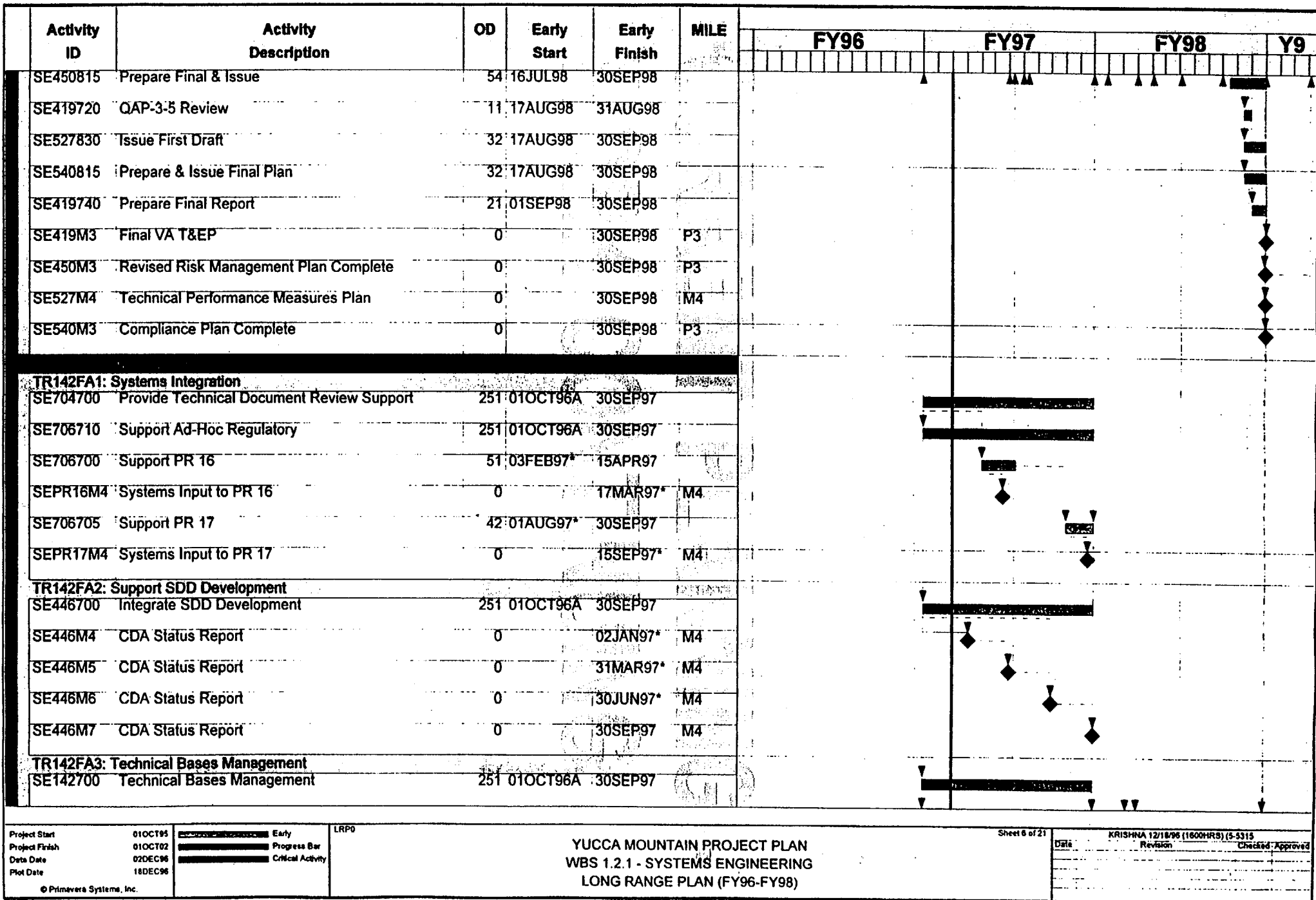


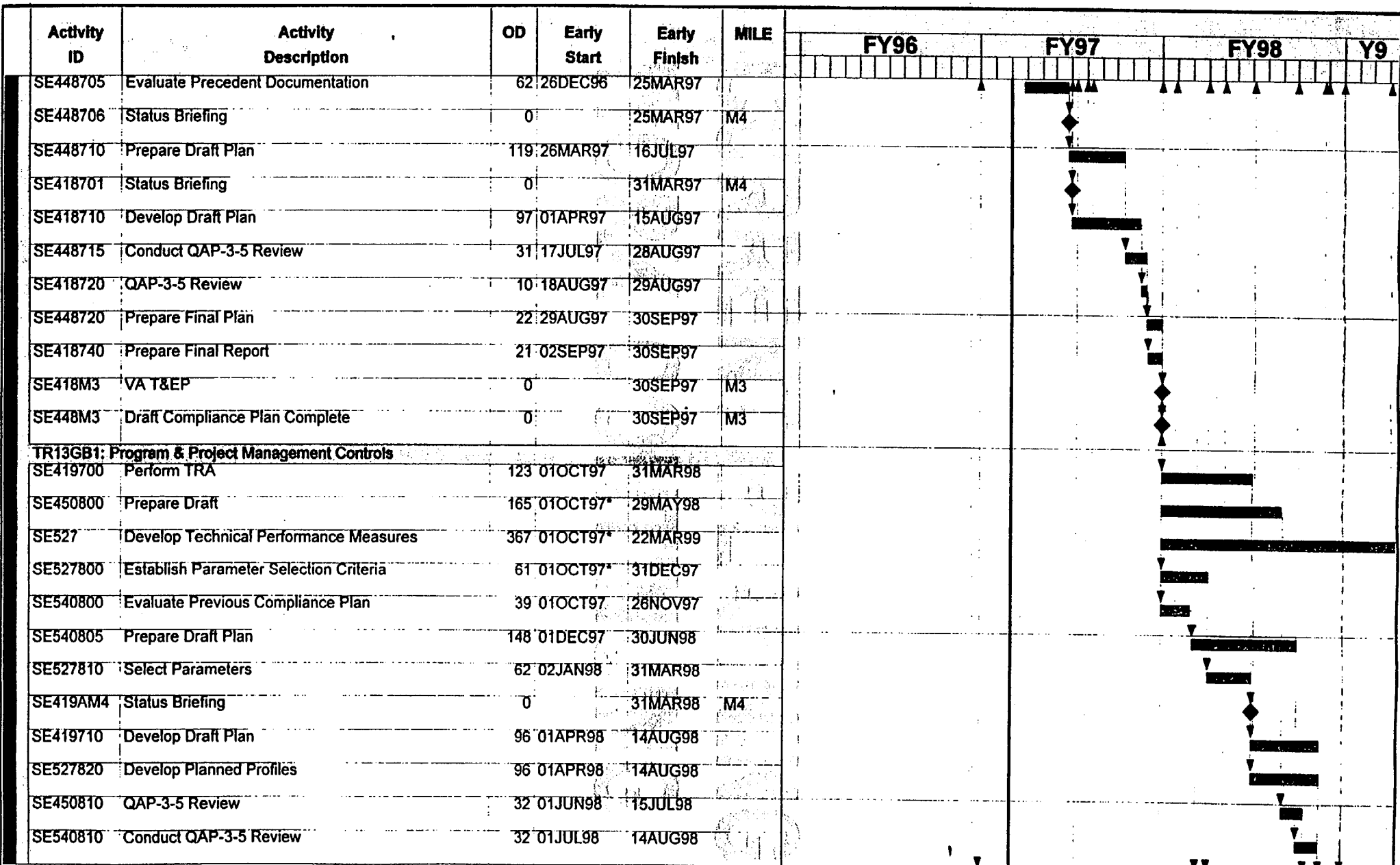
Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9											
<b>TR142GA1: Technical Bases Management</b>																																																					
SE142800	Technical Bases Management	455	01OCT97	26JUL99																																																	
<b>TR142GA2: Systems Integration</b>																																																					
SE446800	Integrate SDD Development	455	01OCT97	26JUL99																																																	
SE704800	Provide Technical Document Review Support	455	01OCT97	26JUL99																																																	
SE706800	Support Ad-Hoc Regulatory Interactions	455	01OCT97*	26JUL99*																																																	
SE706835	Support VA Design Summary Statement	74	01OCT97*	20JAN98																																																	
SE706840	Support MGDS VA Review	44	01OCT97	05DEC97																																																	
SE446AM4	CDA Issues Status Report	0		02JAN98*	M4																																																
SE706810	Support PR 18	143	02FEB98*	24AUG98																																																	
SEPR18M4	Systems Input to PR18	0		13MAR98*	M4																																																
SE446BM4	CDA Issues Status Report	0		31MAR98*	M4																																																
SE446CM4	CDA Issues Status Report	0		30JUN98*	M4																																																
SE706820	Support PR 19	137	25AUG98*	15MAR99																																																	
SEPR19M4	Systems Input to PR 19	0		15SEP98*	M4																																																
SE446DM4	CDA Issues Status Report	0		30SEP98*	M4																																																
<b>TR142GA3: Support PISA Chapter 1 Development</b>																																																					
SE708800	Review PISA Plan	30	31OCT97*	16DEC97																																																	
SE708810	Support TOC Development	15	31OCT97*	21NOV97																																																	
SE708815	Support AO Development	15	31OCT97*	21NOV97																																																	
SE708820	Support Text Development	55	24NOV97	12FEB98																																																	
SE708825	Support Chapter 1 Review	40	13FEB98	10APR98																																																	
<b>TR142GA4: Support PISA Development</b>																																																					
SE708840	Support PISA Chapter Integration	187	01OCT97*	30JUN98																																																	
SE708845	Participate in Integrated M&O Review	34	15JUN98*	31JUL98																																																	

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

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

Date \_\_\_\_\_ Revision \_\_\_\_\_ Checked \_\_\_\_\_ Approved \_\_\_\_\_





Project Start 01OCT95  
 Project Finish 01OCT02  
 Data Date 02DEC96  
 Plot Date 18DEC96

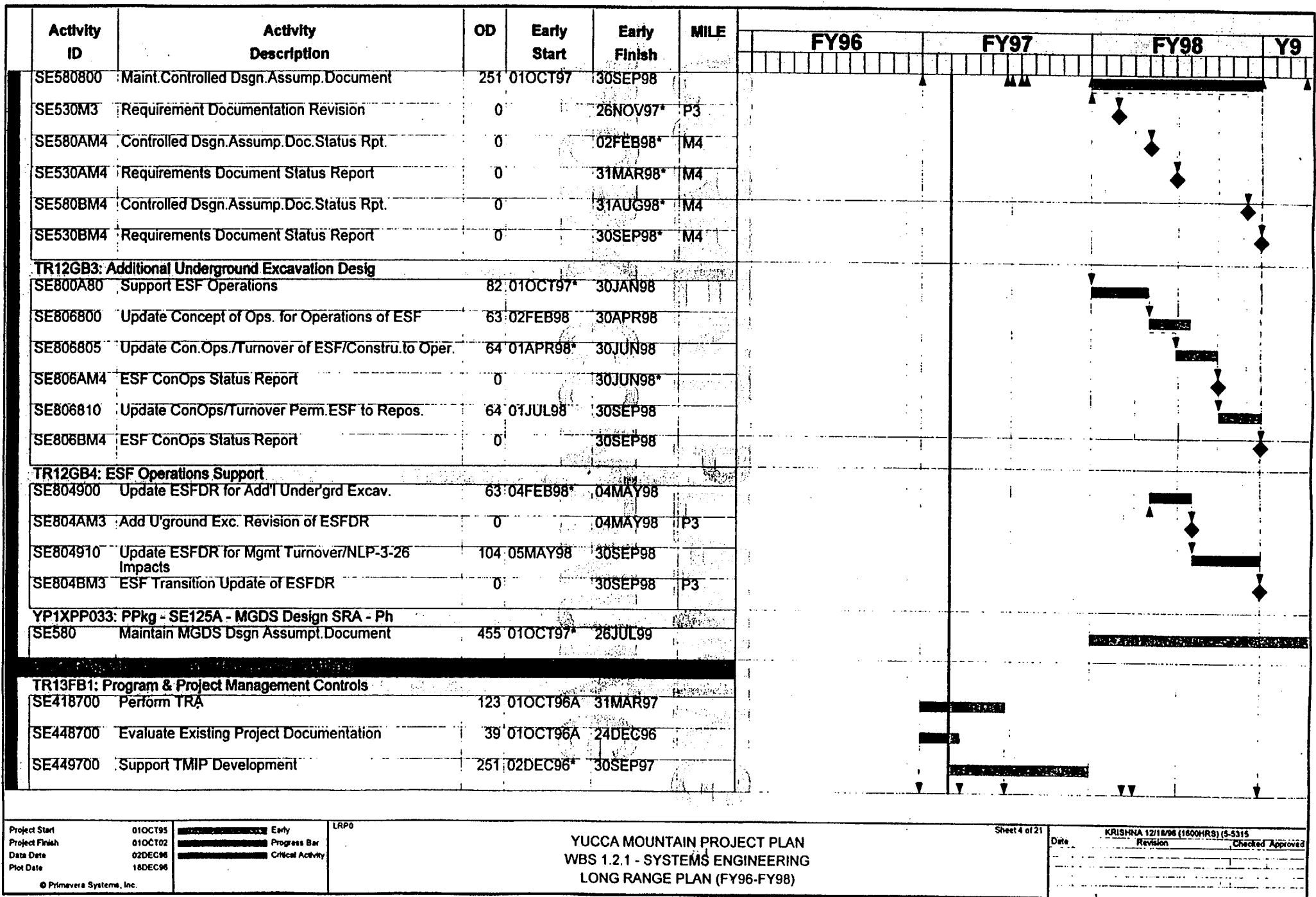
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YUCCA MOUNTAIN PROJECT PLAN  
 WBS 1.2.1 - SYSTEMS ENGINEERING  
 LONG RANGE PLAN (FY96-FY98)

Sheet 5 of 21

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



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 Project Finish 01OCT02  
 Data Date 02DEC96  
 Plot Date 18DEC96

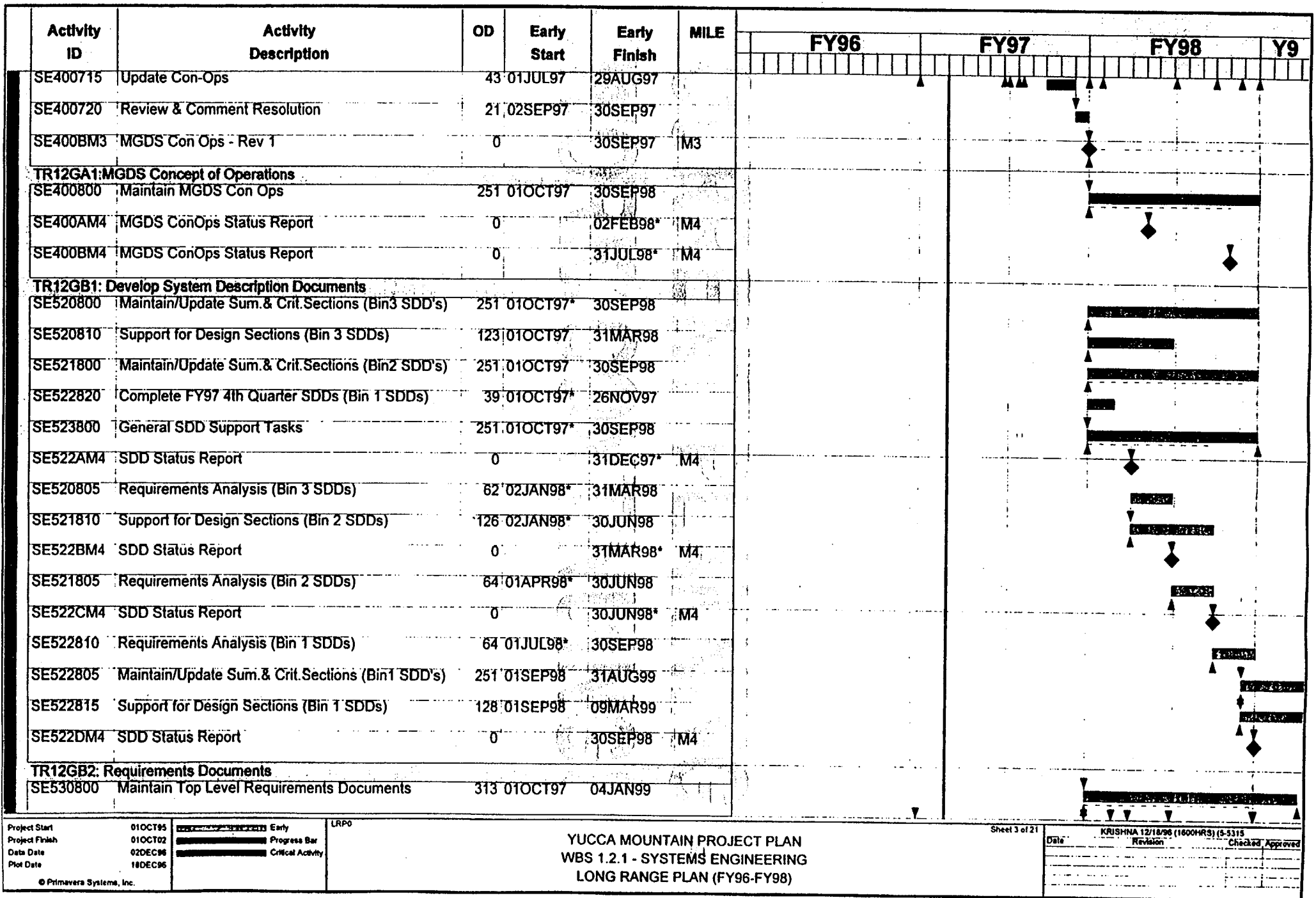
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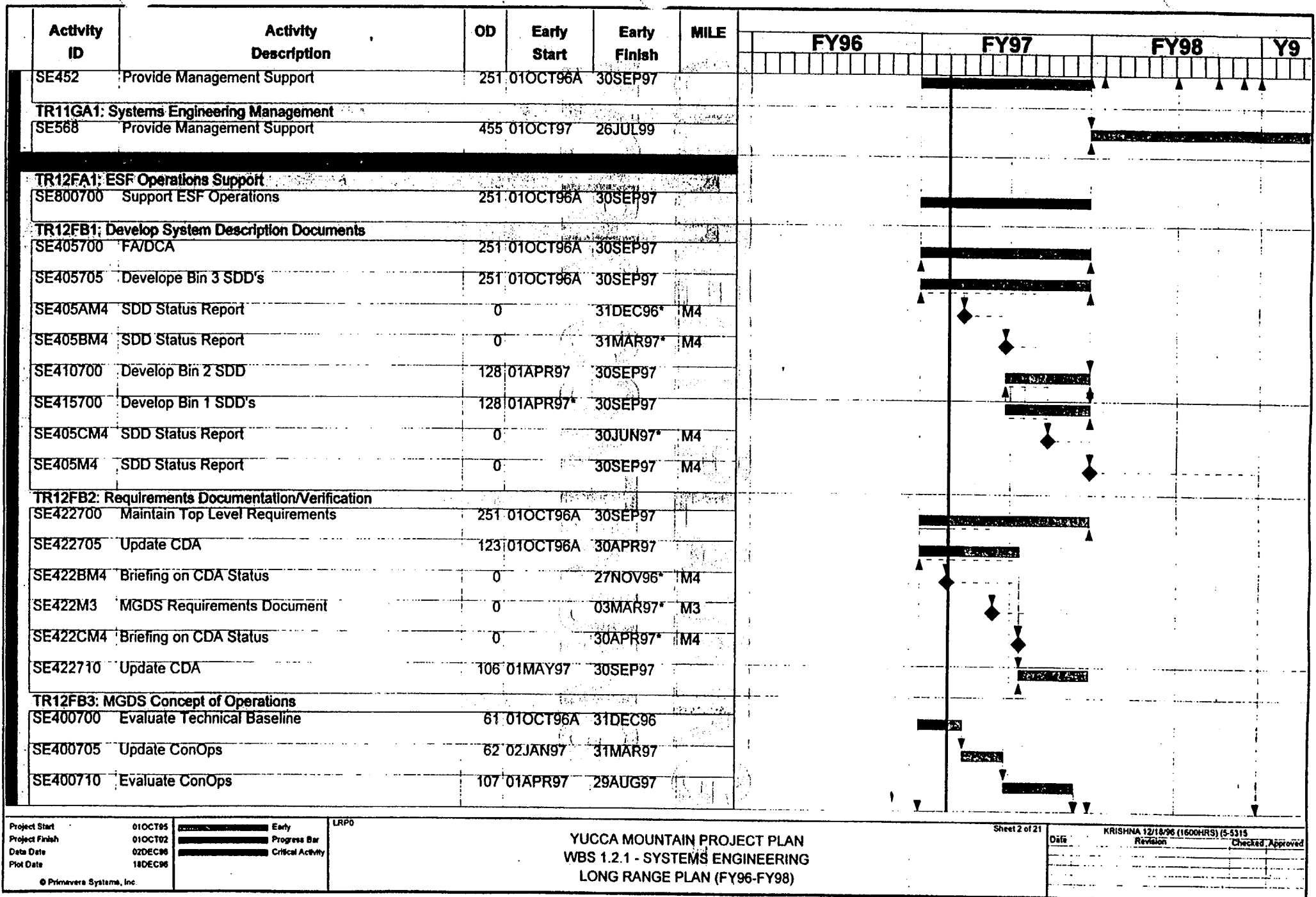
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YUCCA MOUNTAIN PROJECT PLAN  
 WBS 1.2.1 - SYSTEMS ENGINEERING  
 LONG RANGE PLAN (FY96-FY98)

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







## **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.

CURRENT PLANNING  
WORK CONTINUING



## **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.

## **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.

# **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**

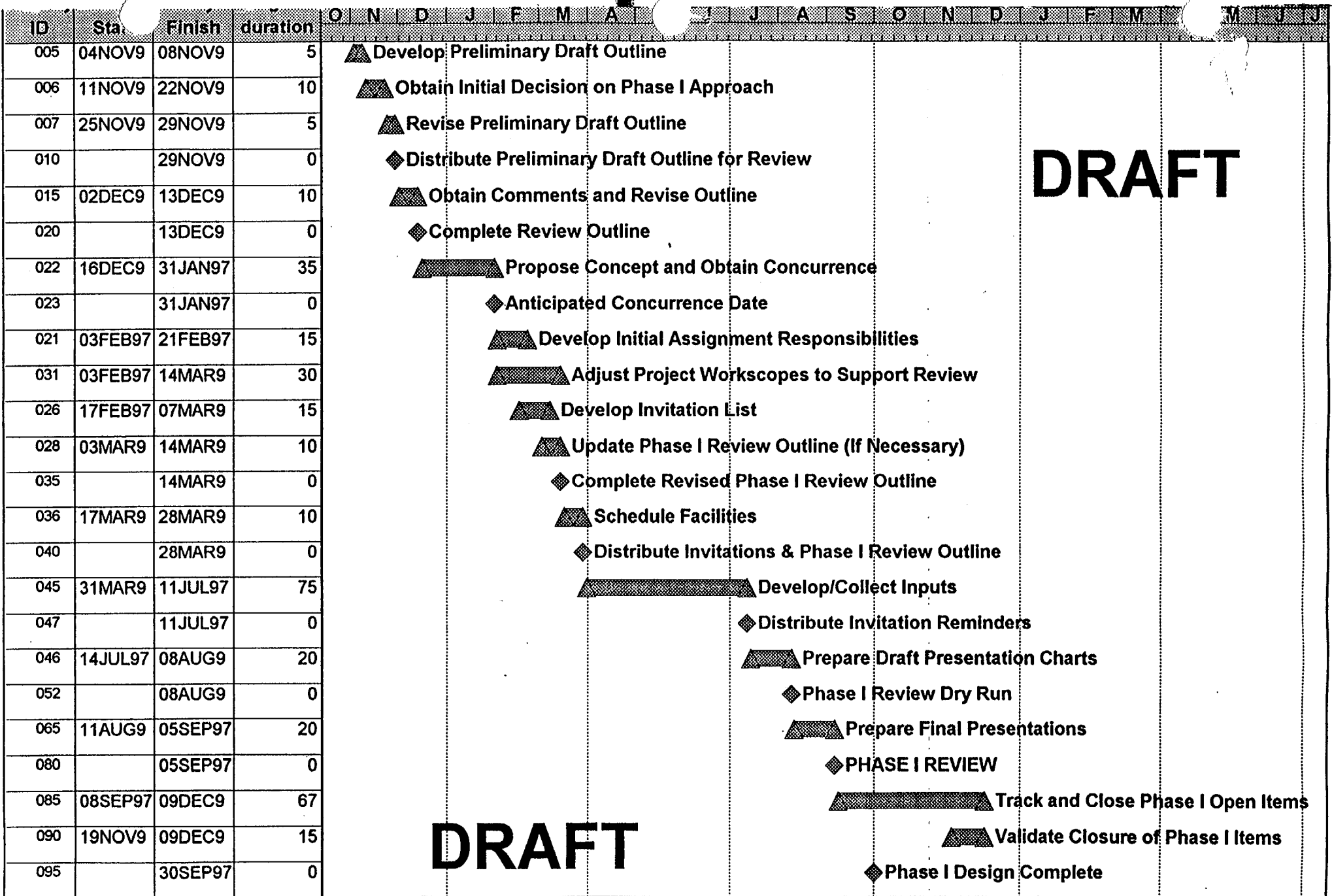
A pre-review package consisting of the Design Summary and the Engineering chapters of the Project Integrated Safety Assessment will be provided to a selected audience after June 30, 1998.

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.

**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.



#### **4.3 Issue Resolution Progress Listing \_\_\_\_\_**

This listing contains the expected level of completion toward resolution of the 13 critical engineering issues important to the VA.

#### **4.4 Selected Topics & Decisions Listing \_\_\_\_\_**

This listing contains selected topics or decisions important to the VA not already covered in the Product, Interface, or Issue Resolution Listings.

#### **4.5 Assessment of Cost and Schedule Variances \_\_\_\_\_**

This listing contains the activities which should be completed by the end of Phase I and an assessment and explanation of variances.

## **PHASE I DESIGN REVIEW**

### **1.0 PROPOSED CONCEPT**

The proposed concept for the Phase I Design Review includes an engineering emphasis and provides an update to the progress of engineering since the June Review. An engineering review is performed to assess the state of the design relative to the planned progress at the time of the VA milestone. Interfaces with engineering are also emphasized since the Phase I Design completion is marked by the final data deliveries between design and its interfacing organizations. This will help ensure that each organization has what it needs from engineering, and that engineering has what it needs from other organizations to adequately support the VA milestone. The review identifies any items still to be provided and the plan for providing those items in time to support the VA milestone. The target audience includes the YMSCO, Project Management Organization, and M&O Management.

### **2.0 PRESENTATION SUMMARIES**

#### **2.1 Engineering**

Engineering presentations will be provided to summarize the engineering completed to date along with a comparison against what is needed to support the VA milestone.

#### **2.2 MGDS Cost Estimate**

All information needed from engineering to prepare the MGDS cost estimate will be identified and any information not yet received will be emphasized for increased focus prior to the final cost estimate preparation. Coordination with the TSLCC will be summarized.

#### **2.3 Scientific Programs**

Presentations focused on model updates and documentation to support engineering needs will be provided. Open issues will be identified for increased focus to ensure necessary information is available to support VA milestone.

#### **2.4 Performance Assessment**

Presentations by PA to show readiness to proceed with the TSPA-VA will be provided. A summary of all data received and any data still missing and needed from engineering will be provided. Preclosure Safety work will be summarized to show progress to date relative to that needed for the VA milestone.

#### **2.5 Licensing**

A briefing of the LA Plan will be given to provide the picture of post-VA emphasis required from engineering. The Compliance Plan and the License Application Design and Review Plan and their incorporation into and/or relationship to the LA Plan will be summarized. A status of the Project Integrated Safety Assessment preparation will be provided.



## **2.6 NEPA/EIS**

Although not slated to support the VA milestone, necessary progress toward the EIS requires engineering data deliveries during the Phase I Design time frame. The Phase I Review provides a convenient opportunity to review the timeliness and adequacy of these data deliveries. Progress on engineering support to the EIS will be statused. Data deliveries provided to date will be summarized including Engineering Files. Progress on the Description of Planned Actions and Alternatives will be summarized. Any additional data needs will be identified for increased focus in the FY 98 to FY 99 time frame.

## **3.0 TIMING**

The Phase I Design Review is tentatively scheduled for early September, 1997. The planning activities for this review are provided in the schedule at the end of this appendix. The review verifies the completion of the Phase I work scope and the necessary data deliveries required through the end of Phase I Design. Any residual Phase I issues and the remaining work scope necessary to support the VA milestone will be identified and finalized for emphasis during the initial portion of the Phase II Design.

## **4.0 DESIGN REVIEW CHECKLIST**

The intent of the Phase I Design Review Checklist is to provide a methodical listing of items to be evaluated against expectations at the conclusion of the Phase I Design. The checklist includes listing of engineering products and their expected level of completion (Appendices C, D & E), a listing of critical interfaces (Appendix L), expected progress on issue resolution (Appendix B), expected progress on selected topics and/or items needing decisions (to be identified as part of activities 028 and 035 of the attached schedule), and an assessment of cost and schedule variances as identified in the most recent PACS report.

### **4.1 Product Listings \_\_\_\_\_**

Each design area has developed a product listing with an expectation of the level of completion for each item at the time of Phase I Design completion.

\_\_\_\_ Repository Sub-surface Product Listing

\_\_\_\_ Repository Surface Product Listing

\_\_\_\_ Waste Package Development Product Listing

\_\_\_\_ Waste Package Materials Product Listing

\_\_\_\_ Systems Engineering Product Listing

### **4.2 Critical Interface Listing \_\_\_\_\_**

## **APPENDIX G**

### **PHASE I DESIGN REVIEW**

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.

## **JUNE DESIGN REVIEW**

### **DRAFT AGENDA**

<b>8:00 am</b>	<b>Introduction and VA Description</b>
<b>8:10 am</b>	<b>Meeting Logistics and Comment Process</b>
<b>8:15 am</b>	<b>Requirements</b>
<b>8:55 am</b>	<b>Concept of Operations</b>
<b>9:35 am</b>	<b>Waste Package (Development &amp; Materials)</b>
<b>10:20 am</b>	<b>Break</b>
<b>10:30 am</b>	<b>Surface Facilities</b>
<b>11:10 am</b>	<b>Subsurface Design</b>
<b>12:35 pm</b>	<b>Lunch (Catered)</b>
<b>1:10 pm</b>	<b>Major Technical Issues, Resolution Plans, and Status</b>
<b>2:10 pm</b>	<b>Performance Assessment Interactions</b>
<b>2:50 pm</b>	<b>Break</b>
<b>3:00 pm</b>	<b>Cost Estimate Plans</b>
<b>3:30 pm</b>	<b>LA Plans</b>
<b>4:00 pm</b>	<b>Open Discussion</b>
<b>5:00 pm</b>	<b>Adjourn</b>

## **4.2 MGDS Design Drivers And Requirements**

The key requirements and design drivers will be identified and explained in terms of their significant implications to MGDS cost, schedule, or performance. Examples may include the required repository capacity, the form and rate of the waste received at the repository, the repository performance requirements in terms of pre- and post-closure, and the governing regulatory requirements for the MGDS. Major assumptions necessary to move the design forward will be identified. Engineering studies, design basis events evaluations, safety analyses, and functional/requirements analyses and their role in establishing requirements will be summarized as appropriate.

## **4.3 MGDS Concept of Operations**

The operational concept for the MGDS will be summarized to explain the disposal process from waste receipt through emplacement, closure, and decommissioning. Key VA issues related to operations will be highlighted. The purpose of this presentation is to set the stage for the remaining presentations for each design area and for the major VA issues.

## **4.4 MGDS Design Overview**

An overview of each design area will be provided, including the Yucca Mountain Site arrangement and layout, the general arrangement of the surface facilities, the general arrangement of the subsurface facilities and layout, the subsurface development plans, and the repository's relationship/interface with the Exploratory Studies Facility. An overview of waste package designs and the general emplacement arrangement of waste packages in the emplacement drifts will be provided. Waste Package materials testing will be summarized. Other significant features in the Engineered Barrier System and how these elements work together to support the waste containment and isolation strategy will be explained. The features of design and the key analytical methodologies will be summarized. Major contingency design alternatives will be identified.

## **5.0 MAJOR TECHNICAL ISSUES, DATA AND METHODS FOR RESOLUTION, RESOLUTION STATUS**

The major technical issues important to the success of the VA milestone will be identified along with the resolution plan for each issue. Current status will be provided. The expected contribution of scientific and test data toward issue resolution will be identified. Performance assessment model development and their use in issue resolution will be explained. Design option and operational concept evaluations under consideration and the timing of expected decision/resolution points will be identified.

## **6.0 ENGINEERING AND PERFORMANCE ASSESSMENT INTERACTIONS**

The iterative interactions between the design development activities with the performance assessment models will be explained. Tight coupling and integration between the design and TSPA which will support the VA milestone will be stressed. Sensitivities of the models to design parameters will be identified to show areas in the design with significant pre- and post-closure performance contributions. Interactions between the design and process models & abstractions will

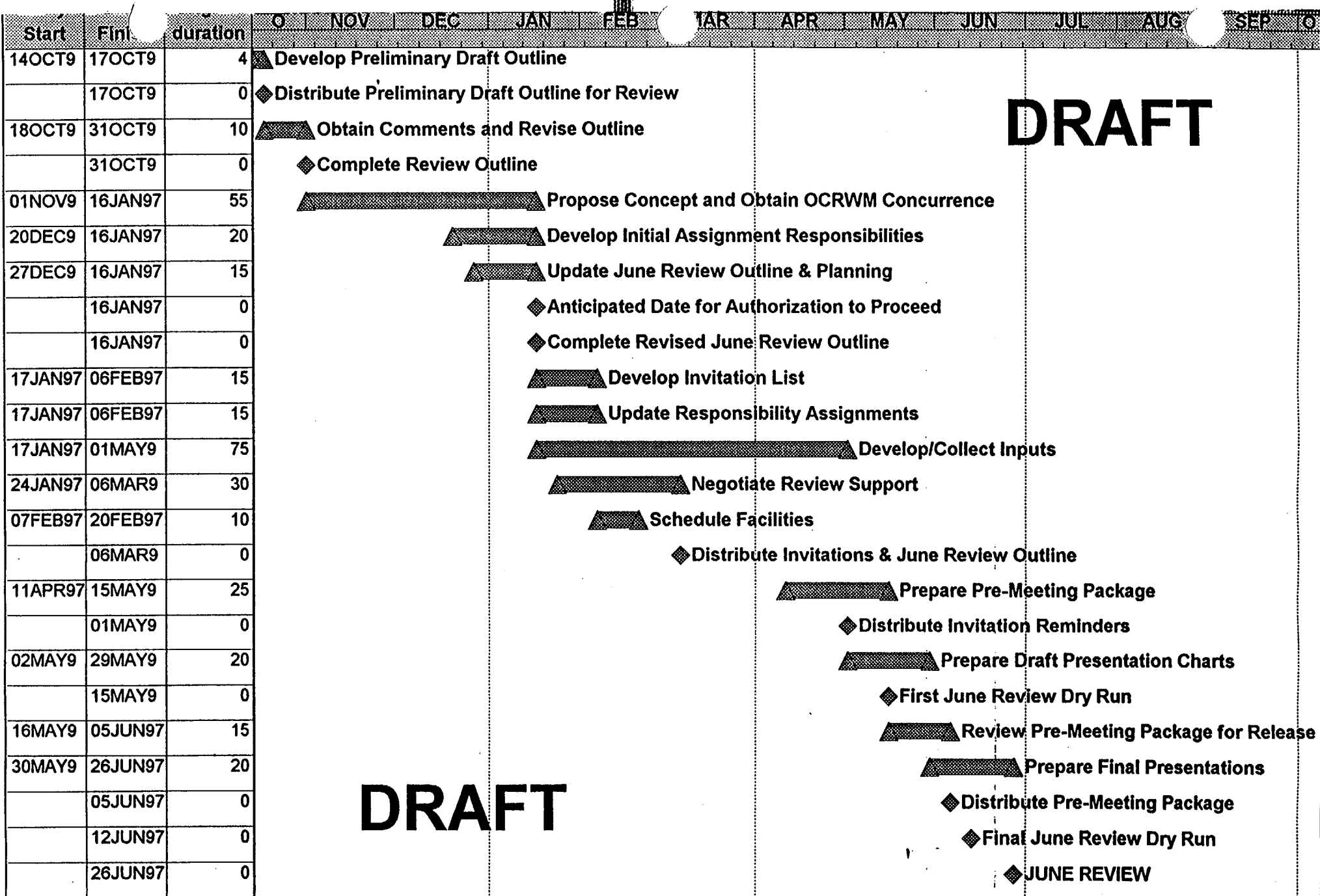
be identified to illustrate the way in which performance assessment predictions influence the design process to converge on performance-sensitive design parameters. Dependencies between the design and the near-field models will be explained.

## **7.0 PLANS FOR PREPARING A COST ESTIMATE**

The plan, strategy, and assumptions for the preparation of an MGDS cost estimate will be identified. Included will be a discussion of the E&I activities to provide information on the cost to complete the MGDS design, to construct the MGDS, to operate the MGDS, and to close, decommission, or, if necessary, to retrieve from the MGDS. Current assumptions and their relationship to cost estimating assumptions (such as those provided in the ACD) or to revised versions of the TSLCC will be explained. The basis and format which will underpin the capital cost estimates will be identified.

## **8.0 MGDS PLANS TO SUPPORT LA**

The strategy and schedule for developing the design sufficient for licensing will be explained. The general level of design detail necessary to docket an LA will be provided, along with representative examples. Design activities required to support the LA for which progress is needed at the time of the VA milestone will be identified along with an indication of the post-VA activities necessary to support a docketable LA. E&I will support YMP cost estimating activities for the design to be included in an LA in March 2002.



# DRAFT

# DRAFT

## **JUNE DESIGN REVIEW**

### **1.0 PURPOSE**

The purpose of this June 1997, review is to assess the overall engineering approach to the VA milestone and obtain high-level management concurrence. Key interfaces such as the relationship between Design Engineering and Performance Assessment will be described. The preparation of an MGDS Cost Estimate and an LA Plan will also be described. Finally, the design status as it currently exists will be reviewed to facilitate an overall understanding of the system and to encourage high-level course correction where needed. This will be a non-Q review.

A draft schedule to prepare for and execute the review is attached.

### **2.0 REVIEW AUDIENCE**

The target audience for the June Design Review is OCRWM (YMSCO and WM&I), Project Management Organization, and M&O Management, as well as M&O Teammate Corporate Executives. TRB and NRC representation is also suggested. The June Design Review will also be shared with the Repository and other consultant boards.

### **3.0 REVIEW FORMAT**

A pre-review package will be prepared to facilitate background development and to help achieve the meeting goals in a single day. Topics for the package will consist of key summary-level material to help set the stage for the review. Candidates for this material include an update to the Director's Summary, Highlights of the DOE's Waste Containment and Isolation Strategy for the Yucca Mountain Site, and the MGDS Concept of Operations. Other material such as the VA Design and Review Plan and the VA Monitoring Plan which describe the VA activities and the role of the June Design Review en-route to that assessment may be provided.

Presentations similar to those provided during the February 1-2, 1996 Management Reviews for the MGDS ACD will be provided. The goal is to develop a set of presentations which can be used for multiple audiences. The presentations would be delivered by the M&O Engineering and Integration Operations' managers. A draft agenda is attached. An explicit definition for the content of the presentation charts is provided below. Comments will be requested.

### **4.0 PRESENTATION CONTENT**

#### **4.1 VA Description**

A brief introductory discussion describing the purpose and scope of the VA activities will be provided along with an overview of how the YMP's engineering efforts support the assessment. In addition, the meeting logistics will be explained, along with the comment process. Comments will be requested on the day of the review, and comment sheets will be provided to facilitate proper documentation.

## **APPENDIX F**

### **JUNE DESIGN REVIEW**

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 M. Sellers. For suggested changes to the contents, contact R. Snell.



# WBS 1.2.1 Systems Engineering Products (Rev. 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
	TR1BG81	SE310800	31-Mar-98	DBE FY98 - 1st Half		Briefing	X		X	X
		SE322800	31-Mar-98	CA/Q-List FY98 - 1st Half		Briefing	X		X	X
		SE310805	30-Sep-98	CA/Q-List FY98 - 2nd Half		Briefing	X		X	X
		SE322805	30-Sep-98	CA/Q-List FY98 - 2nd Half		Briefing	X		X	X

CURRENT PLANNING -  
WORK CONTINUING

## WBS 1.2.1 Systems Engineering Products (Rev. 0, 12/18/96)

							VA COMPONENT			
P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.1.2	TR12FB2	SE422M3	03-Mar-97	MGDS-RD Update		Document	X	X	X	X
	TR12GB2	SE530AM4	31-Mar-97	Rqmts. Doc. Status Report		Ltr. Report	X	X	X	X
	TR12FB3	SE400BM3	30-Sep-97	MGDS Conops, Rev. 1		Document	X	X	X	X
	TR12GA1	SE400AM4	02-Feb-98	MGDS Conops Status Report		Ltr. Report	X	X	X	X
	TR12FB2	SE422705	30-Apr-97	CDA Update		Document	X	X		X
		SE422710	30-Sep-97	CDA Update		Document	X	X		X
		SE580AM4	02-Feb-97	CDA Status Report		Ltr. Report	X	X		X
	TR12FB1	SE405AM4	31-Dec-96	SDD Status Report		Ltr. Report	X	X		X
		SE405BM4	31-Mar-97	SDD Status Report		Ltr. Report	X	X		X
		SE405CM4	30-Jun-97	SDD Status Report		Ltr. Report	X	X		X
		SE405M4	30-Sep-97	SDD Status Report		Ltr. Report	X	X		X
	TR12GB1	SE522AM4	31-Dec-97	SDD Status Report		Ltr. Report	X	X		X
		SE522BM4	31-Mar-97	SDD Status Report		Ltr. Report	X	X		X
		SE522CM4	30-Jun-97	SDD Status Report		Ltr. Report	X	X		X
1.2.1.3	TR13FB1	SE418701	31-Mar-97	Test & Evaluation Plan Development Status Update		Briefing	X	X		X
		SE418M3	30-Sep-97	VA Test & Evaluation Plan		Document	X		X	
		SE488706	25-Mar-97	Design Compliance Plan for LA Status Update		Briefing	X	X	X	X
		SE488M3	30-Sep-97	Draft Design Compliance Plan for LA		Document	X		X	X
	TR13GB1	SE419AM4	31-Mar-98	Status of Update to T&EP		Briefing	X		X	X
		SE419M3	30-Sep-98	Final VA T&EP		Document	X		X	X
		SE540M3	30-Sep-98	Design Compliance Plan for LA, Rev. 0		Document	X		X	X
1.2.1.5	TR15FB1	SE050705	05-Mar-97	Establish Draft Performance Confirmation Baseline		IOC	X		X	X
		SE050720	29-Aug-97	Complete Initial Performance Confirmation Plan		IOC	X		X	X

## WBS 1.2.1 Systems Engineering Products (Rev. 0, 12/18/96)

							VA COMPONENT			
P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	PRELIMINARY DESIGN CONCE	TSPA-VA	LA PLAN	ESTIMATE OF COST
		SE050BM3	30-Sep-97	Performance Confirmation Plan, Rev. 0		Document	X		X	X
		SE436700	01-Apr-97	Start Waste Generated Study		Briefing	X	X		X
		SE436M3	30-Sep-97	Complete Waste Generated Study		Document	X	X		X
		SE440700	01-Oct-96	Conduct Research for Waste Isolation Requirements Study		Briefing	X	X		X
		SE440M3	01-Apr-97	Complete Waste Isolation Requirements Study		Document	X	X	X	X
		SE460700	01-Apr-97	Start Waste Package Size Study		Briefing	X	X		X
		SE460M3	30-Sep-97	Waste Package Size Study Report		Document	X	X		X
		SE506700	01-Oct-96	Start Seals Study		Briefing	X	X		X
		SE506M3	03-Jun-97	Seals Study Report		Document	X	X	X	X
	TR15FB2	SE200700	01-Oct-97	Start Waste Quantity, Mix, Throughput Study		Briefing	X	X		X
		SE200M3	11-Apr-97	Waste Quantity, Mix, Throughput Study		Document	X	X		X
	TR15FB3	SE502700	01-Oct-96	Start Retrieval Study		Briefing	X		X	X
		SE502M3	06-May-97	Retrieval Study		Document	X		X	X
	TR15FB4	SE456700	01-Oct-96	Start Rail Corridor Evaluation		Briefing	X			X
		SE456M3	30-Apr-97	Rail corridor Evaluation Report		Document	X			X
1.2.1.7	TR17FB1	SE124700	01-Oct-96	Start MGDS Cost Estimate Planning		Briefing	X		X	X
		SE124AM3	30-Sep-97	Draft MGDS Cost Plan		Document	X		X	X
	TR17681	SE124850	20-Aug-98	Final VA Cost Estimate		Document	X		X	X
1.2.1.8	TR18FB2	SE500M3	27-Jun-97	Safe Guards and Security VA Rqmts. Study		Document	X		X	X
1.2.1.11	TR18FB1	SE310700	31-Mar-97	DBE FY97 - 1st Half		Briefing	X		X	X
		SE320700	31-Mar-97	CA/Q-List FY97		Briefing	X		X	X
		SE310705	30-Sep-97	DBE FY97 - 2nd Half		Briefing	X		X	X
		SE320705	30-Sep-97	CA/Q-List-FY97		Briefing	X		X	X

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.7 Cont'd	TR47FBI Cont'd	RP126730	31-Mar-97	Backfilling Operations (3D)	RP120M3E	Dwg	X	X		X
				Backfilling P&ID	RP120M3E	Dwg	X	X		X
				Waste Package Support System	RP120M3E	Dwg	X	X		X
				Emplacement Drift Invert & Support System (3D)	RP120M3E	Dwg	X	X		X
	TR47FBJ	RP124700	15-Apr-97	Remote Monitoring, Communications, and Control Systems for Performance Confirmation		Anal	X			
		RP124705	02-Apr-97	Performance Confirmation Facilities		Anal	X			
		RP124715	01-Apr-97	Mobile Remote Monitoring System: Physical Layout	RP120M3F	Dwg	X	X		X
				Mobile Remote Monitoring System: Electrical Subsystems	RP120M3F	Dwg	X			X
				Mobile Remote Monitoring System: Control and Instrumentation	RP120M3F	Dwg	X			X
				Performance Confirmation Drift and Access - Sheet 1	RP120M3F	Dwg	X	X		X
				Performance Confirmation Stations Detail	RP120M3F	Dwg	X	X		X
				Performance Confirmation Stations Detail	RP120M3F	Dwg	X	X		X
				Performance Confirmation Drift Ventilation System	RP120M3F	Dwg	X	X		X
				Performance Confirmation Drift Ventilation System	RP120M3F	Dwg	X	X		X
				Performance Confirmation Test Drilling Arrangement - Sheet 1	RP120M3F	Dwg	X	X		X
				Performance Confirmation Test Drilling Arrangement - Sheet 2	RP120M3F	Dwg	X	X		X

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.7 Cont'd	TR47FB9 Cont'd	RP122720	28-Feb-97	Airflow Control Analysis		Anal	X	X		
		RP122705	31-Jan-97	Dust Control Analysis		Anal	X	X		
		RP122730	30-Apr-97	Preliminary Equipment List and Description		Tech Doc	X			X
		RP122745	30-Sep-97	Overall Subsurface Ventilation GA - Pre-emplacment Construction Early Phase	RP120M3D	Dwg	X	X		X
				Overall Subsurface Ventilation GA - Pre-emplacment Construction Mid Phase	RP120M3D	Dwg	X	X		X
				Overall Subsurface Ventilation GA - Pre-emplacment Construction Late Phase	RP120M3D	Dwg	X	X		X
				Overall Subsurface Ventilation GA - Development and Emplacement Early Phase	RP120M3D	Dwg	X			X
				Overall Subsurface Ventilation GA - Development and Emplacement Mid Phase	RP120M3D	Dwg	X	X		X
				Overall Subsurface Ventilation GA - Development and Emplacement Early Final Phase	RP120M3D	Dwg	X	X		X
				Overall Subsurface Ventilation GA - Caretaker Phase	RP120M3D	Dwg	X	X		X
				Exhaust Shaft GA Fans & HEPA Filters Sheet 1	RP120M3D	Dwg	X			X
				Exhaust Shaft GA Fans & HEPA Filters Sheet 2	RP120M3D	Dwg	X			X
				Exhaust Shaft GA Fans & HEPA Filters Sheet 3	RP120M3D	Dwg	X			X
				South Portal Intake Fans and Airlock GA Sheet 1	RP120M3D	Dwg	X			X
				South Portal Intake Fans and Airlock GA Sheet 2	RP120M3D	Dwg	X			X
				South Portal Intake Fans and Airlock GA Sheet 3	RP120M3D	Dwg	X			X
				Emplacement/Development Isolation Airlocks (3D)	RP120M3D	Dwg	X			X
				Emplacement Drift Ventilation Doors (3D)	RP120M3D	Dwg	X			X
	TR47FBA	RP504705	13-Jun-97	Waste Package Retrieval Equipment		Anal	X			
		RP504715	29-Aug-97	WP Retrieval Equipment Description		Tech Doc	X			X
		RP504710	18-Jun-97	Retrailer	RP504M3	Dwg	X			X
				Heavy Duty Forklift		Dwg	X			X

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.7 Cont'd	TR47FBa Cont'd	RP504710 Cont'd		Inclined Plane Hauler	RP504M3	Dwg	X			X
				Inclined Plane Hauler & Shielding	RP504M3	Dwg	X			X
				LHD with Ejector Bucket		Dwg	X			X
				H.D. Forklift for Emplacement Drift		Dwg	X			X
				Covered Shuttle Car & LHD Unit		Dwg	X			X
				Multipurpose Vehicle w/Impact Hammer		Dwg	X			X
				Multipurpose Vehicle w/Bucket		Dwg	X			X
				Multipurpose Vehicle w/Shear	RP504M3	Dwg	X			X
				Hydraulic Shear	RP504M3	Dwg	X			X
				Retrieval Skid Plate	RP504M3	Dwg	X			X
	TR47FBD	RP123762	30-Sep-97	DBE Scenario Analysis		Anal	X			
		RP123768	30-Sep-97	CMF Logic Analysis		Anal	X			
		RP123764	15-Sep-97	SSC Support Document		Tech Doc	X			
		RP123766	30-Apr-97	Computer Code Qualification		Tech Doc	X			
	TR47FBH	RP128715	04-Aug-97	Subsurface Repository Engineering File		Tech Doc	X			
		RP128705	30-Jun-97	General Surface, Subsurface Arrangement - Proposed Action		Dwg	X			
				Subsurface Layout - Proposed Action (High Thermal Load)		Dwg	X			
				Subsurface Layout - Alternative (Medium Thermal Load)		Dwg	X			
				Subsurface Layout - Alternative (Low Thermal Load)		Dwg	X			
	TR47FBI	RP126710	14-Jan-97	Backfill Strategy and Preliminary Design		Anal	X	X		X
		RP126720	28-Feb-97	Waste Package Support System		Anal	X	X		X
		RP126700	31-Jan-97	Emplacement Drift Invert		Anal	X	X		X

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TS&PA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.7 Cont'd	TR47FB5 Cont'd	RP120785 Cont'd		Roadheader Excavation of Emplacement Drift Turnout (3D)		Dwg	X	X		X
				Emplacement Drift TBM and Trailing Gear Configuration (3D)		Dwg	X	X		X
				Emplacement Drift TBM Launch (3D)		Dwg	X	X		X
				Emplacement Drift TBM Recovery (3D)		Dwg	X	X		X
				Equipping of Mains for Emplacement Operations		Dwg	X	X		X
				Emplacement Drift Equipping		Dwg	X	X		X
				Emplacement Drift Ventilation Raises Excavation and Lining Installation		Dwg	X	X		X
				Muck Handling P&ID		Dwg	X	X		X
				Muck Handling Equipment and Operations Details		Dwg	X	X		X
				Emplacement Drift Ground Support Installation (3D)		Dwg	X	X		X
				Ventilation Shafts Excavation Sequence and Lining Installation		Dwg	X	X		X
				Emplacement Area for 70,000 MTU of Waste	RP120M3B	Dwg	X	X		X
				Emplacement Drift and Waste Package Emplacement Arrangement	RP120M3B	Dwg	X	X		X
	TR47FB6	RP502700	14-Jul-97	Emplacement Equipment Design Analysis		Anal	X			
		RP502730	14-Aug-97	Remote Handling and Communications for WP Emplacement Systems		Anal	X			
		RP502705	15-Jul-97	Electrification of SS Railed Vehicles		Anal	X			
		RP502715	30-Sep-97	Emplacement Equipment Description		Tech Doc	X			X
		RP502740	30-Sep-97	RH&C Equipment Description		Tech Doc	X			X
		RP502735	20-Jun-97	Transport Locomotive	RP502M3	Dwg	X			X
				WP Transporter with Unloading System	RP502M3	Dwg	X			X
				Gantry Carrier	RP502M3	Dwg	X			X
				Rail Car	RP502M3	Dwg	X			X

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.7 Cont'd	TR47FB6 Cont'd	RP502735 Cont'd		Emplacement Rail System	RP502M3	Dwg	X			X
				WP Gantry Plan & Elevation	RP502M3	Dwg	X			X
				WP Gantry Vertical Lift Detail	RP502M3	Dwg	X			X
				WP Gantry Traction Motor Detail	RP502M3	Dwg	X			X
				WP Gantry Length Adjustment Method	RP502M3	Dwg	X			X
				Repository Partial Plan - Drift Isolation Doors	RP502M3	Dwg	X			X
				Interface Logic Diagram for Mobile Equipment	RP502M3	Dwg	X			X
				Typical Main Drift Overhead Wire System	RP502M3	Dwg	X			X
				Typical Emplacement Drift Conductor Bar System	RP502M3	Dwg	X			X
				Typical Drift Turnout Conductor Bar System	RP502M3	Dwg	X			X
				Emplacement Transfer/Loading Dock	RP502M3	Dwg	X			X
				SS Layout of the Rail Rectifier Units	RP502M3	Dwg	X			X
				Rail Electrification One-Line Diagram	RP502M3	Dwg	X			X
				Emplacement System: Control Systems	RP502M3	Dwg	X			X
				Overview of Control and Communication Systems for WP Emplacement	RP502M3	Dwg	X			X
				Emplacement System: Communications System	RP502M3	Dwg	X			X
				Emplacement Gantry: Control & Communication Systems	RP502M3	Dwg	X			X
	TR47FB7	RP123750	30-Sep-97	Shielding Analysis		Anal	X			
		RP123758	30-Jun-97	Retrieval OPS Analysis		Anal	X			
		RP123752	30-Sep-97	Computer Code Qualification		Tech Doc	X			
	TR47FB9	RP122725	30-Apr-97	Devel./Emplacement Ventilation Analysis		Anal	X	X		
		RP122710	28-Feb-97	Emplacement Exhaust HEPA Filter Analysis		Anal	X			



## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

WBS 1.2.4 Repository Products (Rev 0, 12/18/96)							VA COMPONENT			
P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	PRELIMINARY DESIGN CONCEPT			
1.2.4.7 Cont'd	TR47FB3 Cont'd	RP506720 Cont'd		Access Intersections Ground Support - GA	RP120M3C	Dwg	X	X		X
				Access Intersections Ground Support - Sections	RP120M3C	Dwg	X	X		X
				TBM Launch & Recovery Chamber Ground Support - GA	RP120M3C	Dwg	X	X		X
				TBM Launch & Recovery Chamber Ground Support - Sections	RP120M3C	Dwg	X	X		X
				Exhaust Main Ground Support - GA	RP120M3C	Dwg	X	X		X
				Exhaust Main Ground Support - Sections	RP120M3C	Dwg		X		X
				Ventilation Raise Ground Support - GA	RP120M3C	Dwg	X	X		X
				Ventilation Raise Ground Support - Sections	RP120M3C	Dwg	X	X		X
				Emplacement Drift Turnout Ground Support - GA	RP120M3C	Dwg	X	X		X
				Emplacement Drift Turnout Ground Support - Sections	RP120M3C	Dwg	X	X		X
				Shaft Ground Support - GA	RP120M3C	Dwg	X	X		X
				Shaft Ground Support - Sections	RP120M3C	Dwg	X	X		X
				Site Geology and Determination of Available Emplacement Area		Anal	X	X		
				Subsurface Layout Analysis		Anal	X	X		
				Subsurface Layout Coordinate Geometry Analysis		Anal	X	X		X
				Subsurface Construction and Development Methodology Analysis		Anal	X			X
				Subsurface Construction and Operations Integrated Schedule		Anal	X			X
	RP120789	01-Apr-97	Thermal Load Management Analysis		Anal	X	X			
	RP120775	01-Jul-97	Preliminary List of Construction Equipment		Tech Doc	X			X	
	RP120785	30-Sep-97	Site Geology Details Plan & Sections, Sheet 1	RP120M3	Dwg	X	X		X	
			Site Geology Details Plan & Sections, Sheet 2	RP120M3	Dwg	X	X		X	
			Overall Subsurface Layout GA (3D)	RP120M3	Dwg	X	X		X	

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

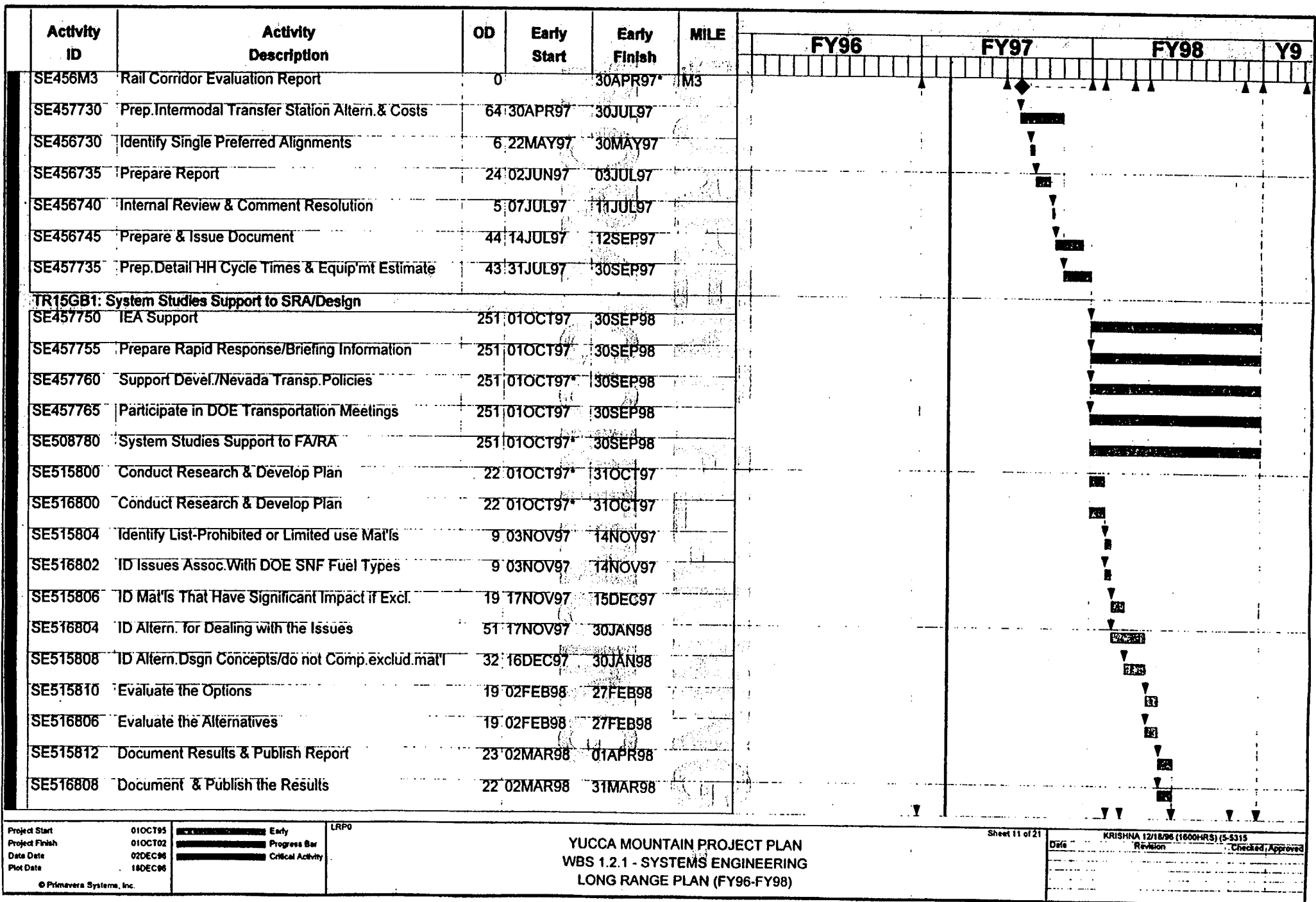
P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.7 Cont'd	TR47FB5 Cont'd	RP120785 Cont'd		Overall Layout Showing Usable Emplacement Area	RP120M3	Dwg	X	X		X
				Potential Emplacement Expansion Areas	RP120M3	Dwg	X	X		X
				Overall Layout Showing Excavation Method & Drift Sizes	RP120M3	Dwg	X	X		X
				Subsurface Drainage Patterns	RP120M3	Dwg	X	X		X
				Typical Access Ramps and Mains Elevations & Cross Sections - Construction Phase	RP120M3	Dwg	X	X		X
				Typical Access Ramps and Mains Elevations & Cross Sections - Emplacement Mode	RP120M3	Dwg	X	X		X
				Emplacement Side Ventilation Shaft GA	RP120M3	Dwg	X	X		X
				Development Side Ventilation Shaft GA	RP120M3	Dwg	X	X		X
				7.62 m TBM Launch and Recovery Chambers (3D)	RP120M3	Dwg	X	X		X
				Exhaust Main and Ventilation Raise GA (3D)	RP120M3	Dwg	X	X		X
				Emplacement Drift Details - Section and Elevation	RP120M3	Dwg	X	X		X
				Emplacement Drift Turnouts	RP120M3	Dwg	X	X		X
				Shadow Shields Details (3D)	RP120M3	Dwg	X	X		X
				Roadheader Openings - Miscellaneous Sections	RP120M3	Dwg	X	X		X
				Pre-Emplacement Construction Schedule	RP120M3A	Dwg	X	X		X
				Emplacement & Development Schedule	RP120M3A	Dwg	X	X		X
				Subsurface Construction & Development Sequence - Phase 1	RP120M3A	Dwg	X	X		X
				Subsurface Construction & Development Sequence - Phase 2	RP120M3A	Dwg	X	X		X
				Subsurface Construction & Development Sequence - Phase 3	RP120M3A	Dwg	X	X		X
				Emplacement Drift Construction Sequence (3D)	RP120M3A	Dwg	X	X		X
				7.62 m TBM and Trailing Gear Configuration (3D)		Dwg	X	X		X
				7.62 m TBM Launch & Recovery (3D)		Dwg	X	X		X

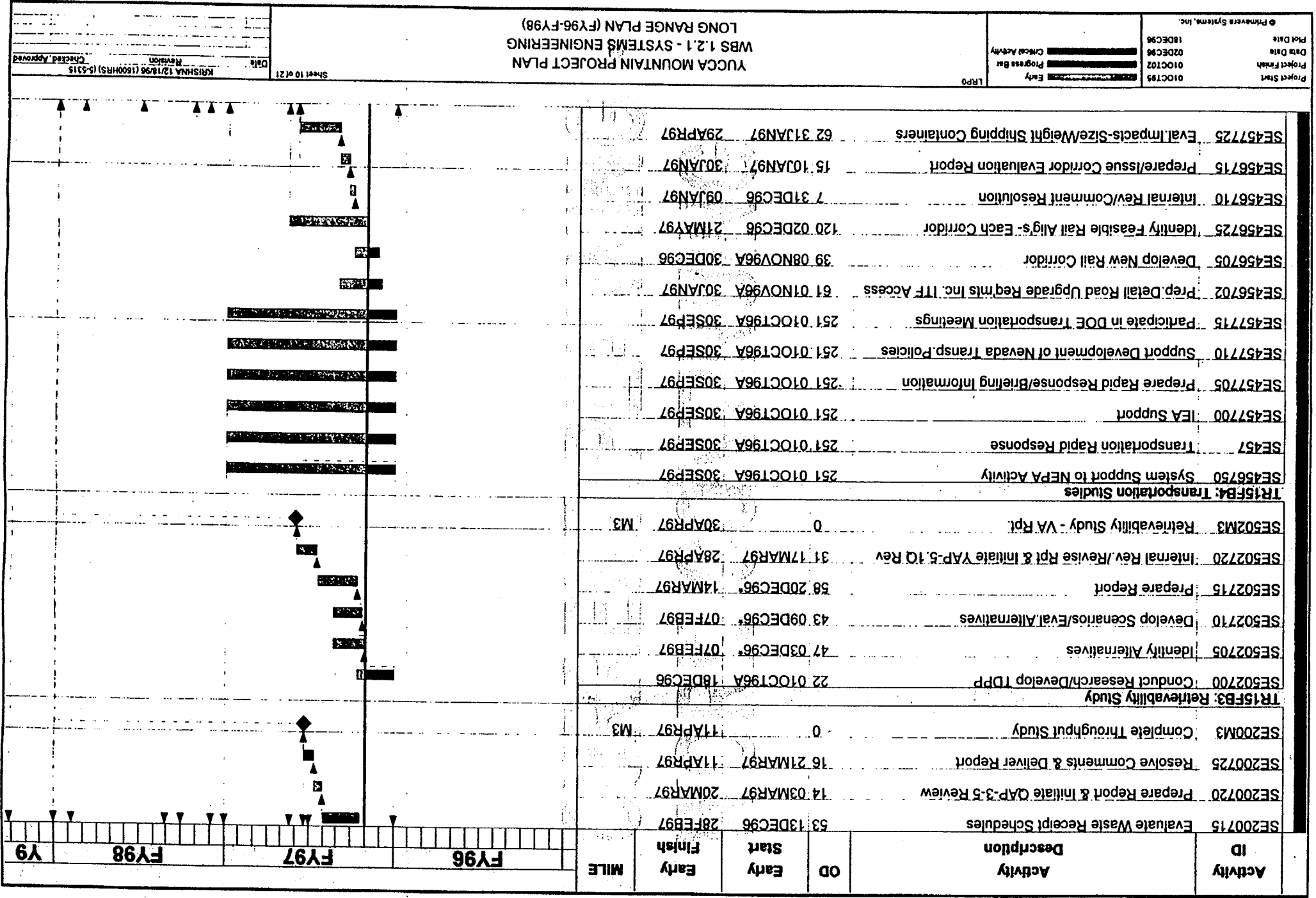
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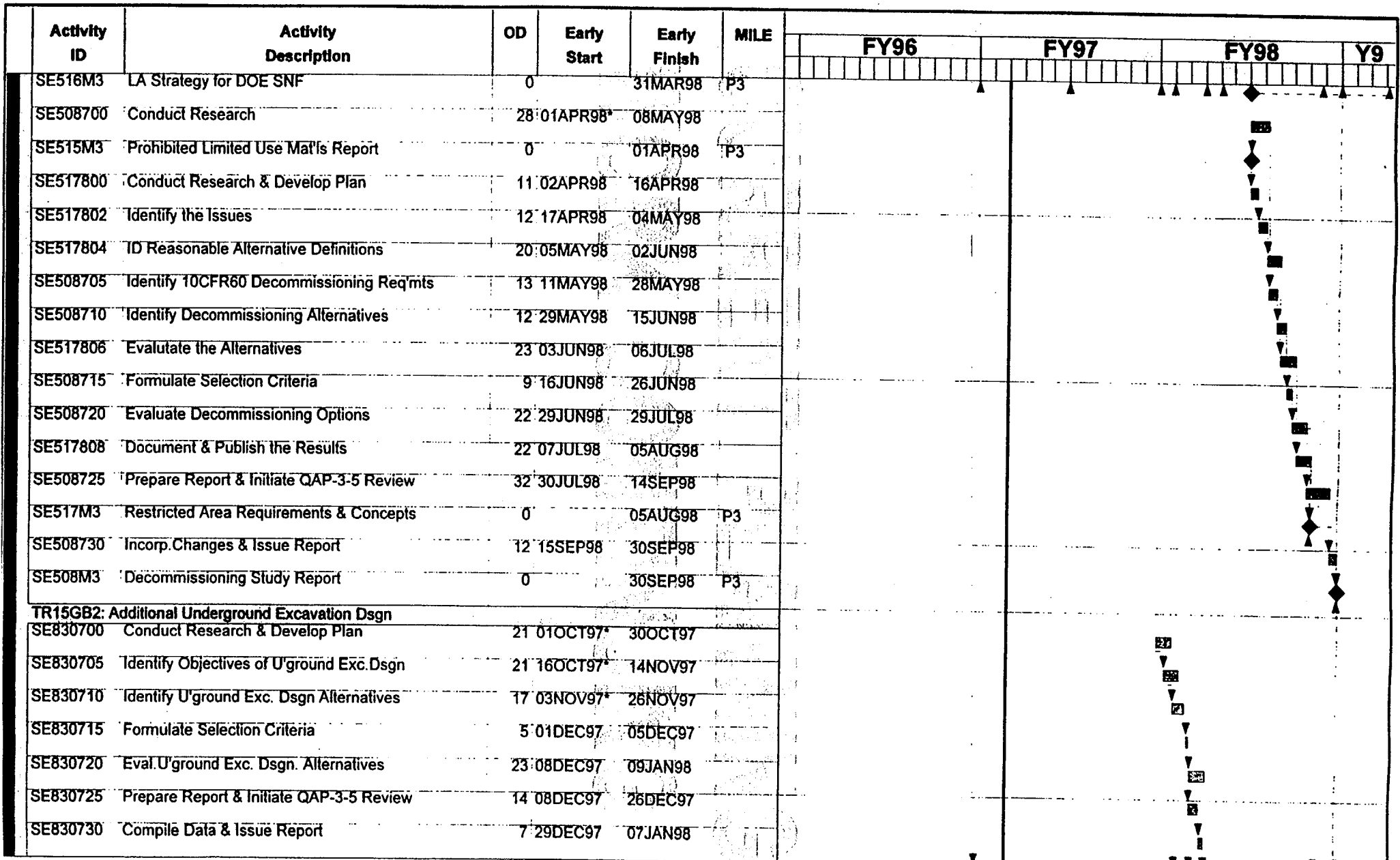
P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.6 Cont'd	TR246FB2 Cont'd	RP2403AA Cont'd		Radiological Waste Treatment Facility Ventilation		Input	X			
	TR46FB3	RP2402A1	30-May-97	Radiological Safety Design Analysis		Anal	X			
				Qualification of Microshield		V&V	X			
				Qualification of Qadcgsp 1.2		V&V	X			
				Qualification of MCNP		V&V	X			
				Waste Handling Facility Radiological Monitoring		Input	X			
		RP2402A2	30-Sep-97	Normal & Off-normal Dose Assessment	RP242AM	Anal	X			
	TR46FB4	RP2402C5	30-Jan-97	Operations/Staffing Letter Report	RP242CM	Ltr	X			X
	TR46FB5	RP2403C1	30-Sep-97	Site Grading & Drainage Plan		Dwg	X			X
		RP2403C2	30-Sep-97	MGDS Facility Layout		Input	X			
				Carrier/Cask Transport		Input	X			
		RP2403C3	30-Sep-97	Repository Surface Operations Overview	RP243CM	Dwg	X			X
				North Portal Operations Overview	RP243CM	Dwg	X			X
				North Portal Operations Area Site Map	RP243CM	Dwg	X			X
	TR46FB7	RP2405C1	01-May-97	DBE Screening Analysis II		Anal	X			
				Complete the Surface DBE Pilot Analysis		Comp.-Anal	X			
				Shipping Cask Slapdown in NOB Analysis		Anal	X			
				Spent Fuel Damage During Welding Analysis		Anal	X			
		RP2405C2	01-Jul-97	External Events Analysis		Anal	X			
		RP2405C3	27-Feb-97	Input to Aircraft Crash Credibility Analysis		Input	X			
		RP2405C4		Classification Analysis Support	LOE	LOE	X			
	TR46FB8	RP24071	30-Apr-97	Reference Design Roadmap		Ltr				

## WBS 1.2.4 Repository Products (Rev 0, 12/18/96)

P&S ACCOUNT	SUMMARY ACCOUNT	ACTIVITY NUMBER	ACTIVITY END DATE	PRODUCT TITLE	DELIVERABLE NUMBER	PRODUCT TYPE	VA COMPONENT			
							PRELIMINARY DESIGN CONCEPT	TSPA-VA	LA PLAN	ESTIMATE OF COST
1.2.4.6 Cont'd	TR46FB8 Cont'd	RP24071 Cont'd		Engineering Files Report Input	RP247M3	Ltr				
		RP24072	30-Sep-97	Operational Staffing Impacts Analysis		Input	X			X
				Operational Wastes/Emissions Impacts Analysis		Input	X			
				HVAC Energy Analysis For Support Structures		Input	X			X
				Electrical Load Estimate		Input	X			X
				Water/Sewage Balance		Input	X			X
				Other Resource Data		Input	X			X
				Off-normal consequences analysis		Input	X			
				Construction Impacts Analysis		Input	X			X
				Engineering Files Report Input Update	RP247M3B	Ltr				
1.2.4.6		RP020700	01APR97	Fifth Rail Corridor Analysis						
		RP020702	05JUN97	Refinement of Rail Corridor Alignments	RP020M3	Dwg	X			X
1.2.4.7	TR47FB1	RP500705	30-Sep-97	Database of Repository Construction Material	RP1206M3	Tech Doc	X	X		X
	TR47FB2	RP510710	31-Jul-97	Near Field Environment of Emplacement Drifts		Anal	X	X		
	TR47FB3	RP506705	31-Dec-96	Materials for Emplacement Drift Ground Support		Anal	X	X		X
		RP506710	01-Apr-97	Stability Analysis for Emplacement Drifts		Anal	X	X		
		RP506715	16-Apr-97	Lining Design for Emplacement Drifts		Anal	X	X		X
		RP506720	30-Sep-97	Emplacement Drift Ground Support GA - Isometric	RP120M3C	Dwg	X	X		
				Emplacement Drift Ground Support Plan & Profile	RP120M3C	Dwg	X	X		X
				Emplacement Drift Ground Support Sections	RP120M3C	Dwg	X	X		X
				Emplacement Drift Ground Support Segment Details & Tolerances	RP120M3C	Dwg	X	X		X
				Accesses Ground Support Section Views	RP120M3C	Dwg	X	X		X







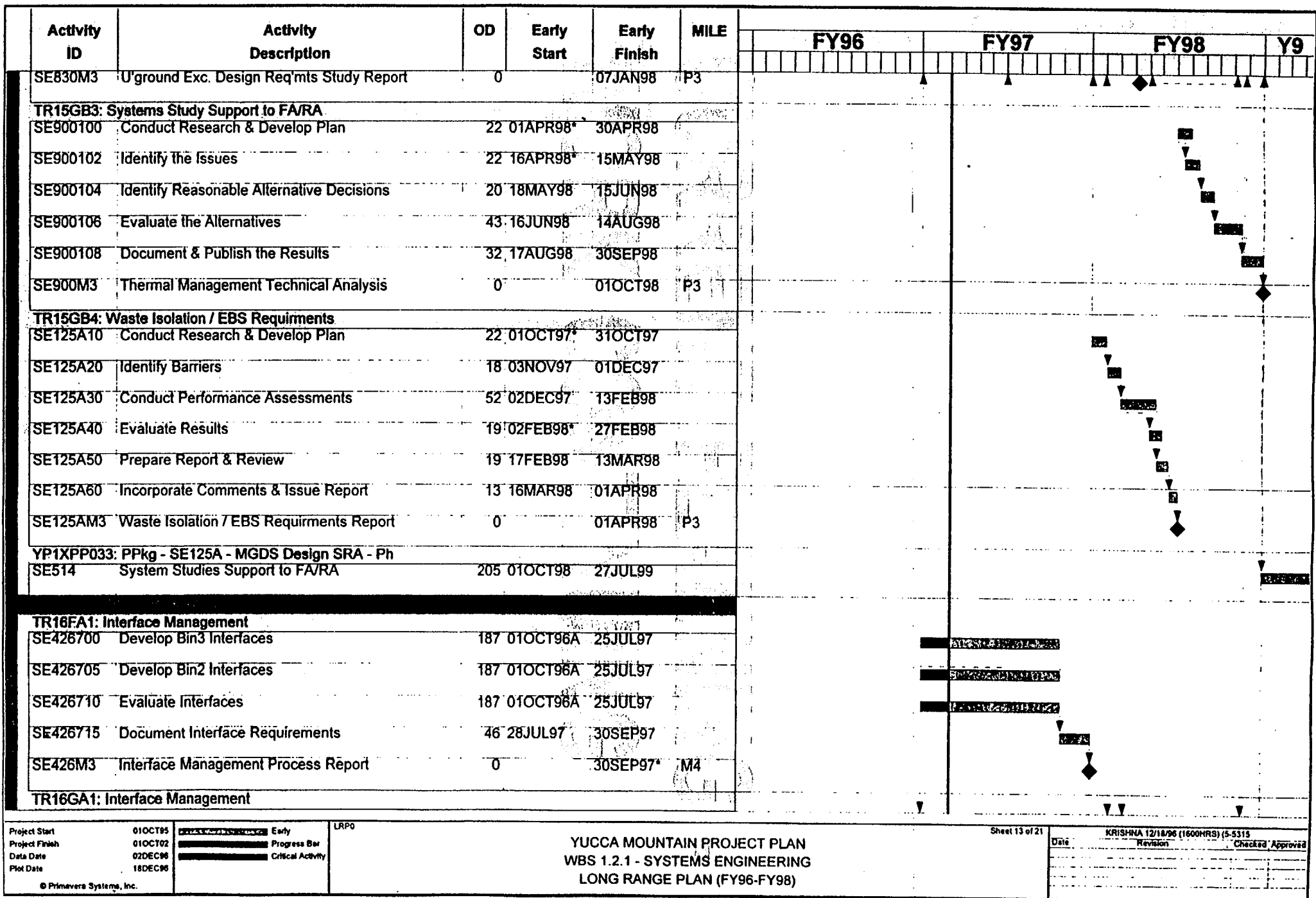
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 Project Finish 01OCT02  
 Data Date 02DEC96  
 Plot Date 18DEC96

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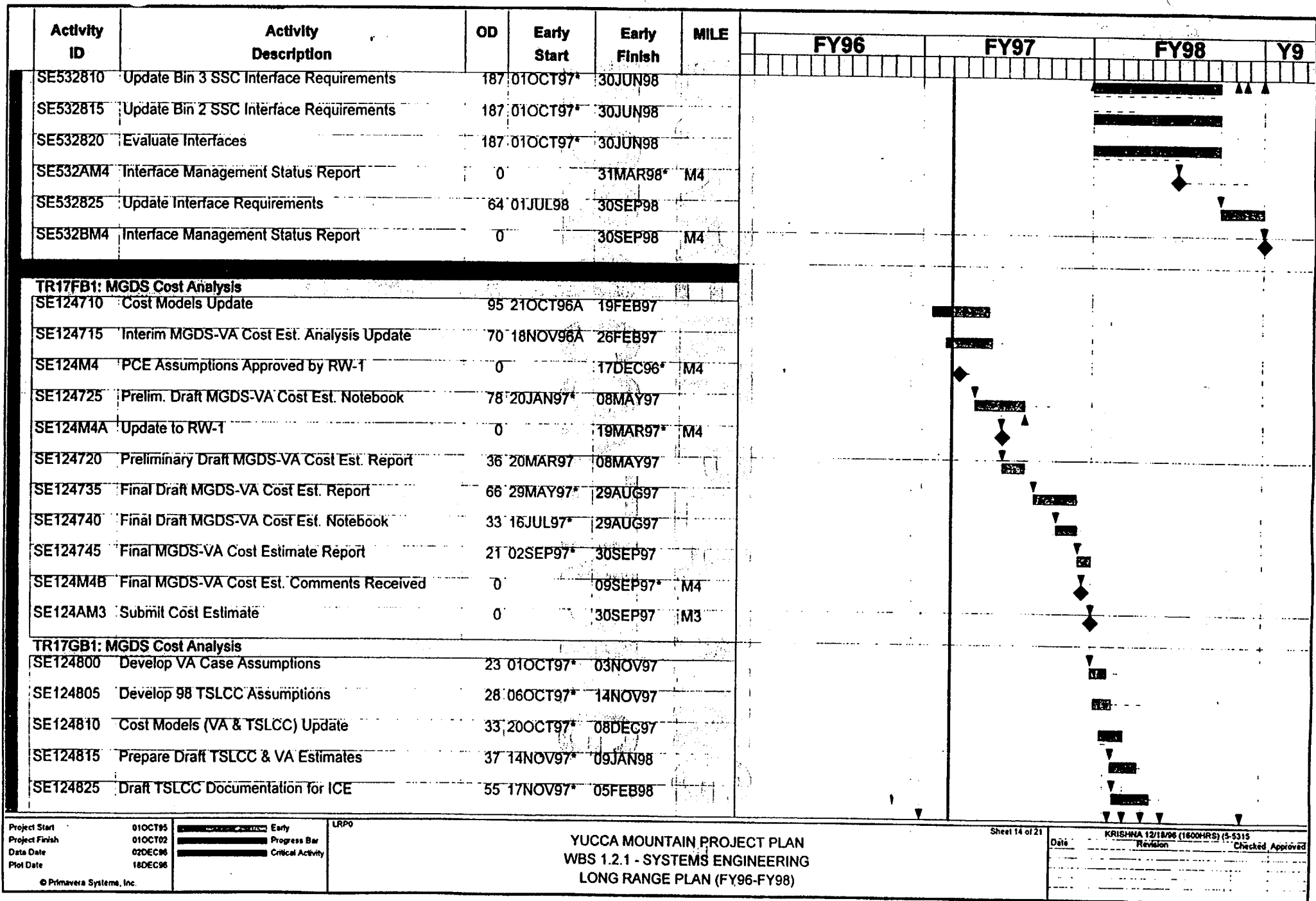
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 WBS 1.2.1 - SYSTEMS ENGINEERING  
 LONG RANGE PLAN (FY96-FY98)

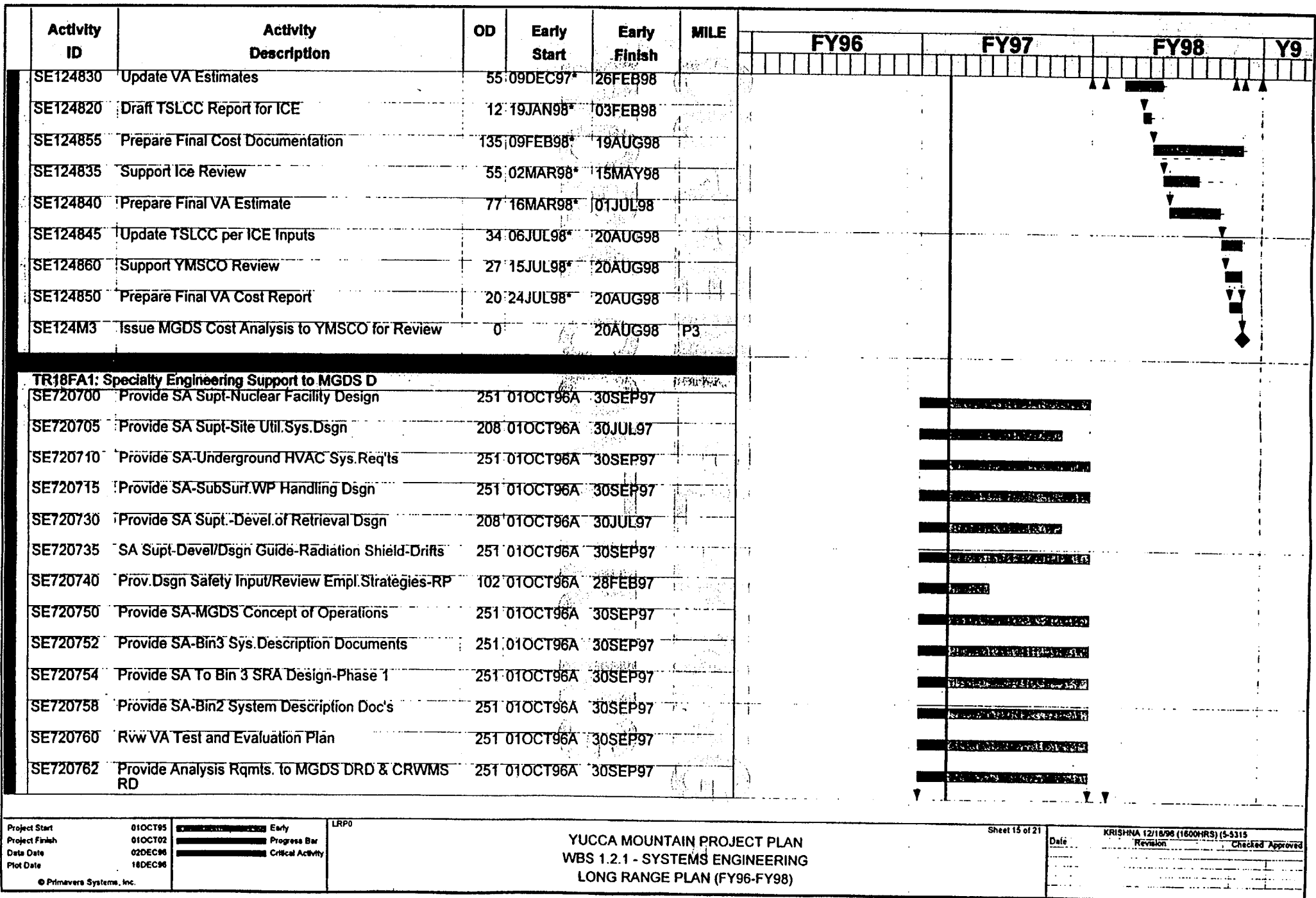
Sheet 12 of 21

Date KRISHNA 12/18/98 (1600HRS) (5-5315)  
 Revision  
 Checked/Approved









Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9											
SE720764	Provide Safety Anal.Input to Bin 2 SRA/Dsgn Ph-1	251	01OCT96A	30SEP97																																																	
SE720766	Provide Inputs on the Applic. of Safety Analysis	251	01OCT96A	30SEP97																																																	
SE720770	Provide Safety Anal. Inputs to Waste Quant.& Mix	124	01OCT96A	01APR97																																																	
SE720772	Provide SA Inputs to Retrievalability ConOps	133	01OCT96A	14APR97																																																	
SE720774	Provide Safety Anal. Sppt. to Document Rvws	251	01OCT96A	30SEP97																																																	
SE720776	Provide SA Suppt/Waste Isolation Req'mts Study	124	01OCT96A	01APR97																																																	
SE720788	Provide Safety Anal. Sppt to Perf.Confirm.Study	251	01OCT96A	30SEP97																																																	
SE720790	Provide Safety Anal. Sppt. to DBE Def. & Anal.	251	01OCT96A	30SEP97																																																	
SE720795	Rvw In'face Drwg Pkgs for Incl.Saftey Anal. Rqm't	251	01OCT96A	30SEP97																																																	
SE720796	Provide SA Inputs tp Prelim. EBS Sys. Des. Doc.	251	01OCT96A	30SEP97																																																	
SE720798	Review/Chk Probabilistic Anal.-WP Dsgns	251	01OCT96A	30SEP97																																																	
SE722700	Provide Human Factors Engr (HFE) Sppt for MGDS	251	01OCT96A	30SEP97																																																	
SE722706	Prelim. HFE Dsgn Ops & Maintainability/Utilities	208	01OCT96A	30JUL97																																																	
SE722710	Prelim.HFE Dsgn Inputs Surface Nuclear Facility	209	01OCT96A	31JUL97																																																	
SE722712	Prelim. HFE Anal.Determ. Impact-Dsgn Changes	251	01OCT96A	30SEP97																																																	
SE722714	Provide HFE Inputs the Oper. Philosophy Covering	67	01OCT96A	09JAN97																																																	
SE722716	Prepare HFE Dsgn Guide/Inputs	251	01OCT96A	30SEP97																																																	
SE722718	Prov.HFE Inputs to Dsgn/Major Sys. & Comp.Descrip.	251	01OCT96A	30SEP97																																																	
SE722724	Provide HFE Inputs WP Implacment Concept	251	01OCT96A	30SEP97																																																	
SE722726	Provide HFE Inputs/Rvw of Perf. Confirmation	124	01OCT96A	01APR97																																																	
SE722728	Provide HFE Inputs to Off-Normal Retrieval CoO	230	01OCT96A	29AUG97																																																	
SE722730	Prepare Dsgn Guide/Inputs for HFE Criteria	251	01OCT96A	30SEP97																																																	
SE722732	Provide HFE Inputs to the Dev. Pot. Emplacement	102	01OCT96A	28FEB97																																																	

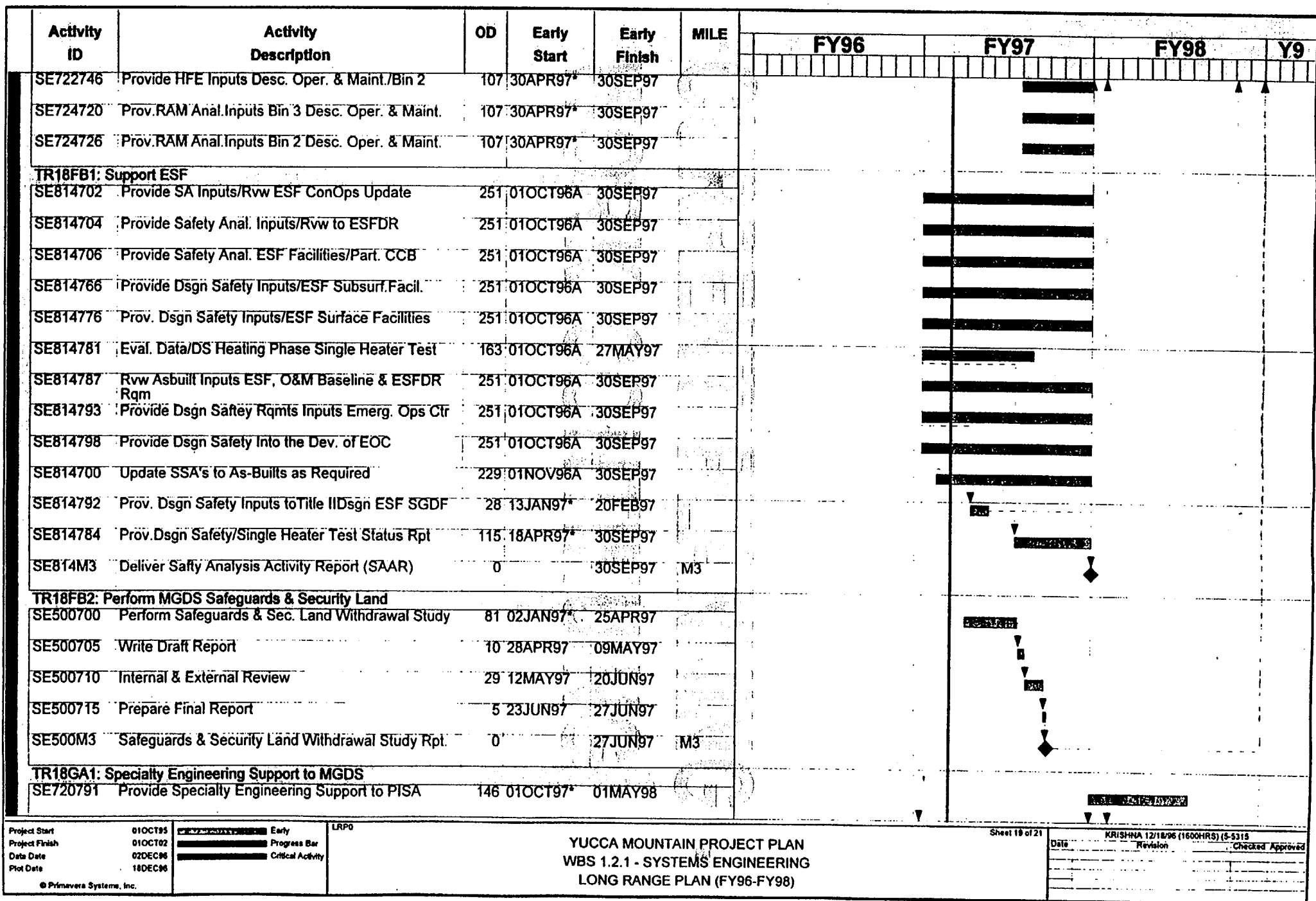
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WBS 1.2.1 - SYSTEMS ENGINEERING  
LONG RANGE PLAN (FY96-FY98)**

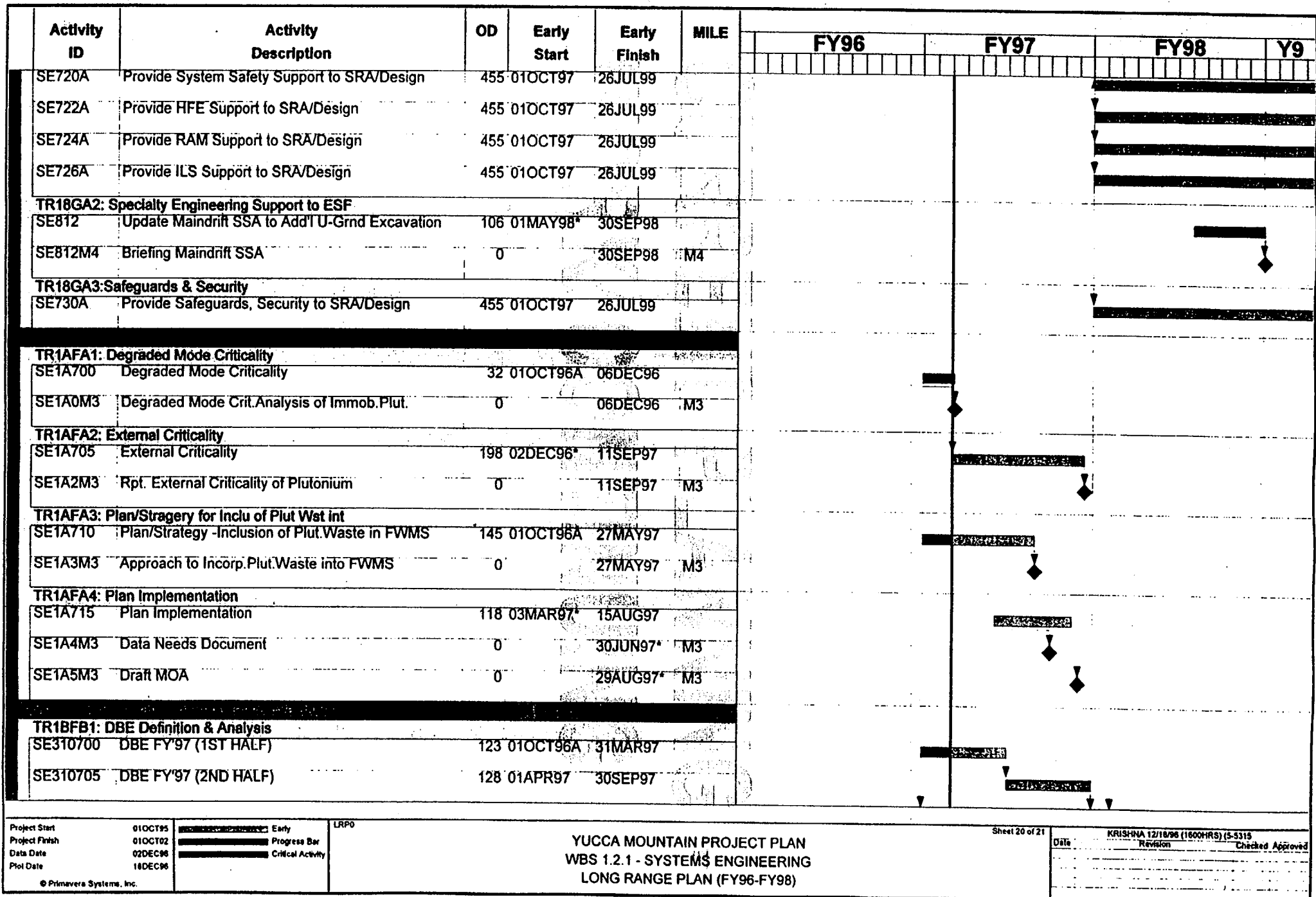
KRISHNA 12/18/98 (1600HRS) 15-5315

Date	Revision	Checked	Approved
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11 Date KRISHNA 12/18/98 (1600HRS) (5-5315) Revision Checked Approved

Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9			
SE724716	Provide RAM Anal. Inputs Bin 3 Sys. Des. Doc's	251	01OCT96A	30SEP97																																									
SE724718	Prov.RAM Anal.Inputs SRA Dsgn P-1/Bin 3	251	01OCT96A	30SEP97																																									
SE724722	Prov. RAM Anal. Inputs Bin 2 Sys.Desc.Doc (SDD)	251	01OCT96A	30SEP97																																									
SE724724	Prov.RAM Anal.Inputs SRA/Dsgn P-1 for Bin 2	251	01OCT96A	30SEP97																																									
SE724728	Rvw the VA Test & Eval. Plan to Ensure RAM	251	01OCT96A	30SEP97																																									
SE724730	Provide New/Update/Mod. RAM	251	01OCT96A	30SEP97																																									
SE724732	Provide Inputs on Applic. of RAM Analysis	251	01OCT96A	30SEP97																																									
SE724734	Provide RAM Analysis Inputs to Retrie. CoO	133	01OCT96A	14APR97																																									
SE724736	Provide RAM Analysis Sppt. to Doc. Rvws	251	01OCT96A	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	01OCT96A	30SEP97																																									
SE724750	Prov.RAM Supt. Devel. Retrieval Dsgn.	230	01OCT96A	29AUG97																																									
SE722720	Provide HFE Dsgn Inputs/Subsurf. Facility Arrang	187	01NOV96A	27JUN97																																									
SE722722	Prov.Prelim.HFE Inputs/Specs, Emerg. Warn. System	187	01NOV96A	27JUN97																																									
SE722704	Prelim. HFE Dsgn to Include Site & Facil. Access	147	03JAN97*	31JUL97																																									
SE720720	Provide SA Supt.-Prelim.Sealing/Closure Dsgn	141	11FEB97*	29AUG97																																									
SE724748	Prov.RAM Supt. Prelim.Sealing/Closure Dsgn	141	11FEB97*	29AUG97																																									
SE722756	Provide Inputs Concerning HFE Dsgn Features	128	01APR97*	30SEP97																																									
SE720756	Provide SA-Desc. of Ops. & Maint.Desc.-Bin 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																																									









## **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 ID	Activity description	Early start	Early finish	% Comp	FY97												FY98												FY99												
					O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	
1.2.2- Waste Package																																									
YP2XPP017: PPkg - WP0020M2B - Complete EMCR Rev	WP0020M2B	Complete Engr. Matls. Char. Rpt. Rev 2	01APR99	0																																					
YP2XPP021: PPkg - WP0035M2B - Complete WFCR Rev	WP0035M2B	Complete Waste Form Char. Rpt. Rev 1	26FEB97	0																																					
YP2XPP023: PPkg - WP015M2B - Complete EMCR Rev 1	WP015M2B	Complete EMCR Rev 1	26FEB97	0																																					
YP2XPP028: PPkg - WP080M2 - Complete Disposal Cr	WP080M2	Complete Disposal Criticality Technical Report	14AUG96	100																																					
YP2XPP032: PPkg - WP110M2B - Complete WFCR Rev 2	WP110M2B	Complete Waste Form Char. Rpt. Rev 2	30NOV98	0																																					
YP2XPP036: PPkg - WP150M2 - Update Disposal Cril	WP150M2	Update Disposal Criticality Topical Report	08OCT97	0																																					
1.2.2.1- Waste Package Coordination and Planning																																									
TR21FA2: Management & Integration Outside EBS	WP21FA2	Management & Integration Outside EBS - Ph I	01OCT96	30SEP97	8																																				
TR21FA3: OPI/EDC/PCG - Ph I	WP21FA3	OPI/EDC/PCG - Ph I	01OCT96	30SEP97	8																																				
TR21FA4: MGDS Waste Package Dsgn Review Phase I	WP21FA4	MGDS Phase I Dsgn Review - Waste Package	02APR97	30SEP97	0																																				
TR21FA5: WPD Management & Integration Phase I	WP21702	Dev WP Design Completion Letter Report	01OCT96	11SEP97	9																																				
WP21FA5	WPD Management & Integration		01OCT96	30SEP97	8																																				
WP21704	Submit EBS/WP Ph-1 Dsgn. Comp. Letter Rpt		12SEP97	0																																					
TR21FA6: LLNL M&I Phase I	WP21FA6	LLNL M&I Phase I	01OCT96	30SEP97	8																																				
TR21FA7: Support LLNL Lab Leads	WP21FA7	Support LLNL Lab Leads	01OCT96	30SEP97	8																																				
TR21FA8: PR Preparation - LLNL	WP21FA8	PR Preparation - LLNL	01OCT96	30SEP97	8																																				
TR21FA9: Annual/Long Range Planning - LLNL	WP21FA9	Annual/Long Range Planning - LLNL	01OCT96	30SEP97	8																																				
TR21FAA: Waste Package Consulting Board	WP21FAA	Waste Package Consulting Board	02DEC96	29MAY97	0																																				

Project Start

01OCT96

Project Finish

03SEP98

Data Date

01NOV98

Plot Date

05DEC98

Early

Progress Bar

Critical Activity

LRPD WPC2

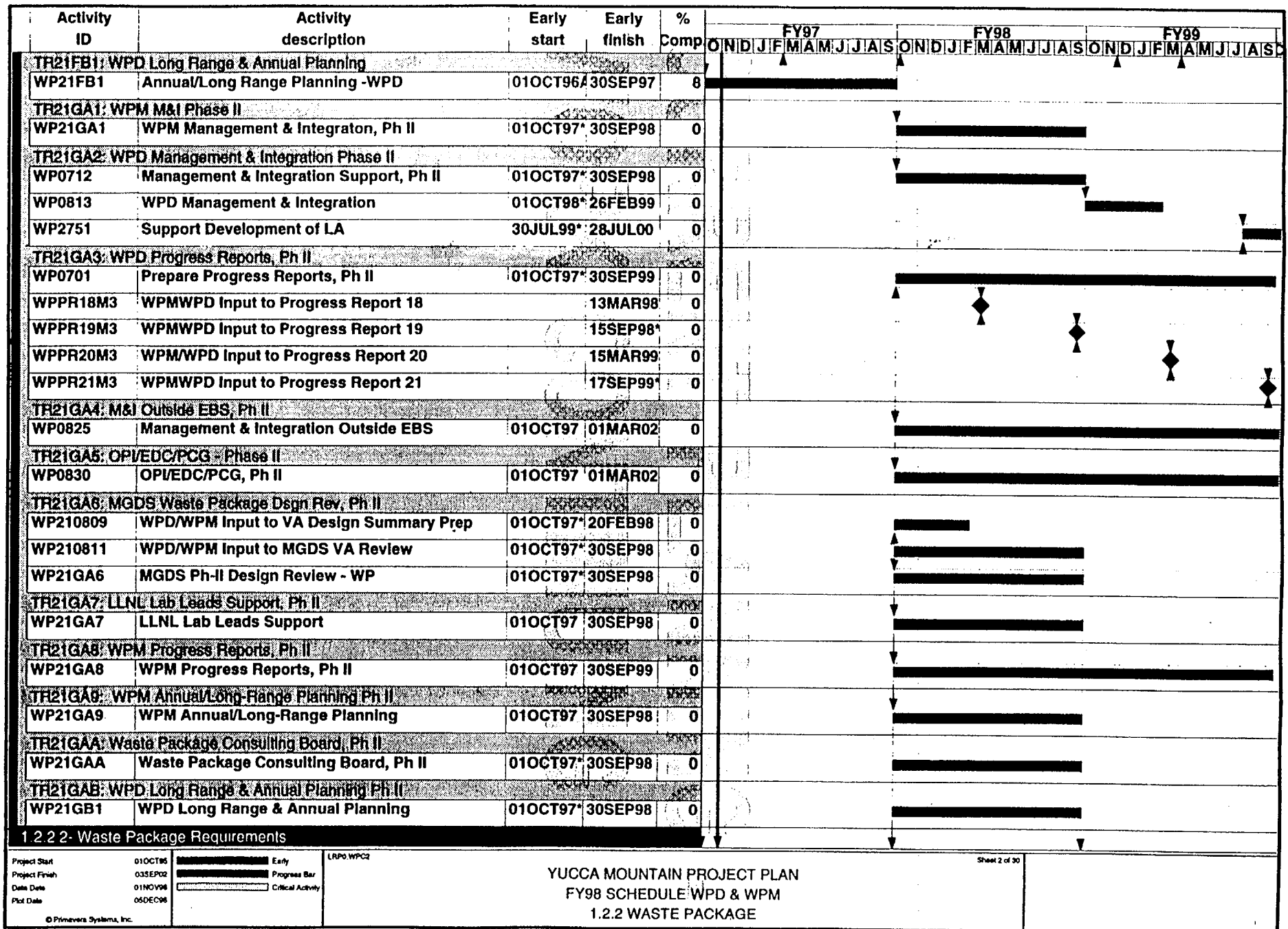
YUCCA MOUNTAIN PROJECT PLAN

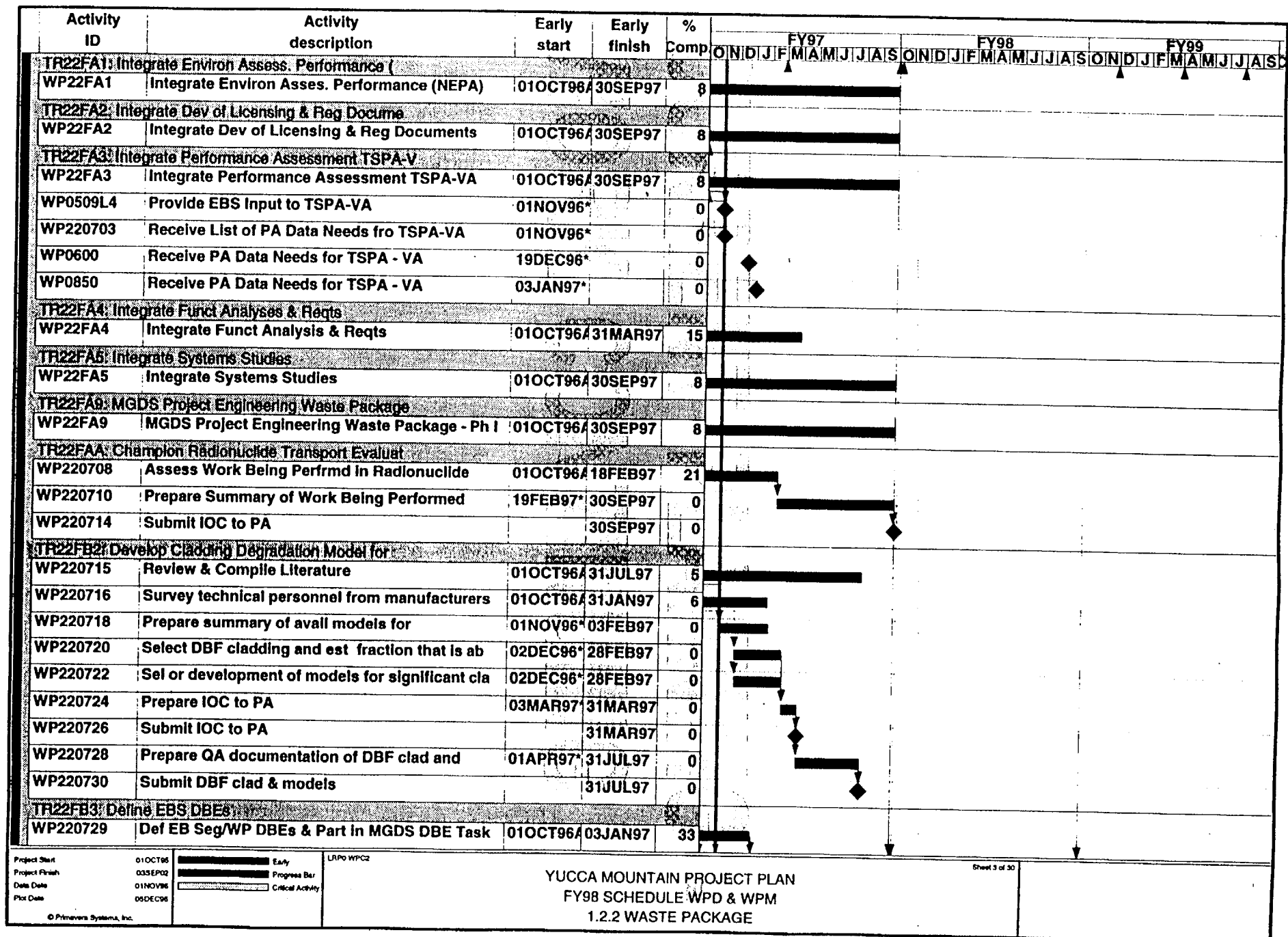
FY98 SCHEDULE WPD & WPM

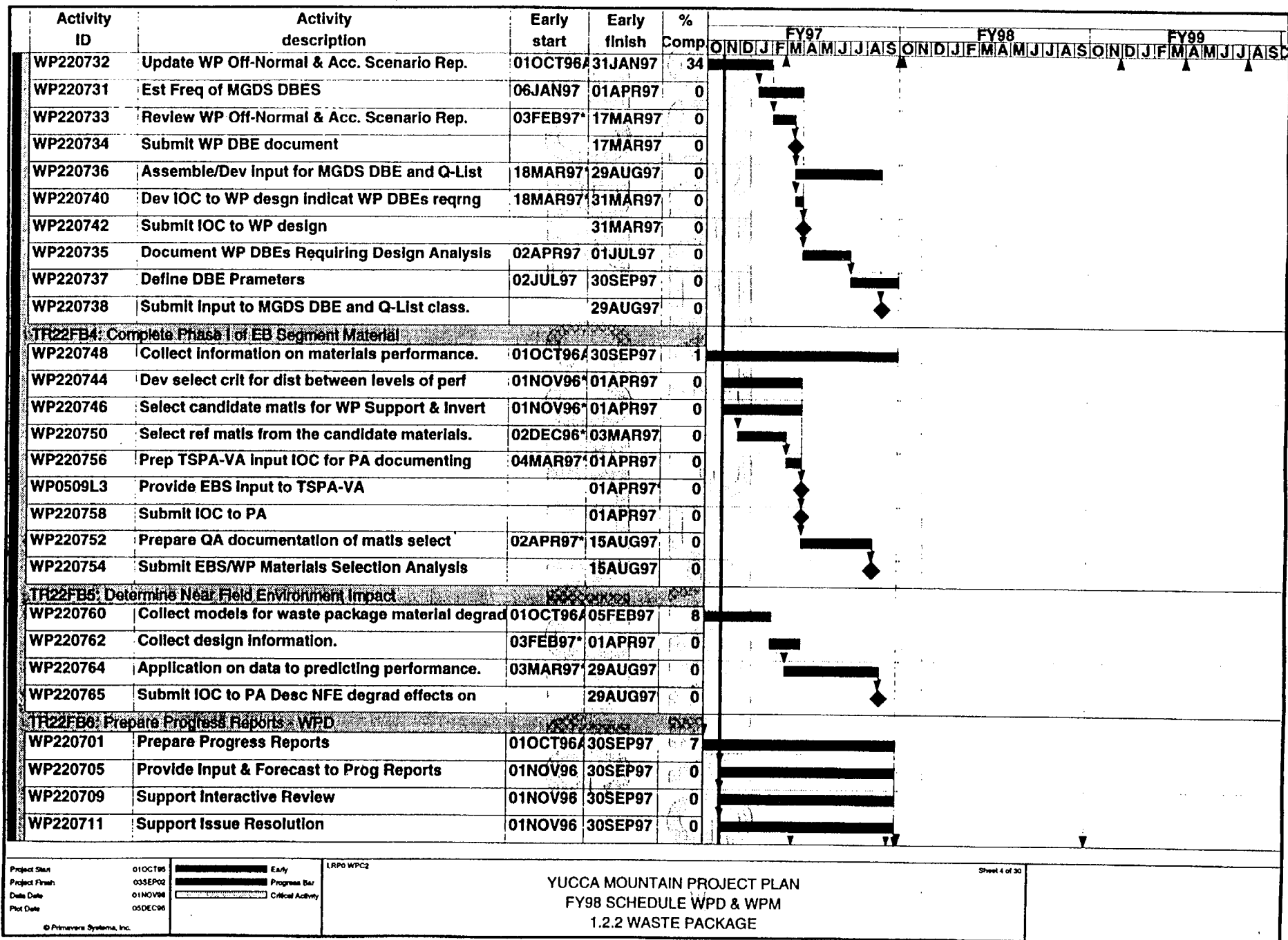
1.2.2 WASTE PACKAGE

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Activity ID	Activity description	Early start	Early finish	% Comp	<div> <div>FY97</div> <div>FY98</div> <div>FY99</div> </div>											
WPPR16M3	WPM/WPD Input to progress Report 16		17MAR97	0												
WPPR17M3	WPMWPD Input to Progress Report 17		15SEP97	0												
TR22GA3: Systems Studies Ph II																
WP0509E	Integrate Systems Studies	06OCT97	30JUL99	0												
TR22GA4: Design Criteria & Requirements Ph II																
WP0509F	Design, Criteria & Requirements, Ph II	01OCT97	27JUL99	0												
TR22GA5: Environ Assessment Performance																
WP0509H	Integrate Environ Assessment Performance	01OCT97	27JUL99	0												
TR22GA6: Performance Assessment TSPA-LA																
WP0509I	Integrate Performance Assessment TSPA-LA	01OCT97	27JUL99	0												
WP0600A	Receive PA Data Needs for TSPA - LA	12MAR98		0												
WP0509IA	Provide EBS Input to TSPA-LA		29JAN99	0												
WP0509IB	Receive Dsgn Assess.Feedback from PA		17MAR99	0												
WP0509D	Receive PA Data Needs for TSPA-LA	18MAR99		0												
TR22GA7: Regulatory & Licensing Ph II																
WP0509K	Integrate Dev of Licensing & Reg Documents	01OCT97	27JUL99	0												
TR22GA9: MGDS Project Engineering Waste Package																
WP22GA9	MGDS Project Engineering Ph-II - Waste Package	01OCT97	30SEP98	0												
WP0920	MGDS Project Engineering -WP, LA	01OCT98	29SEP00	0												
TR22GAA: Radionuclide Transport Evaln, Ph II																
WP220812	Eval Data & Dev Recommendations	01OCT97	30SEP98	0												
WP22GB6	Champion Radionuclide Transp.Eval.-Ph II	01OCT97	30SEP98	0												
WP220807	Coord Quarterly Workshops	01OCT98	30SEP99	0												
TR22GB1: WPD Input to PISA Chap 5 & 6																
WP050A9M	Prepare WPD Input to PISA Chap 5&6	01OCT97	29JUL98	0												
WP050A9D	Issue Draft WPD Input to PISA Chap 5&6		27FEB98	0												
WP050A9E	Issue Final WPD Input to PISA Chap 5&6		30JUN98	0												
TR22GB2: WPM Input to PISA Chap 5 & 6																
WP0802	Prepare WPM Input to PISA Chapter 5 & 6	01OCT97	29JUL98	0												
WP0802A	Issue Draft WPM Input to PISA Chapter 5 & 6		27FEB98	0												
WP0802B	Issue Final WPM Input to PISA Chapter 5 & 6		30JUN98	0												
TR22GB4: EB Segment Materials Selection Ph II																

Project Start 01OCT95  
 Project Finish 03SEP02  
 Data Date 01NOV98  
 Plot Date 05DEC98

LRPO WPC2

YUCCA MOUNTAIN PROJECT PLAN  
 FY98 SCHEDULE WPD & WPM  
 1.2.2 WASTE PACKAGE

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Activity ID	Activity description	Early start	Early finish	% Comp		FY97	FY98	FY99
WP0807	Document & Update EB Segment Matls Selection	01OCT97*	30SEP98	0				
WP220805	Revised WP/EB Seg Matls Selection Analysis Ph II		30SEP98	0				
<b>TR22GB5: Cladding Degradation Model for TSPA LA</b>								
WP0808	Develop Cladding Degrad.Model for TSPA-VA	01OCT97*	30JUL98	0				
<b>TR22GB7: Near Field Environment Impacts, Ph II</b>								
WP227	Near Field Environment Impacts, Phase II	01OCT97*	30SEP98	0				
<b>1.2.2.3.1- Multi-Purpose Canister</b>								
<b>TR231FA1: Complete Phase I of CF Disposal Contal</b>								
WP231720	Dev Compare & Contrast Table for UCF Evals	01OCT96*	31MAR97	15				
WP231722	DevTbl Comparing M&O 93 MPC Design	01APR97*	30SEP97	0				
<b>TR231GB1: CF Disposal Container Ph II</b>								
WP231800	Prepare List of Eng'g Eval's/Analyses	01OCT97*	02DEC97	0				
WP231802	Perform Thermal evaluations	01OCT97*	10JUL98	0				
WP231804	Perform Structural evaluations	01OCT97*	10JUL98	0				
WP231806	Perf.Criticality Determination, Evaluation	01OCT97*	01JUL98	0				
WP231808	Evaluate 2 Std. Canisters	01OCT97*	16MAR98	0				
WP231809	Group Canister Types & Select 1	01OCT97*	22DEC97	0				
WP231817	Support Standard Canister Comm Dev Effort	01OCT97*	30SEP98	0				
WP231818	Perform Shielding Analyses	01OCT97*	08JUL98	0				
WP231814	Prepare Technical Input Sheets	03DEC97*	19FEB98	0				
WP231812	Assess vendor(s) CF des acceptability to MGDS	05JAN98*	30SEP98	0				
WP231811	Sub Des Basis Canister Sel Letter Report		16MAR98	0				
WP231810	Prepare engineering sketches	17MAR98*	27OCT98	0				
WP0501	Complete Dev of CF Disposal Container Design	28OCT98*	27OCT99	0				
WP231801	Consolidate CF Des Input Fm SDDs (LOE)	02AUG99*	31JUL00	0				
WP2752	Document Development of CF Disposal Container	02AUG99*	04FEB00	0				
<b>1.2.2.3.2- High-Level Waste Glass Canister</b>								
<b>TR232FA1: Complete Phase I of HLW Disposal Conta</b>								
WP232718	Compare & Cont HLW DC to VA Evals of UCF DC	01OCT96*	31MAR97	15				
WP232720	Revw ACD Design Evals & Report	01APR97*	30SEP97	0				
<b>TR232GB1: HLW Disposal Container Ph II</b>								

Project Start  
01OCT96

Project Finish  
03SEP02

Date Date  
01NOV98

Pilot Date  
05DEC98

Legend:

- Early
- Progress Bar
- Critical Activity

LRPO WPC2

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### YUCCA MOUNTAIN PROJECT PLAN

### FY98 SCHEDULE WPD & WPM

### 1.2.2 WASTE PACKAGE

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Activity ID	Activity description	Early start	Early finish	% Comp	FY97 O N D J F M A M J J A S	FY98 O N D J F M A M J J A S	FY99 O N D J F M A M J J A S
WP232800	Prepare List of Eng'g Eval's/Analyses	01OCT97*	05DEC97	0			
WP232802	Thermal evaluations	01OCT97*	13JUL98	0			
WP232804	Structural evaluations	01OCT97*	13JUL98	0			
WP232806	Disposal Criticality Determination	01OCT97*	09APR98	0			
WP232816	Update val ver & maintain analytical codes (LOE)	01OCT97*	30SEP98	0			
WP232812	Assess vendor(s) HLW DC Des acceptability to	05JAN98*	30SEP98	0			
WP232808	Prepare technical input sheets	20FEB98*	04MAY98	0			
WP232810	Prepare engineering sketches	05MAY98*	17DEC98	0			
WP232814	Develop and coordinate the MGDS/EBS inputs	01JUL98*	30SEP98	0			
WP0503	Complete Dev of HLW Disposal Container Design	18DEC98*	17DEC99	0			
WP2754	Document Development of HLW Disposal	18DEC98*	17JUN99	0			
WP232801	Consolidate HLW DC Des Input Fm SDDs (LOE)	02AUG99*	31JUL00	0			
<b>1 2 2 3 3- Uncanistered Spent Fuel</b>							
<b>TH233FA1: Evaluate DOE-Owned SNF Phase I</b>							
WP233722	Participate in the DOE Canister Working Group	01OCT96*	31MAR97	15			
WP233724	Coordinate DOE/EMs SNF canisterization and	01APR97*	30SEP97	0			
<b>TH233FB1: Complete PH I EBS Segment Parts List &amp;</b>							
WP233703	Prepare Initial Indentured parts list	01OCT96*	13DEC96	69			
WP233728	Coord dev of drawing input sheets	01OCT96*	19DEC96	34			
WP233730	Dev prel tech drwgs for UCF DC compnts	02JAN97*	30JUN97	0			
WP233732	Develop tech drwgs for other EBS compnts	02JAN97*	30JUN97	0			
WP233738	Dev WPD Program Drawings	02JAN97*	30SEP97	0			
WP233735	Sub EBS/WP Parts List		30SEP97	0			
<b>TH233FB2: Perform Probabilistic Eval. of WP Des</b>							
WP233744	Perform 3rd WP Prob. Crit. Analyses	01OCT96*	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			
WP233747	Prep Final draft 3rd WP Prob Crit Analyses	09JUN97*	16SEP97	0			

Project Start      01OCT96

Project Finish    03SEP02

Date Date         01NOV96

Plot Date          05DEC96

Legend:

- [Solid Bar] Early
- [Hatched Bar] Progress Bar
- [Dashed Bar] Critical Activity

LAMP WPCZ

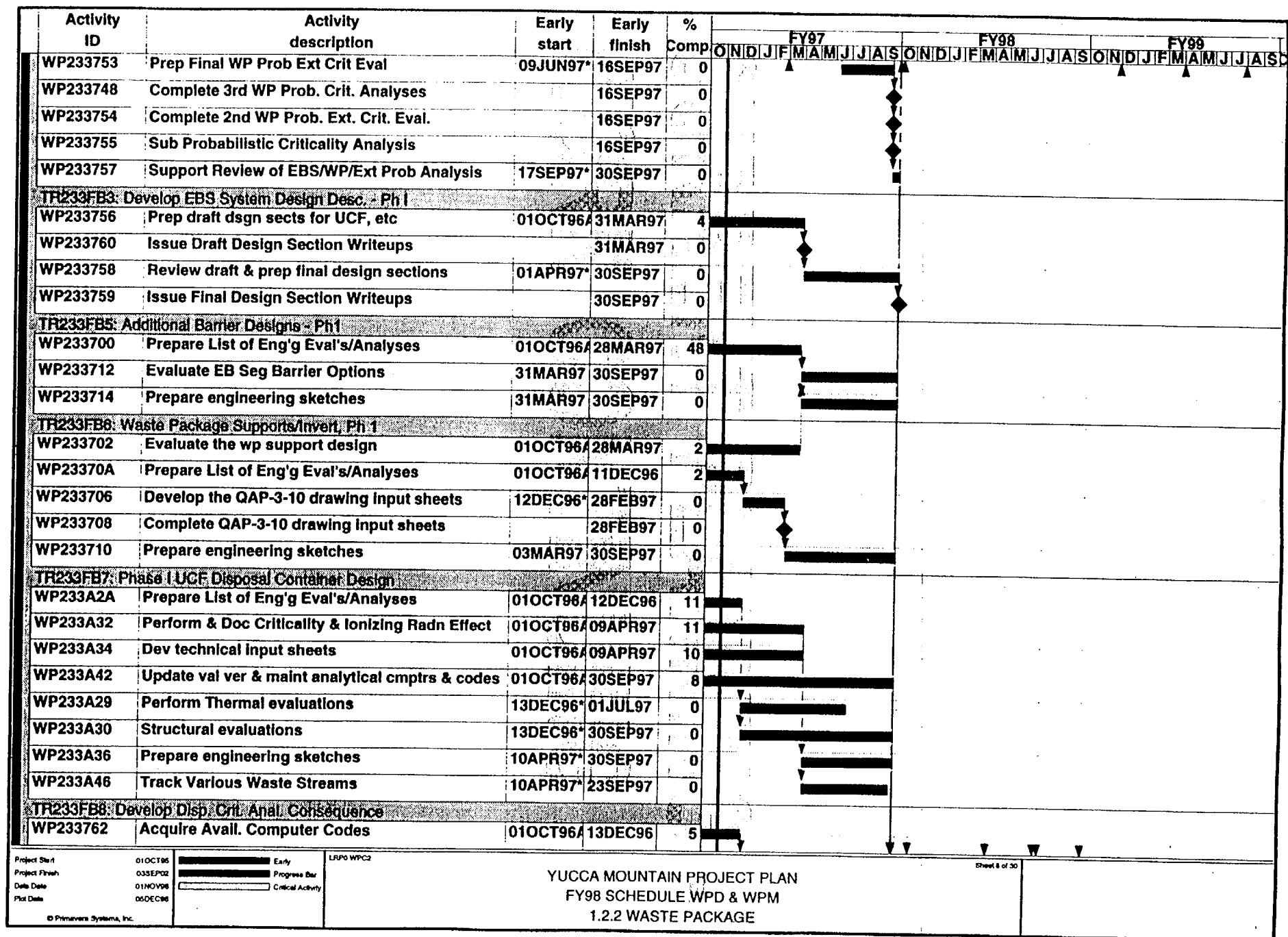
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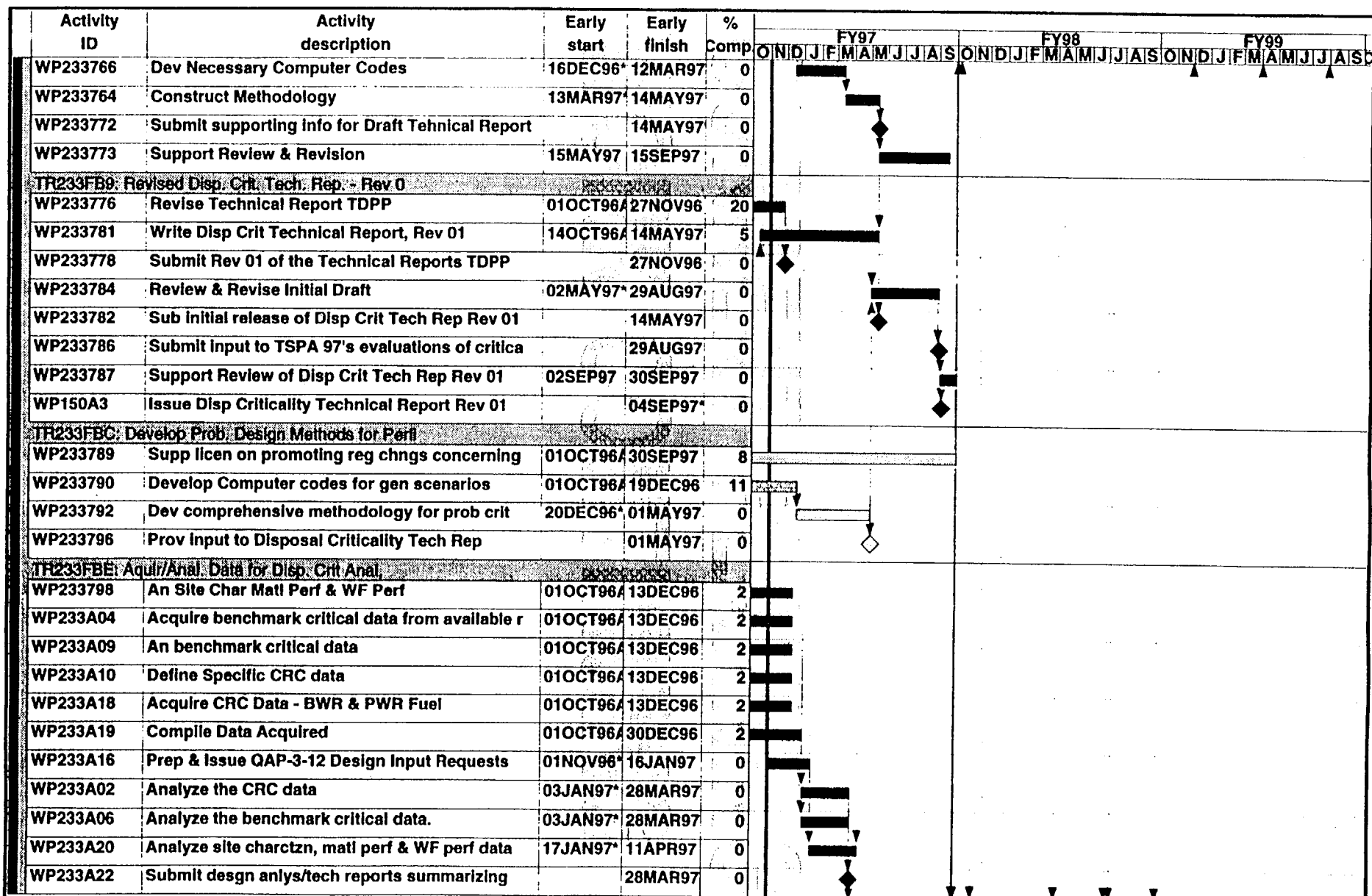
### YUCCA MOUNTAIN PROJECT PLAN

### FY98 SCHEDULE WPD & WPM

### 1.2.2 WASTE PACKAGE

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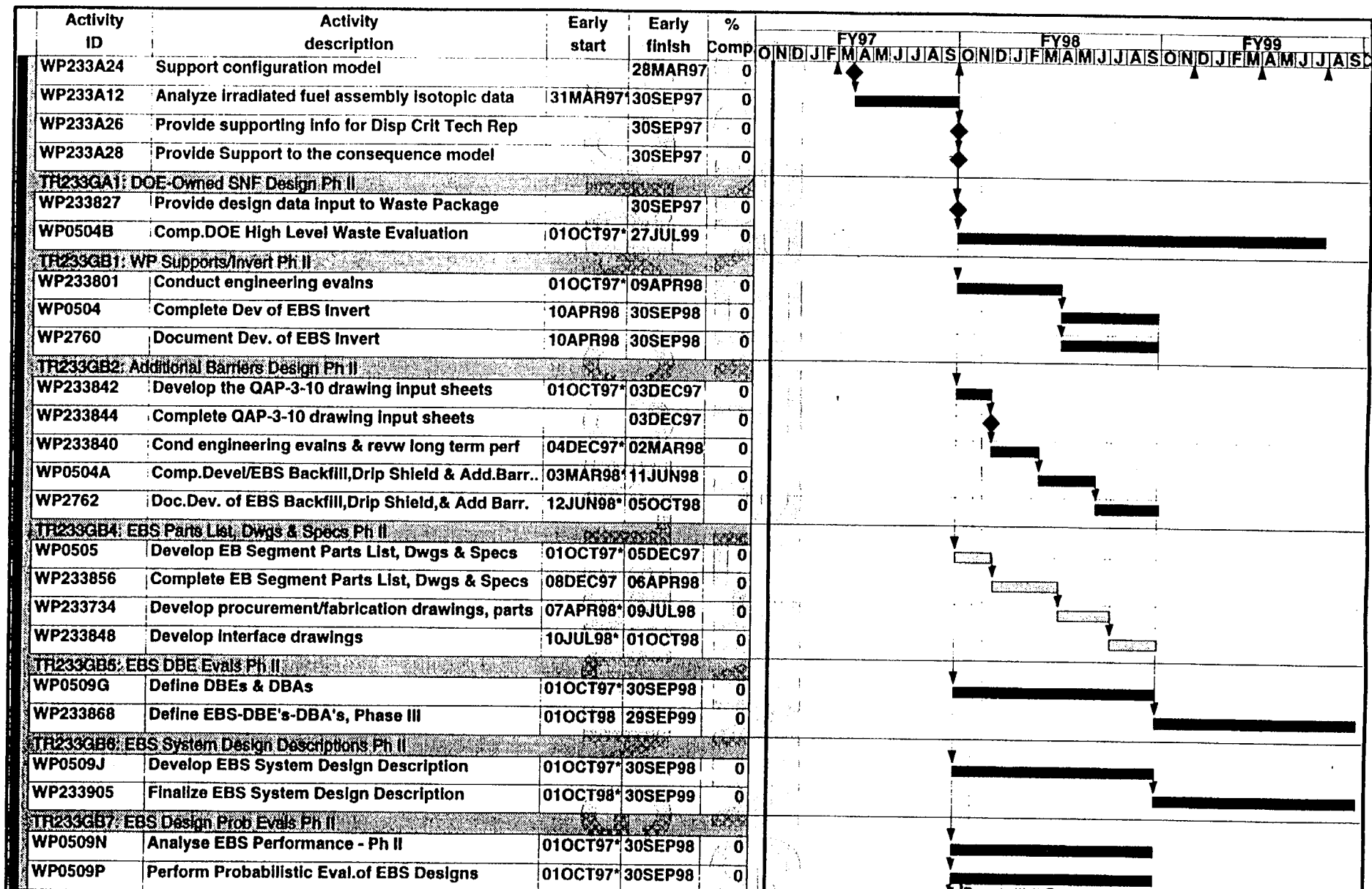


Project Start 01OCT96  
 Project Finish 03SEP97  
 Data Date 01NOV96  
 Plot Date 05DEC96

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YUCCA MOUNTAIN PROJECT PLAN  
 FY98 SCHEDULE WPD & WPM  
 1.2.2 WASTE PACKAGE

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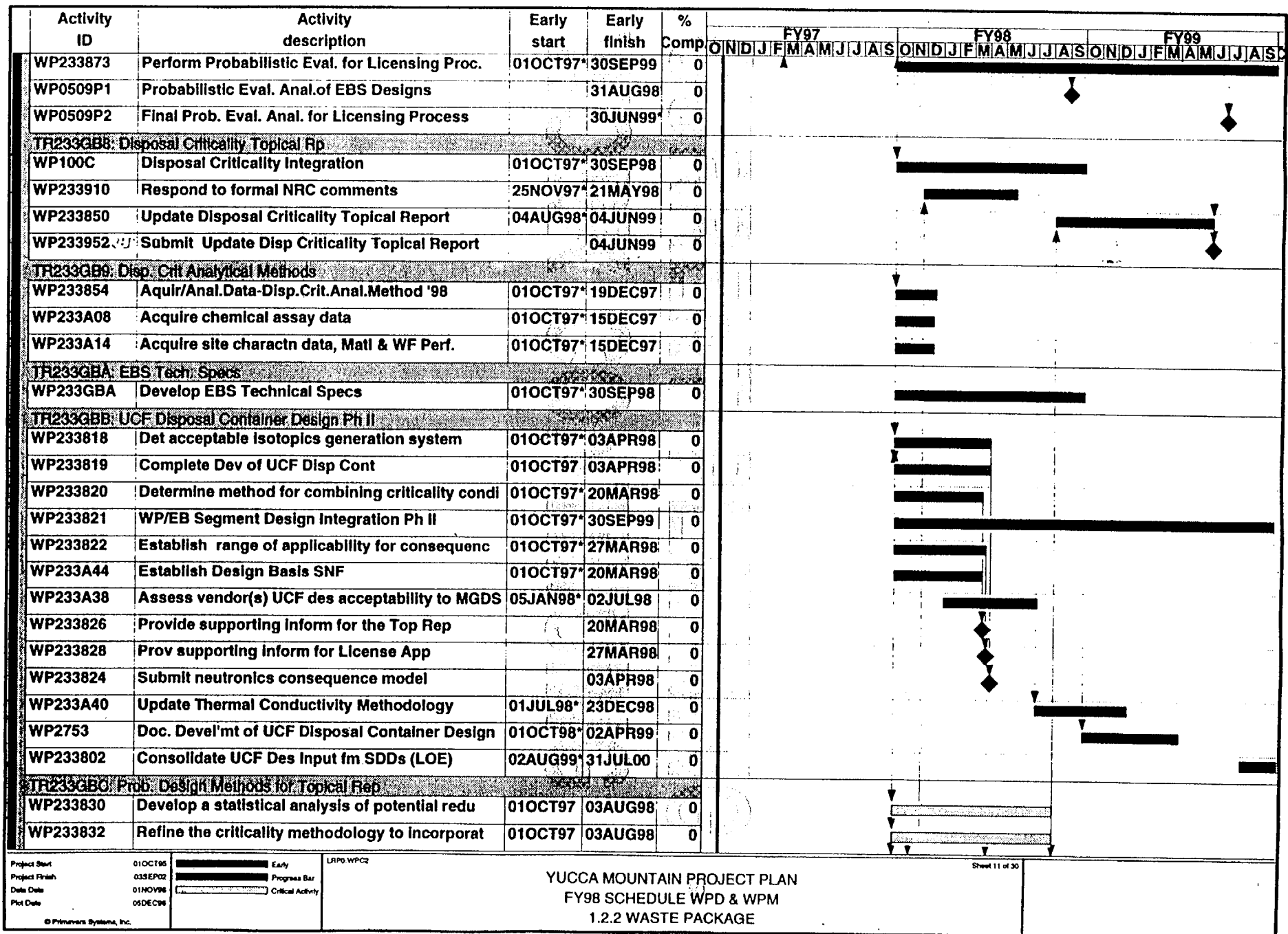
Project Start: 01OCT95  
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 Data Date: 01NOV98  
 Plot Date: 06DEC98

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LRP0 WPC2

YUCCA MOUNTAIN PROJECT PLAN  
 FY98 SCHEDULE WPD & WPM  
 1.2.2 WASTE PACKAGE

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Activity ID	Activity description	Early start	Early finish	% Comp		FY97	FY98	FY99
						O N D J F M A M J J J A S O N D J F M A M J J J A S O N D J F M A M J J J A S		
WP233834	Suprt llog prmtng reg chngs (Risk bsd Stndrds)	01OCT97	03AUG98	0				
WP233836	Provide input to TSPA		03AUG98	0				
WP233838	Prov Input to the Disposal Criticality Top Rep		03AUG98	0				
<b>TR233GBD: Disposal Criticality Top Report</b>								
WP100A3	Sub Disp Criticality An Methdlogy Top Report		31OCT96	0				
WP233804	Dev Topical Report TDPP	01OCT97*	31OCT97	0				
WP233808	Issue Topical Report for formal NRC review	01OCT97*	24NOV97	0				
WP233860	Develop Disposal Criticality Top.Report	01OCT97*	03AUG98	0				
WP233920	Apply & Update Disposal Crit Anal Methodology	01OCT97*	30SEP98	0				
WP233812	Complete Rev 00 of the Topical Report TDPP		31OCT97	0				
WP233806	Dev. Topical Report	03NOV97*	03AUG98	0				
<b>TR233GBE: Disp. Crit. Anal. Consequence Md</b>								
WP233870	Comp.Disp.Critical Analysis Consequence Mdl.	01OCT97*	31MAR98	0				
WP233872	Establsh range of applicability for consequence	01APR98*	24JUN98	0				
WP233874	Submit neutronics consequence model		24JUN98*	0				
<b>1.2.2.3.4- Engineering Development</b>								
<b>TR234FB1: Complete Phase I EB Segment Cost Estim</b>								
WP234702	Prep & provide cost estimates	01OCT96*	30SEP97	4				
WP234704	Obtain vendor verification of material prices	01OCT96*	27JUN97	4				
WP234705	Prepare input to TSLCC	01JUL97*	30SEP97	0				
WP234706	Sub IOC transmitting input to TSLCC		30SEP97	0				
WP234707	Sub IOC transmitting cost of pedestal & supports		30SEP97	0				
WP234709	Sub IOC transmitting unit cost of closure weld		30SEP97	0				
<b>TR234FB2: Complete Phase I Disposal Container Ci</b>								
WP234708	Dev TGD & Test Plan for full circ weld mockup	01OCT96*	18DEC96	10				
WP234714	Provide weld mockups for corrosion testing	01OCT96*	18DEC96	10				
WP234718	Provide weld samples for thermal stability testg	01OCT96*	04DEC96	7				
WP234715	Constuct full circular weld mockup	19DEC96	24MAR97	0				
WP234722	Sub updated weld equip envelope to subsurf		30DEC96*	0				
WP234710	Analyze stress concentrations	25MAR97*	18JUN97	0				
WP234713	Perform Tests IAW TGD & TP	25MAR97*	18JUN97	0				

Project Start: 01OCT96  
Project Finish: 03SEP92  
Data Date: 01NOV96  
Plot Date: 05DEC96

Legend:  
 Early  
 Progress Bar  
 Critical Activity

LRP WPC2

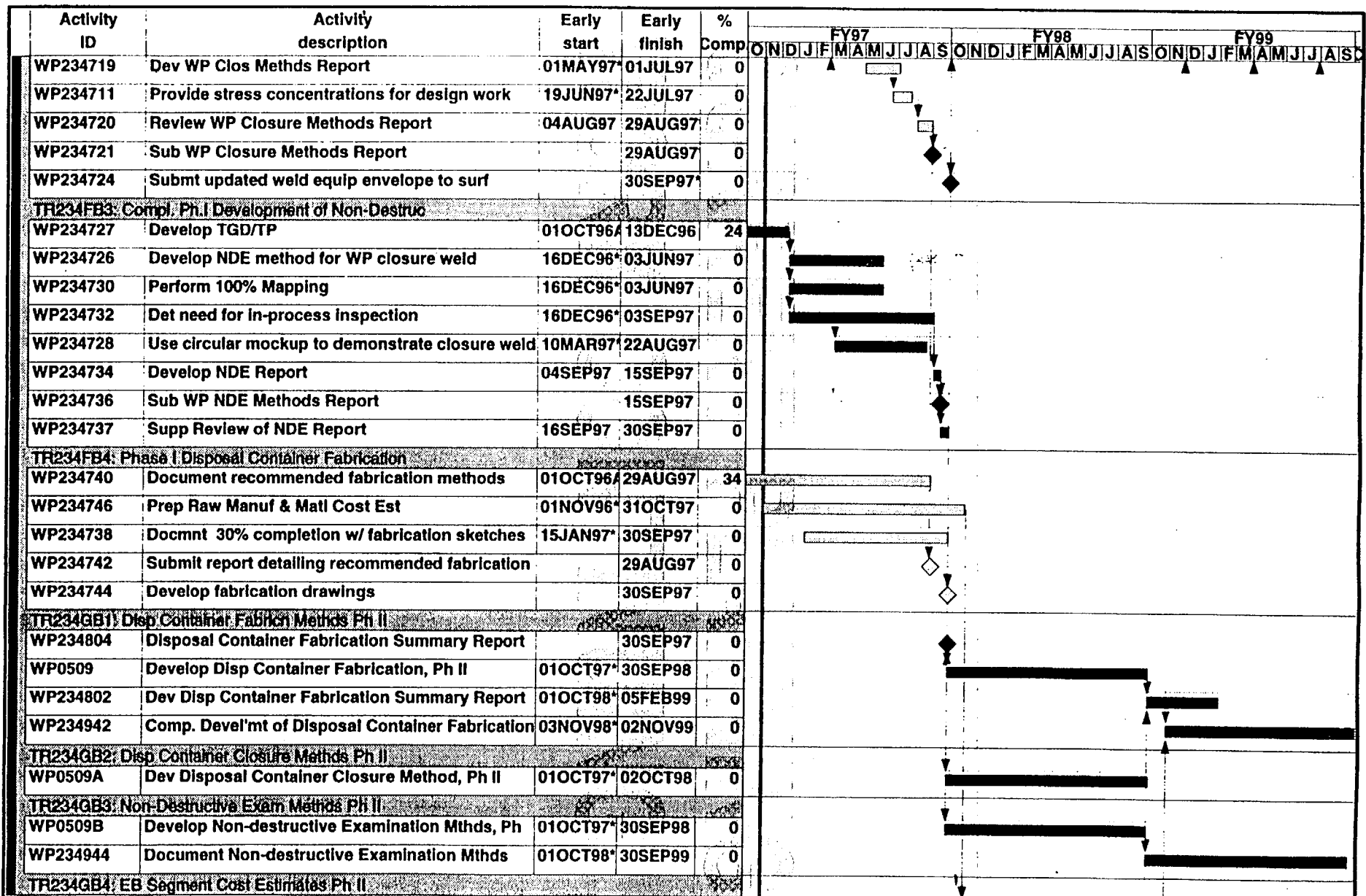
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#### FY98 SCHEDULE WPD & WPM

#### 1.2.2 WASTE PACKAGE

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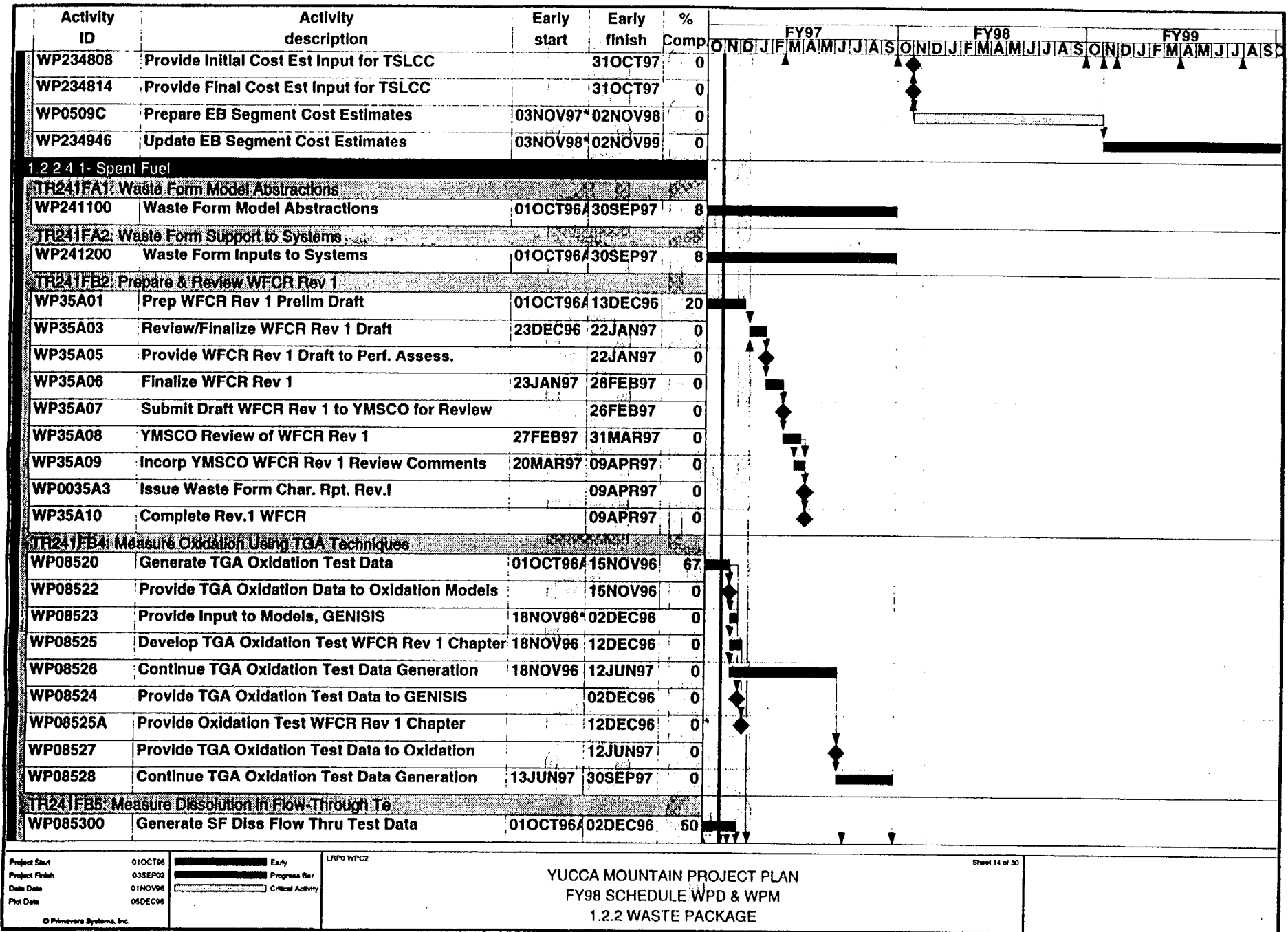


Project Start: 01OCT95  
 Project Finish: 03SEP02  
 Data Date: 01NOV96  
 Plot Date: 05DEC96

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YUCCA MOUNTAIN PROJECT PLAN  
 FY98 SCHEDULE WPD & WPM  
 1.2.2 WASTE PACKAGE

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Activity ID	Activity description	Early start	Early finish	% Comp		FY97	FY98	FY99
WP26502	Provide Feedback-LT Tests/Controlled Humidities	16JAN97	30SEP97	0		O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S		
WP26506	Provide Thermogravimetric Anal Update to PA		30SEP97	0				
TR251FB7	Electrochem. Basis for Galvanic Tests							
WP26201	Conduct test over range of pH/temp/solution	01OCT96	15JAN97	29				
WP26202	Conduct Diff Area Ratio Tests/Design cells	01NOV96	31JUL97	0				
WP26203	Critical Potential Test Data to PA		15JAN97	0				
WP26204	Diff Area Ratios Test Update Data to PA		31JUL97	0				
WP26208	Continue ST Galvanic Tests	01AUG97	30SEP97	0				
TR251FB8	Prepare & Review EMCR Rev 1							
WP15A01	Prep EMCR Rev 1 Prelim Draft	01OCT96	13DEC96	40				
WP15A03	Review/Finalize EMCR Rev 1 Draft	16DEC96	15JAN97	0				
WP15A05	Provide EMCR Rev 1 Draft to Perf. Assess.		15JAN97	0				
WP15A06	Finalize EMCR Rev 1	16JAN97	26FEB97	0				
WP015A3	Submit Draft EMCR Rev.1 to YMSCO for Review		26FEB97	0				
WP15A08	YMSCO Review of EMCR Rev 1	27FEB97	19MAR97	0				
WP15A09	Incorp YMSCO EMCR Rev 1 Review Comments	27FEB97	28MAR97	0				
WP15A10	Issue EMCR Rev.1		28MAR97	0				
TR251FBA	Electrochemical Potential Testing							
WP26401	Develop Potential Control LT Test Conditions	01OCT96	16JAN97	29				
WP60901	Prepare QA Planning Documents	01OCT96	27NOV96	50				
WP60902	Design LT Electrochemical Potential Test Matrix	18NOV96	31DEC96	0				
WP60903	Procure Electrochemical Potential Test	18NOV96	31DEC96	0				
WP60904	Conduct Tests by applied E, alloy, pH, T, Enviro	02JAN97	30SEP97	0				
WP26404	Provide Potential Control Data to PA		16JAN97	0				
WP26402	Ltr Rep Init of LT Cntrl'd Electrochem Pot Tsts		10FEB97	0				
WP60905	Characterize Specimens (1st Batch)	01APR97	30JUN97	0				
WP26403	Provide Potential Control Data Update to PA		30JUN97	0				
TR251FBB	Long Term Galvanic Protection Tests							
WP60801	Design/Procure Galvanic Test Specimens	01OCT96	31DEC96	33				
WP60802	Fabricate Tanks for 3rd Increment	01OCT96	31JAN97	25				

Project Start  
01OCT96

Project Finish  
03SEP97

Data Date  
01NOV96

Plot Date  
06DEC96

Legend:

- Early
- Progress Bar
- Critical Activity

LRPO WPC2

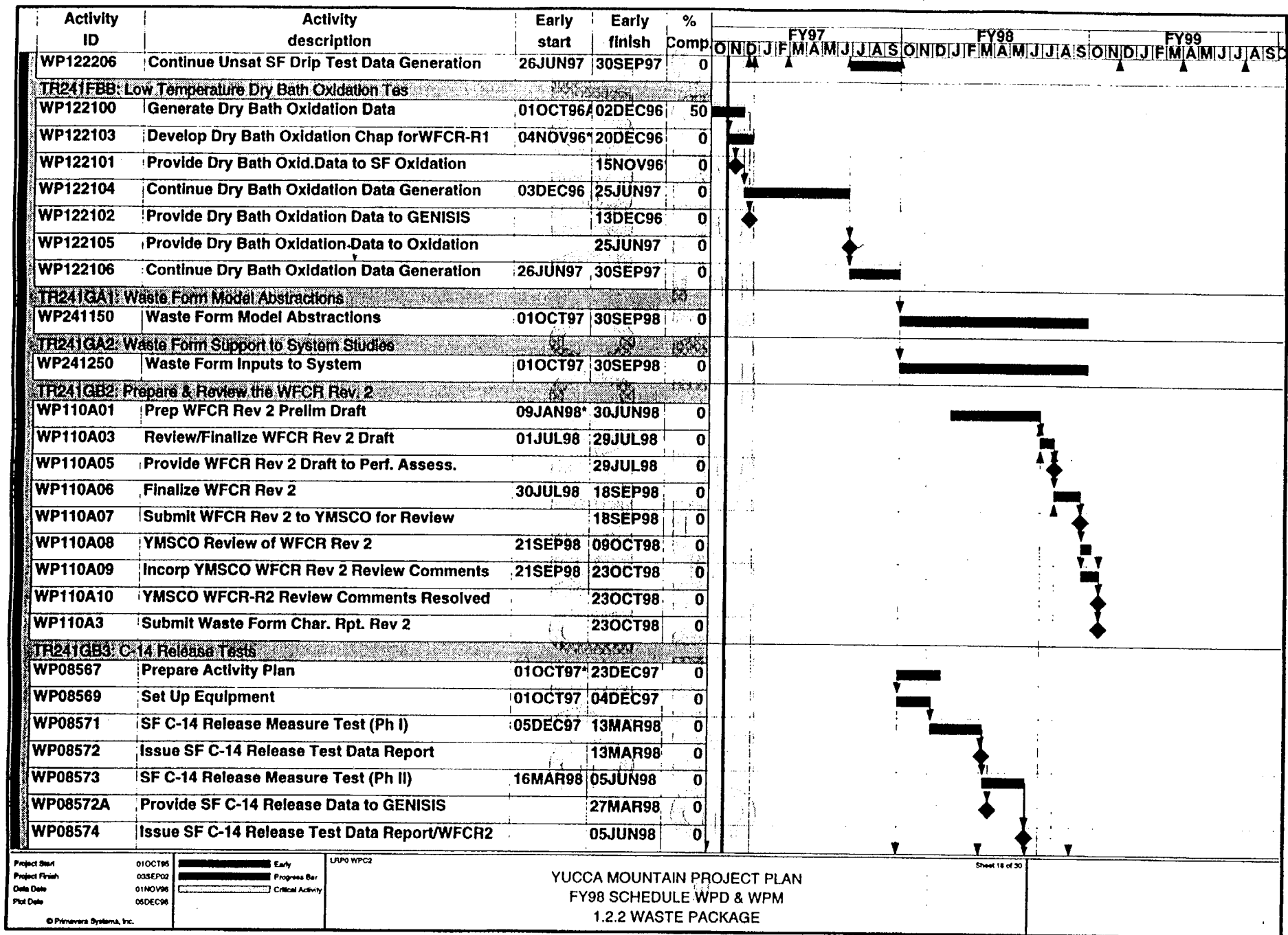
### YUCCA MOUNTAIN PROJECT PLAN

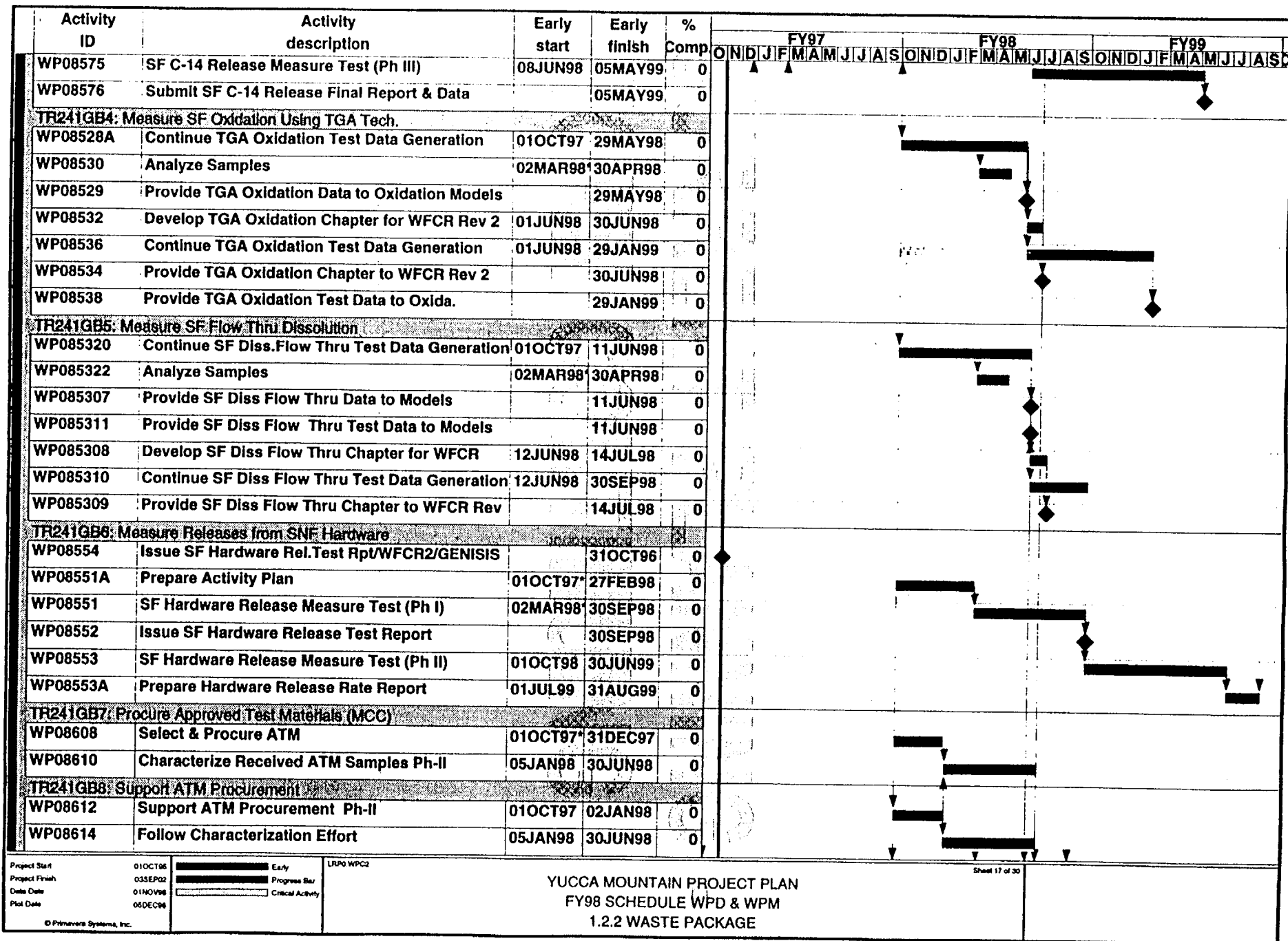
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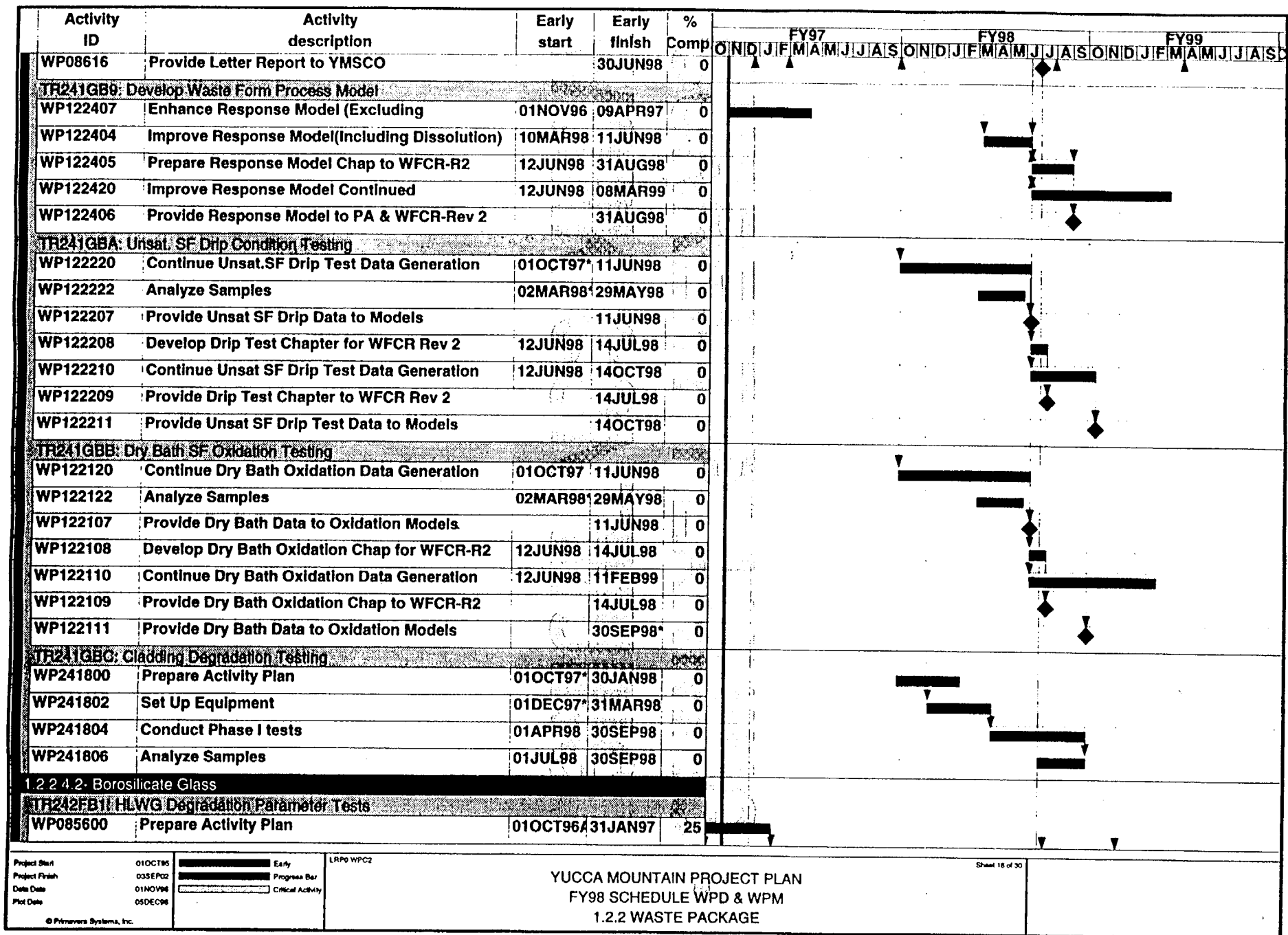
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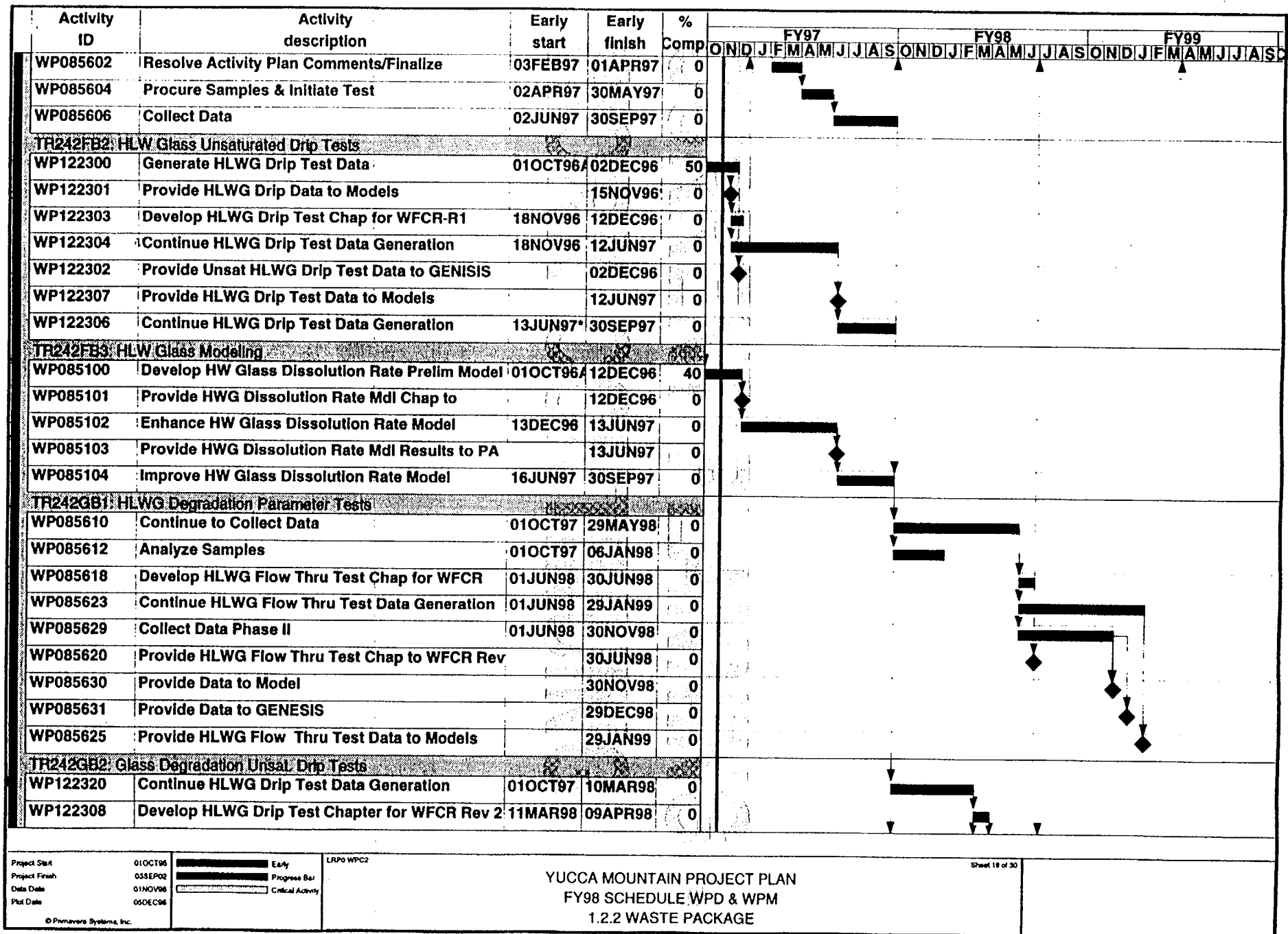
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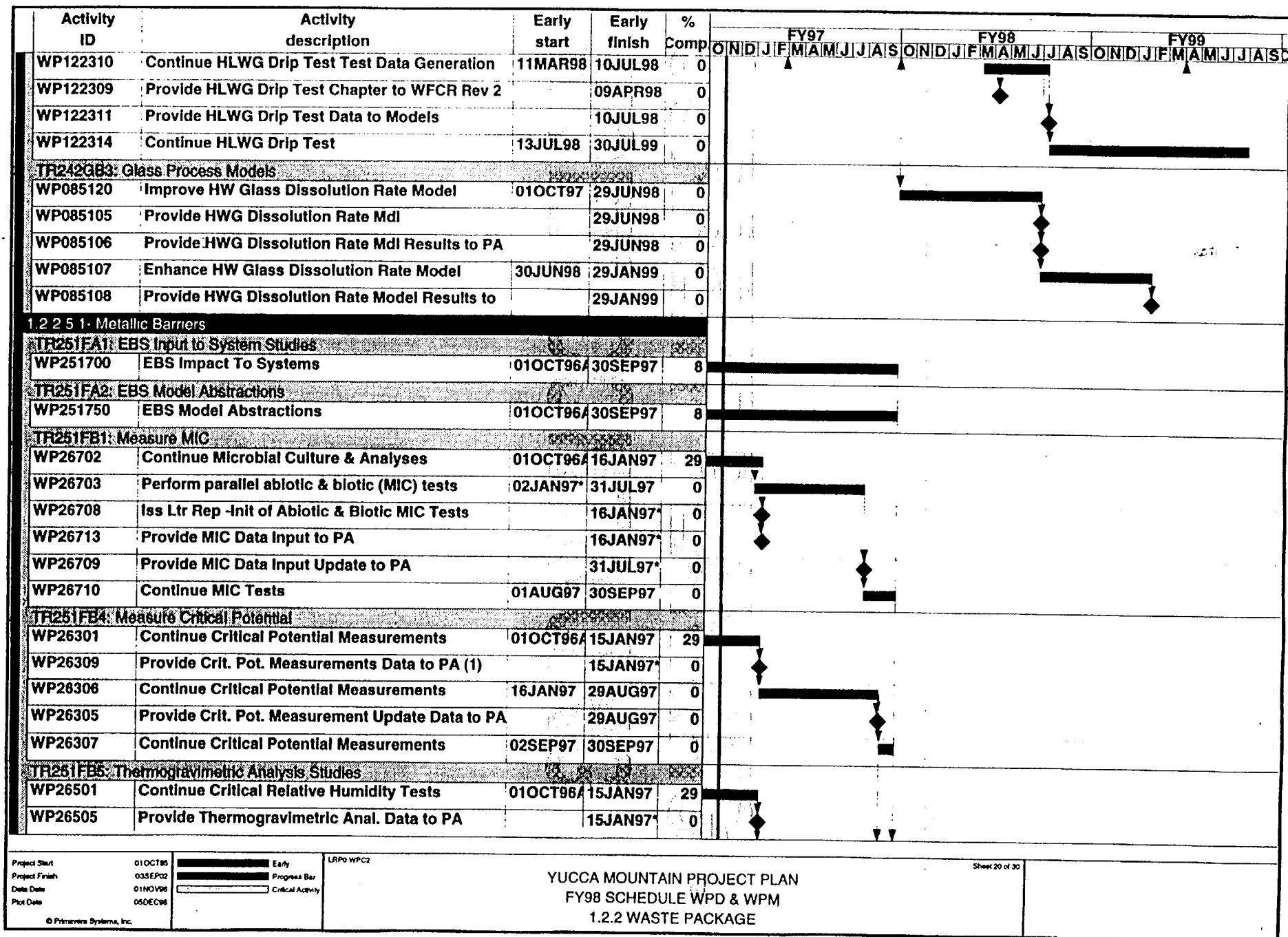
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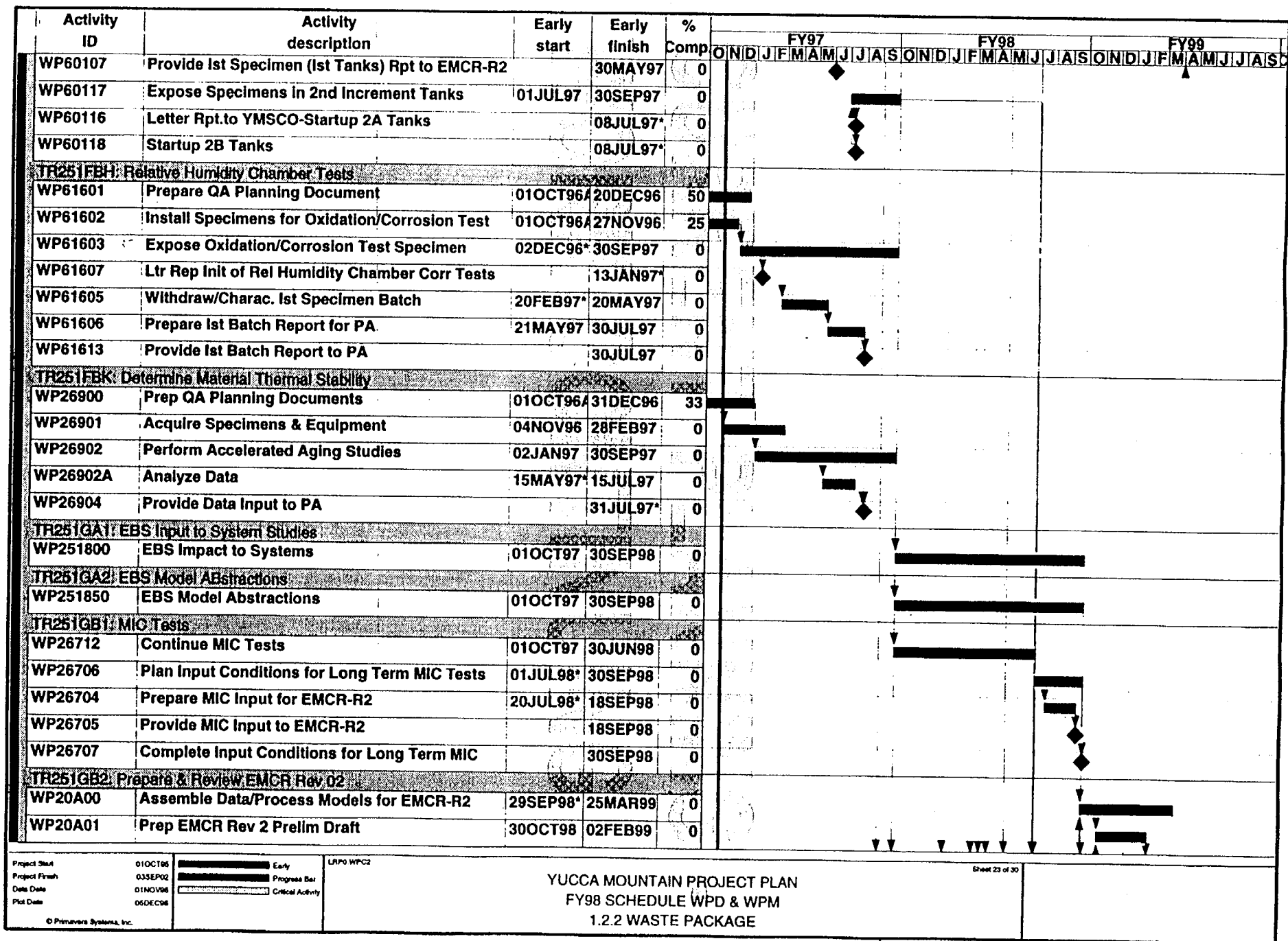


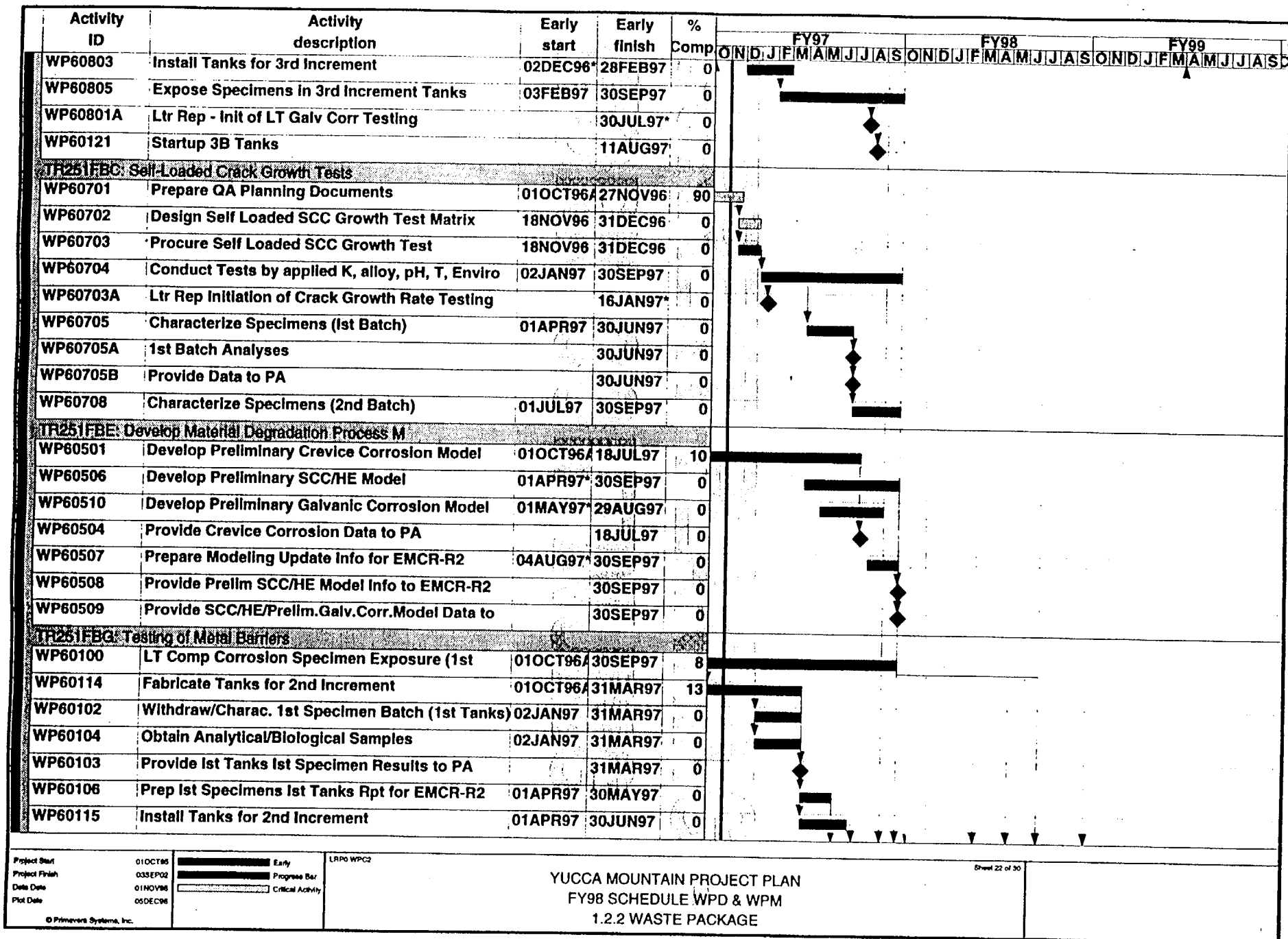




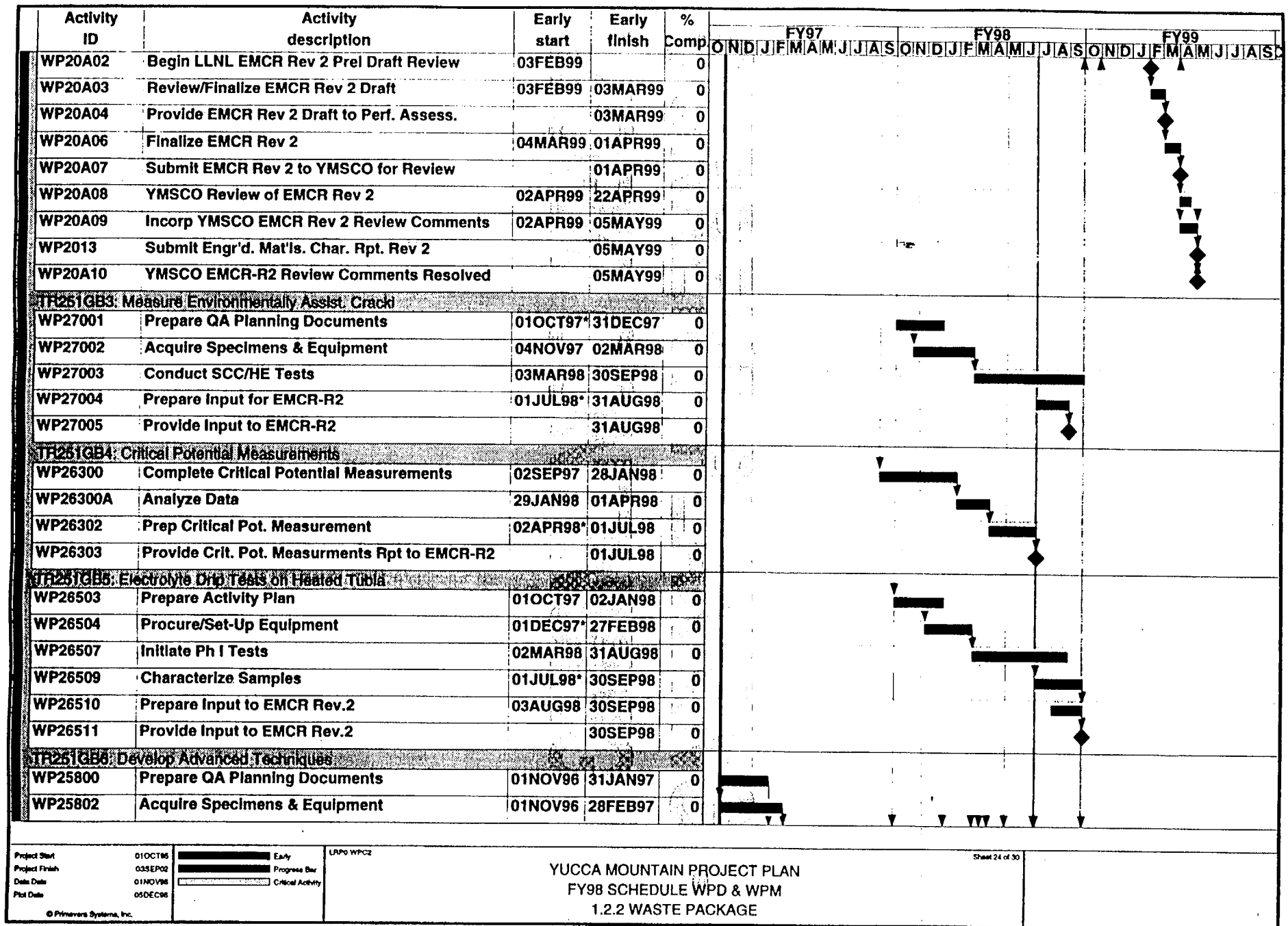


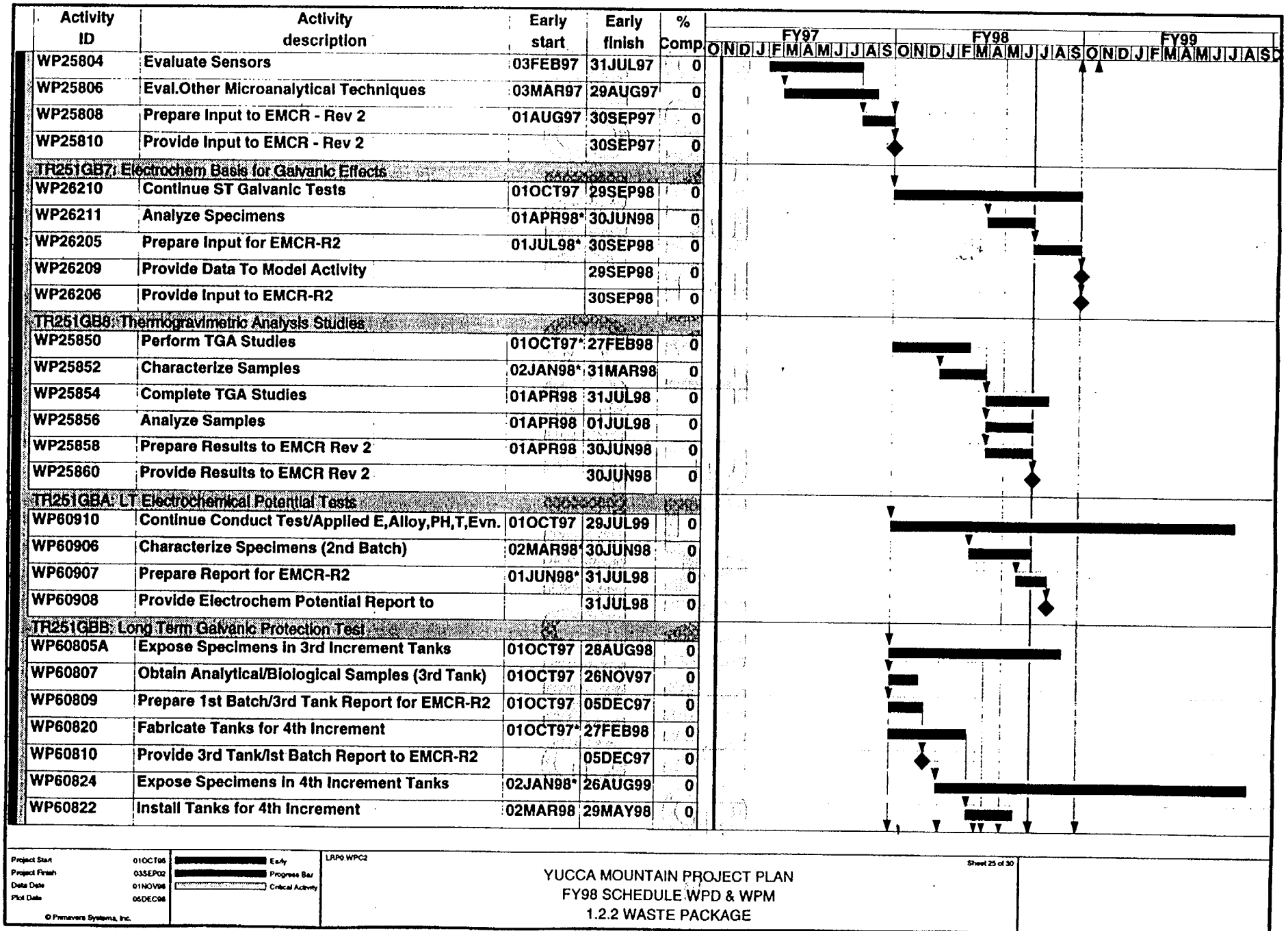






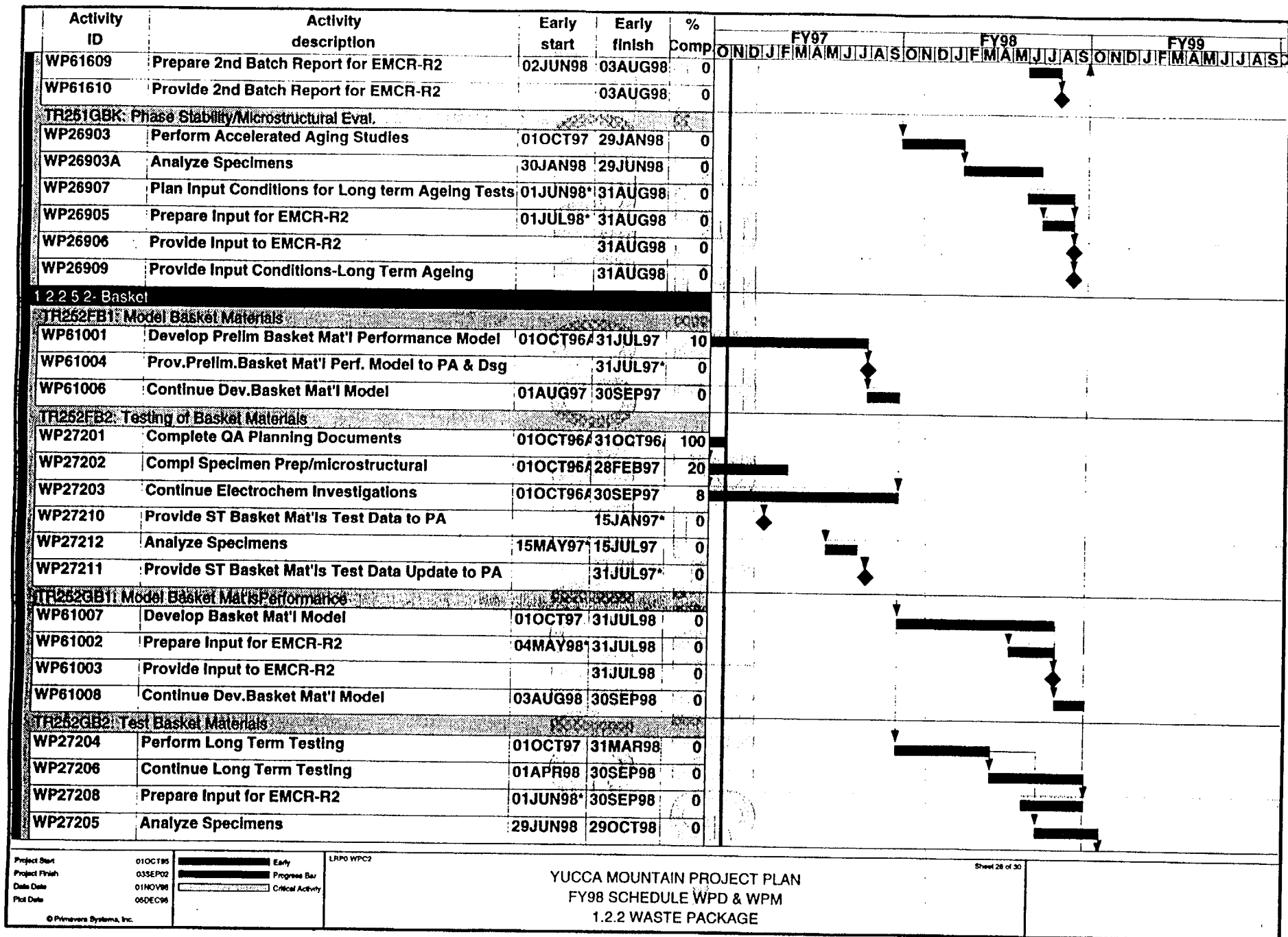


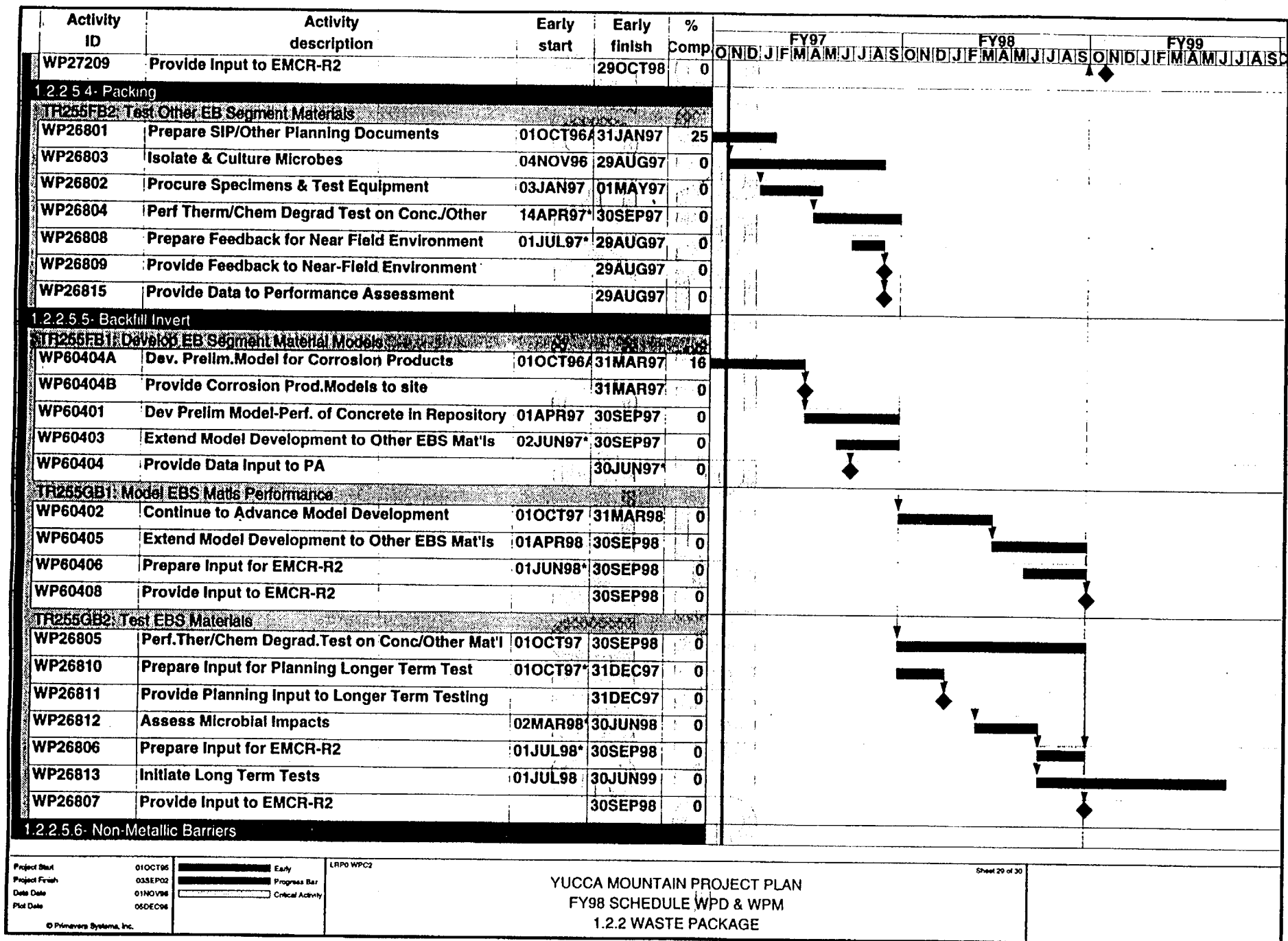


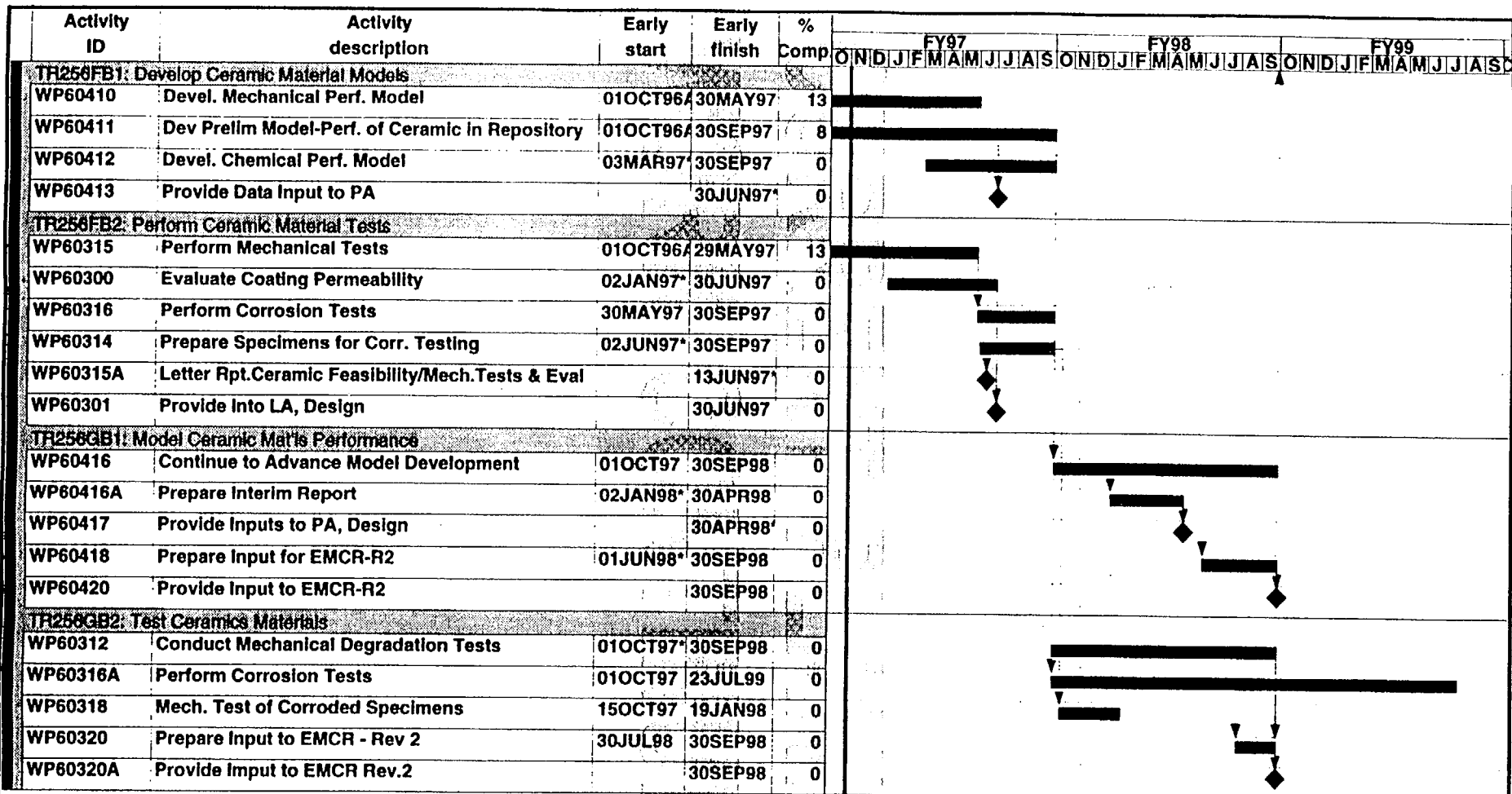


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Project Start 01OCT96  
 Project Finish 03SEP02  
 Data Date 01NOV98  
 Plot Date 05DEC98

LRPO WPC2

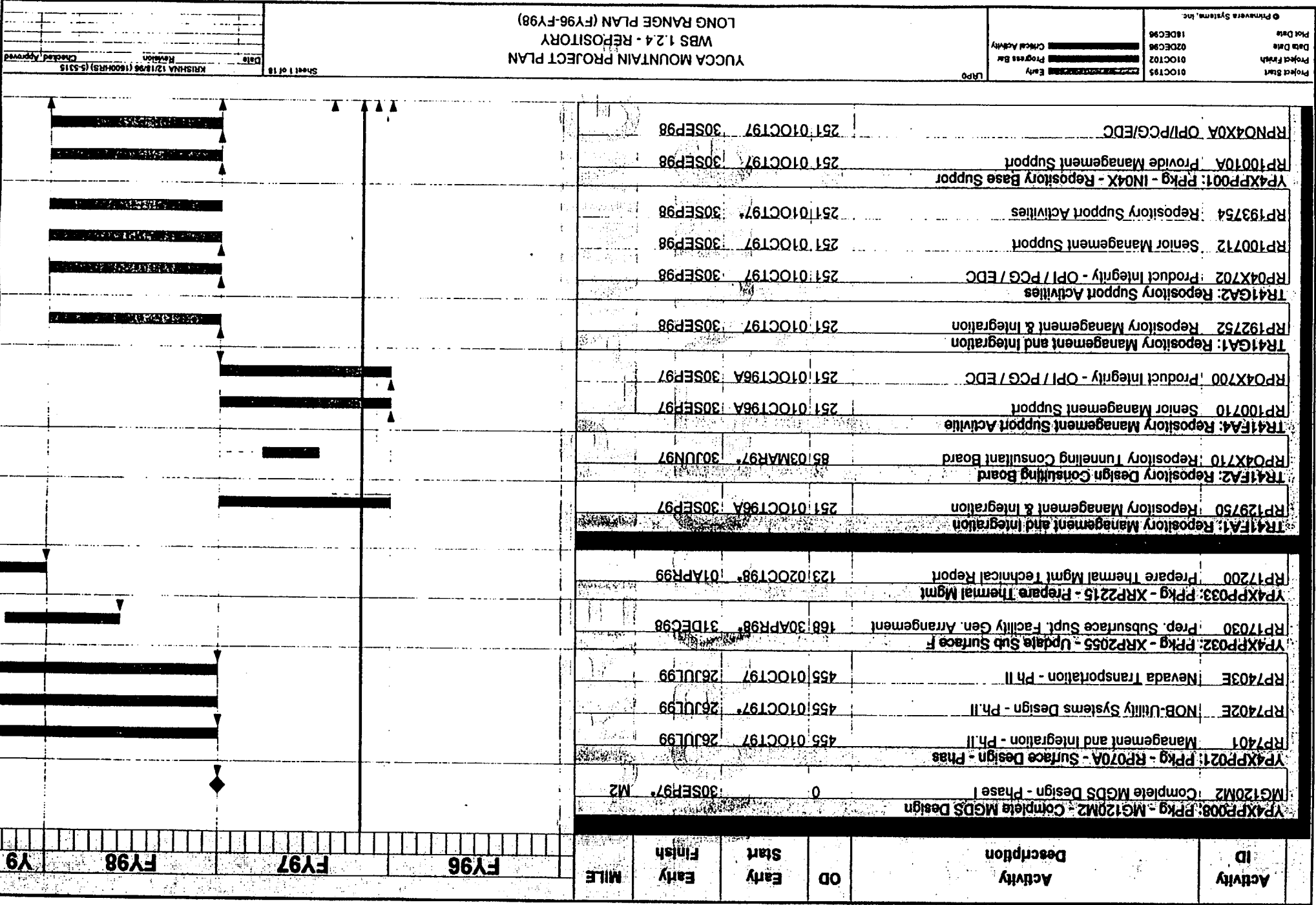
YUCCA MOUNTAIN PROJECT PLAN  
 FY98 SCHEDULE WPD & WPM  
 1.2.2 WASTE PACKAGE

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## **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.

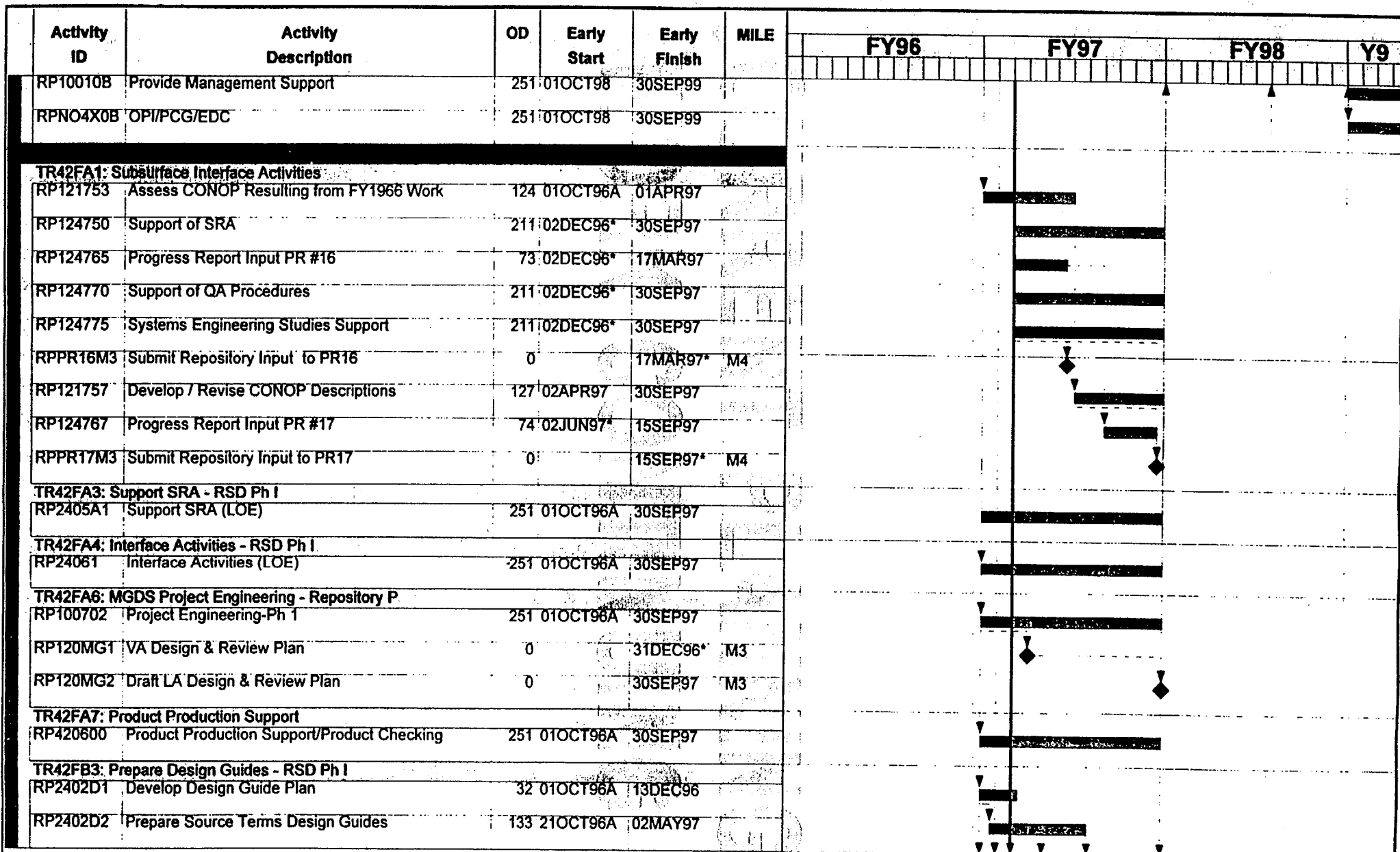




YUCCA MOUNTAIN PROJECT PLAN  
WBS 1.2.4 - REPOSITORY  
LONG RANGE PLAN (FY96-FY98)

Sheet 1 of 18  
KRISHNA 12/18/98 (1600HR9) (5-5315)  
Revision  
Checked/Approved

Project Start  
01OCT95  
Project Finish  
01OCT02  
Data Date  
02DEC98  
Plot Date  
18DEC98  
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Early  
Progress Bar  
Critical Activity



Project Start 01OCT95  
 Project Finish 01OCT02  
 Data Date 02DEC96  
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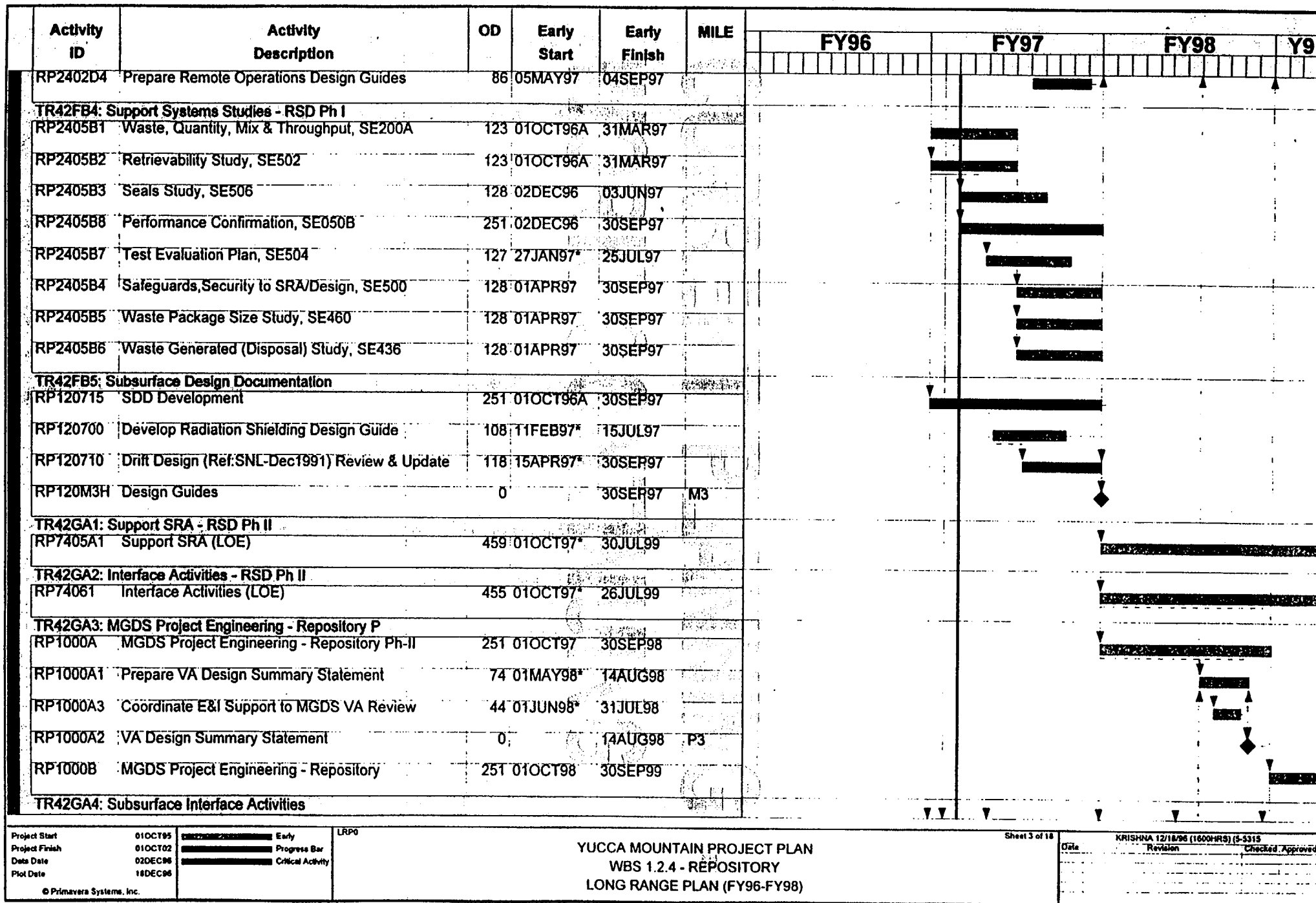
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YUCCA MOUNTAIN PROJECT PLAN  
 WBS 1.2.4 - REPOSITORY  
 LONG RANGE PLAN (FY96-FY98)

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KRISHNA 12/18/96 (1600HRS) (S-5315)

Date	Revision	Checked / Approved



Project Start 01OCT95  
 Project Finish 01OCT02  
 Data Date 02DEC96  
 Plot Date 18DEC96

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

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KRISHNA 12/18/96 (1600HRS) (5-3315)

Date Revision Checked Approved

Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9
RP74051	Subsurface Interface Activities	251	01OCT97*	30SEP98																																						
RPPR18M3	Submit Repository Input to PR 18	0		13MAR98*	M4																																					
RPPR19M3	Submit Repository Input to PR19	0		15SEP98*	M4																																					
<b>TR42GA7: Product Production Support</b>																																										
RP7303F1	Product Production Support	896	01OCT97*	27APR01																																						
<b>TR42GB2: Subsurface Design Documentation</b>																																										
RP74064	Prep.Repos.Text & Info.to PISA Chpts 2-11	102	01OCT97*	02MAR98																																						
RP74062	SDD Development	190	02JAN98	30SEP98																																						
RP74066	Coord.& Cond.Rev's of Relative PISA Chpts	64	03MAR98	01JUN98																																						
RP74068	Support Prep. of Plan for Development	85	02JUN98	30SEP98																																						
<b>TR42GB3: Support Systems Studies - RSD Ph II</b>																																										
RP7405B1	Decomissioning, SE508	230	01OCT97*	31AUG98																																						
<b>TR42GB4: Prepare Design Guides - RSD Ph II</b>																																										
RP7403F1	Prepare Design Guides	230	01OCT97*	31AUG98																																						
<b>YP4XPP003: PPkg - MG010 - Write Design/Operation</b>																																										
RPG1402B	Write PISA	186	01OCT97*	29JUN98																																						
RPG10M3A	Submit Initial Draft Repository PISA Chapters	0		30DEC97*	P3																																					
RPG10M3	Submit Final Repository PISA Chapters	0		29JUN98	P3																																					
<b>YP4XPP024: PPkg - RP170A - Subsurface Design - P</b>																																										
RP17000	Support SRA - Phase II	455	01OCT97*	26JUL99																																						
RP17005	Update Subsurface Layout	374	01OCT97*	31MAR99																																						
RP17017	Design Guide Development - Phase II	455	01OCT97*	26JUL99																																						
RP17022	Support DBA/Q-List Development	455	01OCT97*	26JUL99																																						
RP17065	Cost Update	455	01OCT97	26JUL99																																						
RP17075	Develop Tech. Spec's - Phase II	455	01OCT97*	26JUL99																																						
RP17098	M & I - SubSurface	455	01OCT97*	26JUL99																																						

Project Start 01OCT95  
Project Finish 01OCT02  
Data Date 02DEC96  
Plot Date 18DEC96

Legend:  Early  
 Progress Bar  
 Critical Activity

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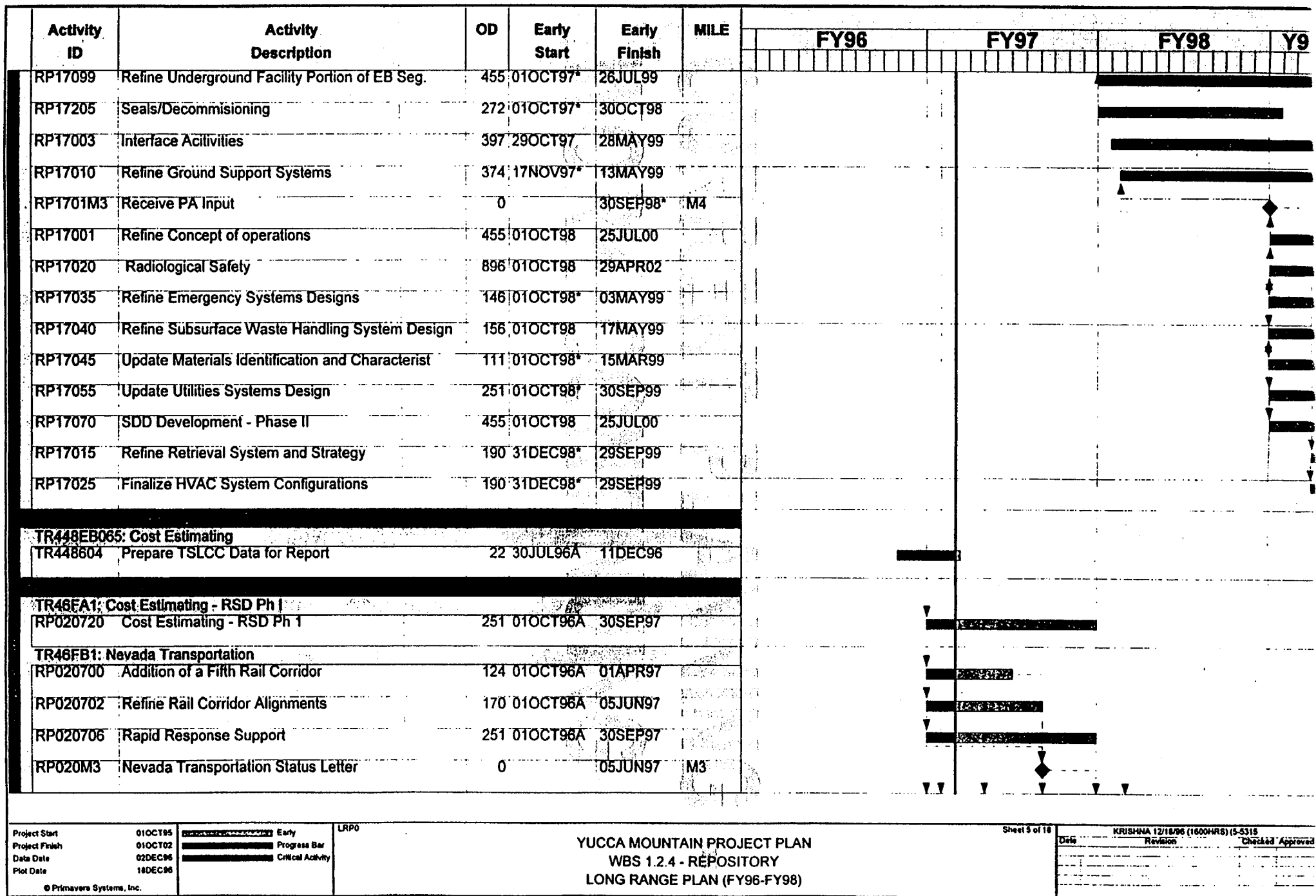
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**WBS 1.2.4 - REPOSITORY**  
**LONG RANGE PLAN (FY96-FY98)**

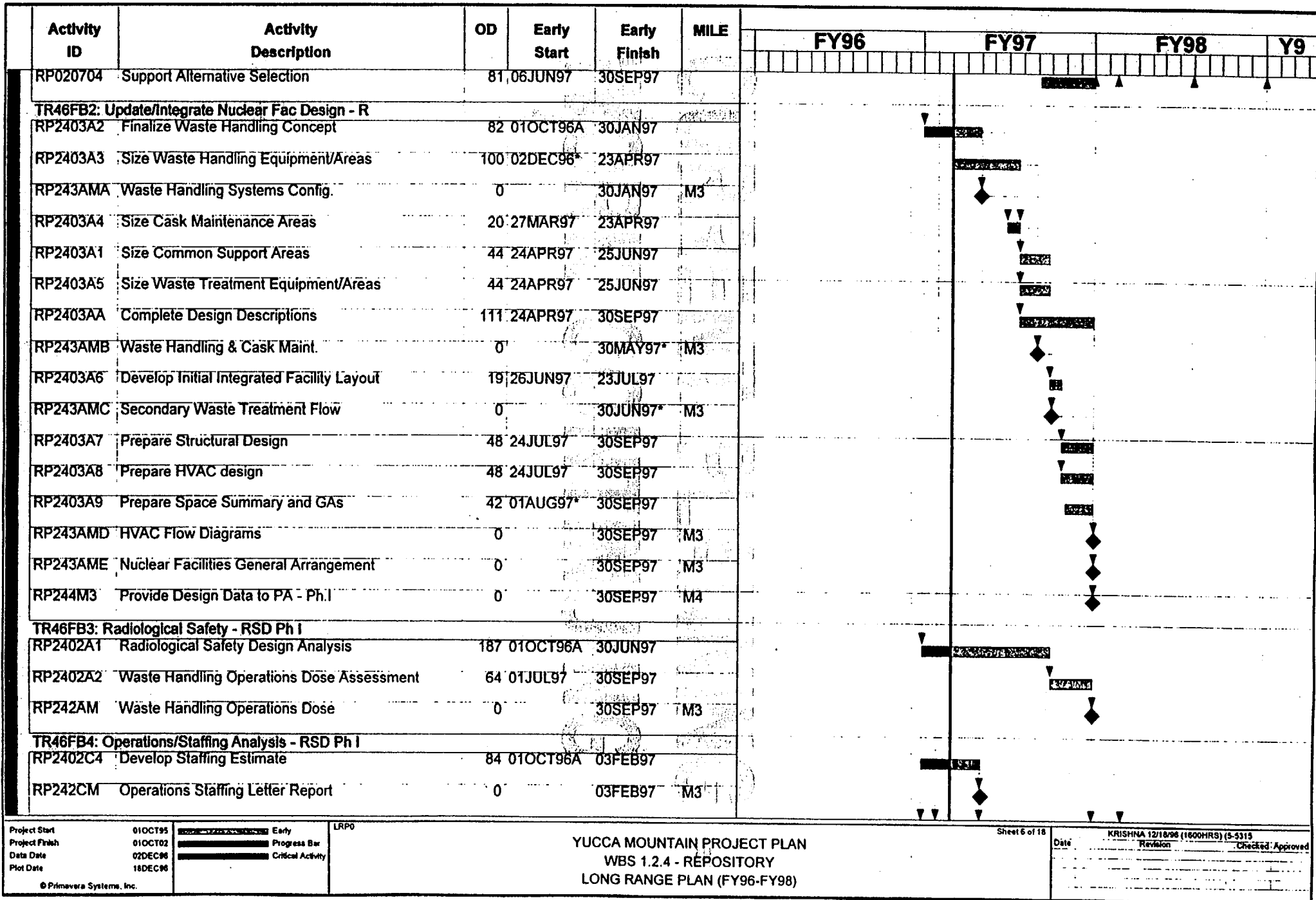
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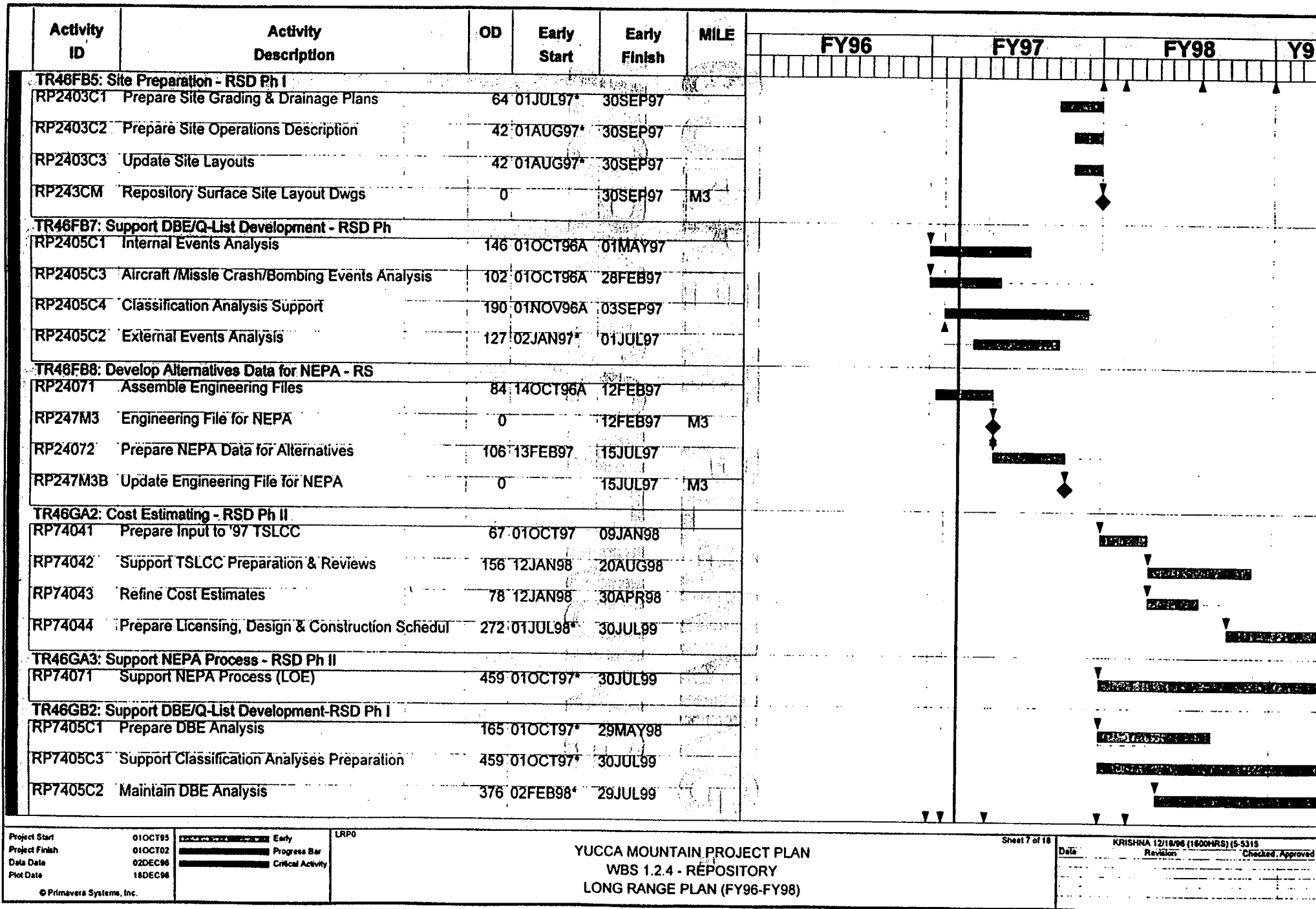
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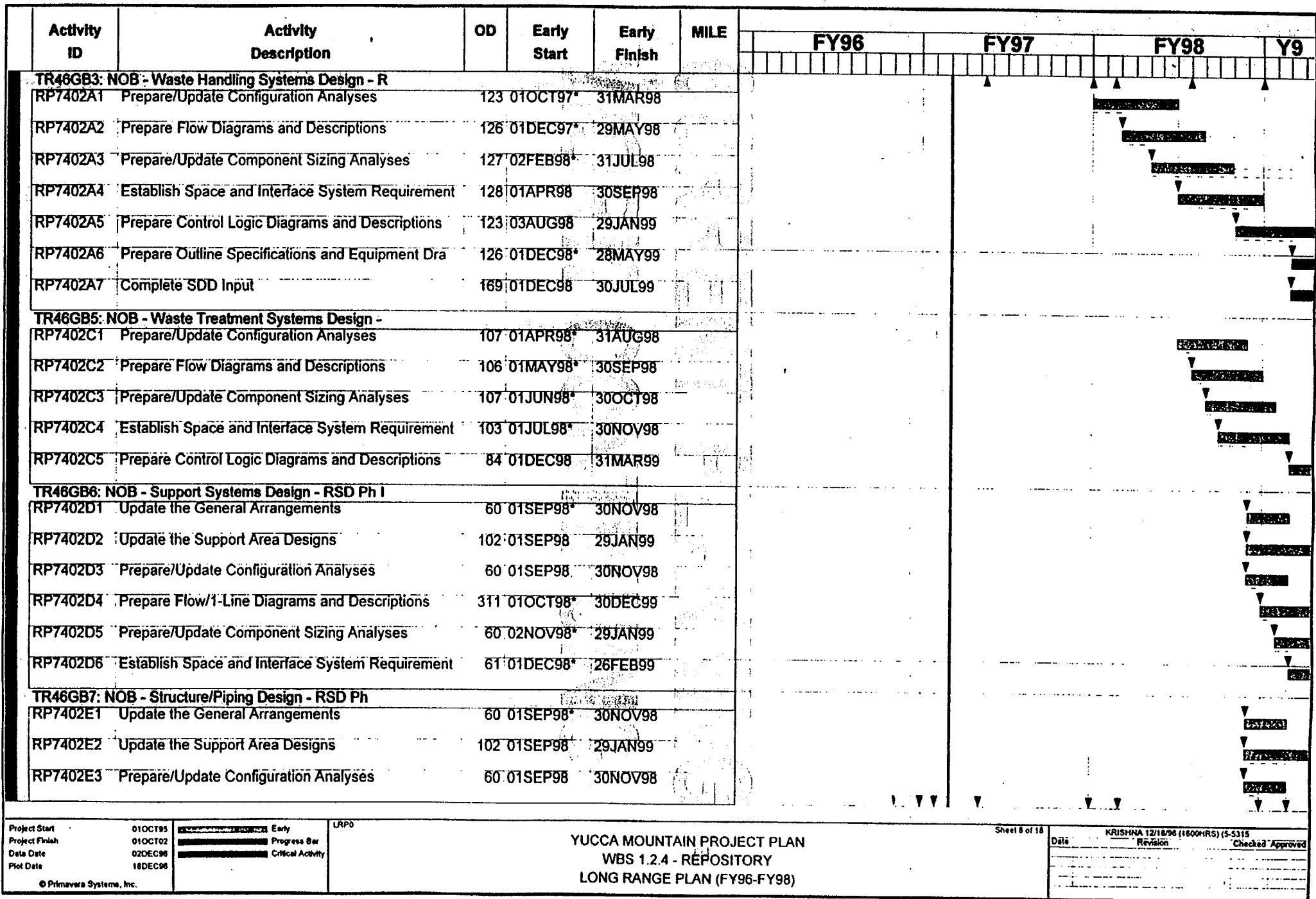
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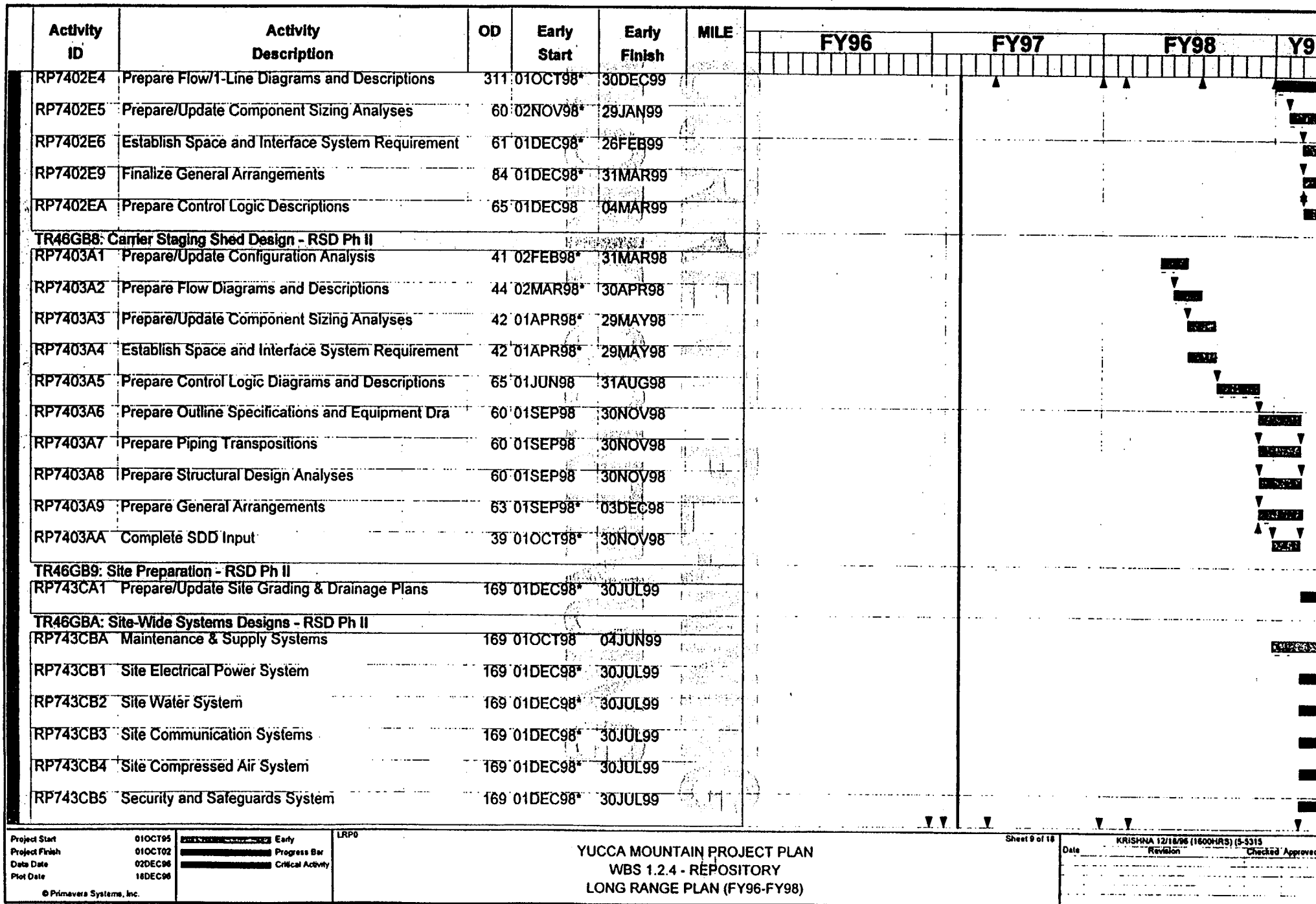












Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9											
RP743CB6	Emergency Response System	169	01DEC98*	30JUL99																																																	
RP743CB7	Health Safety System	169	01DEC98*	30JUL99																																																	
RP743CB8	Surface Environmental Monitoring System	169	01DEC98*	30JUL99																																																	
RP743CB9	Central Command and Control Operations System	169	01DEC98*	30JUL99																																																	
RP743CBB	Administration System	169	01DEC98*	30JUL99																																																	
RP743CBC	General Site Transportation System	169	01DEC98*	30JUL99																																																	
RP743CBD	Site Gen Hazardous & Non Hazard Waste Disposal	169	01DEC98*	30JUL99																																																	
<b>TR46GBC: Radiological Safety - RSD Ph II</b>																																																					
RP7403D1	Prepare/Update Radiological Safety Design Analys	373	01OCT97*	30MAR99																																																	
RP7403D2	Prepare/Update Operations Dose Assessment	229	01SEP98*	30JUL99																																																	
RP7403D3	Prepare ALARA Analyses	229	01SEP98	30JUL99																																																	
<b>TR46GBD: VA Nuclear Facil Sys Des - RSD Ph II</b>																																																					
RP742VD1	Prepare Analyses	111	01OCT97*	13MAR98																																																	
RP742VD3	Establish Space and Interface System Requirement	60	03NOV97*	30JAN98																																																	
RP742VD2	Prepare Flow/1-Line Diagrams & Descriptions	70	17NOV97*	27FEB98																																																	
RP742VD4	Complete SDD Inputs	47	17NOV97*	26JAN98																																																	
<b>TR46GBE: VA Site Wide Sys &amp; Stur Des - RSD Ph II</b>																																																					
RP743VC1	Utility System Design	101	01OCT97*	27FEB98																																																	
RP743VC2	Safety & Security Systems Design	101	01OCT97*	27FEB98																																																	
RP743VC3	Management & Admin Systems Design	101	01OCT97*	27FEB98																																																	
RP743VC4	Transportation Systems Design	101	01OCT97*	27FEB98																																																	
RP743VC5	Site Generated Harazdous/non Harazd waste Syst	101	01OCT97*	27FEB98																																																	
<b>TR46GBF: Prepare Technical Reports - RSD Ph II</b>																																																					
RP84091	Prepare Uncanistered Fuel Handling Technical Rep	229	01SEP98*	30JUL99																																																	
<b>TR46GBG: Technical Specifications Site Systems -</b>																																																					

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LONG RANGE PLAN (FY96-FY98)

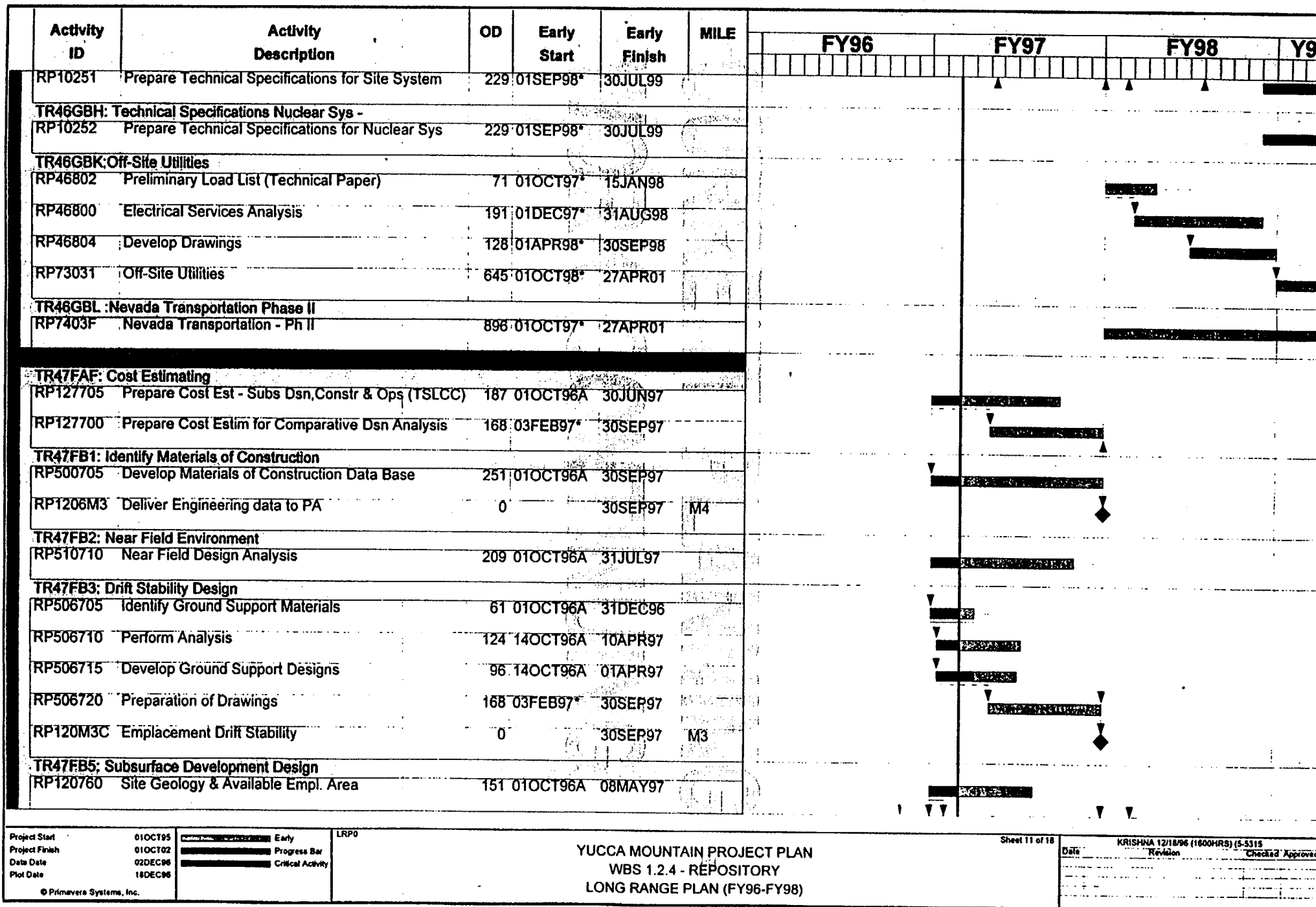
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Legend:  Early  
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 Critical Activity



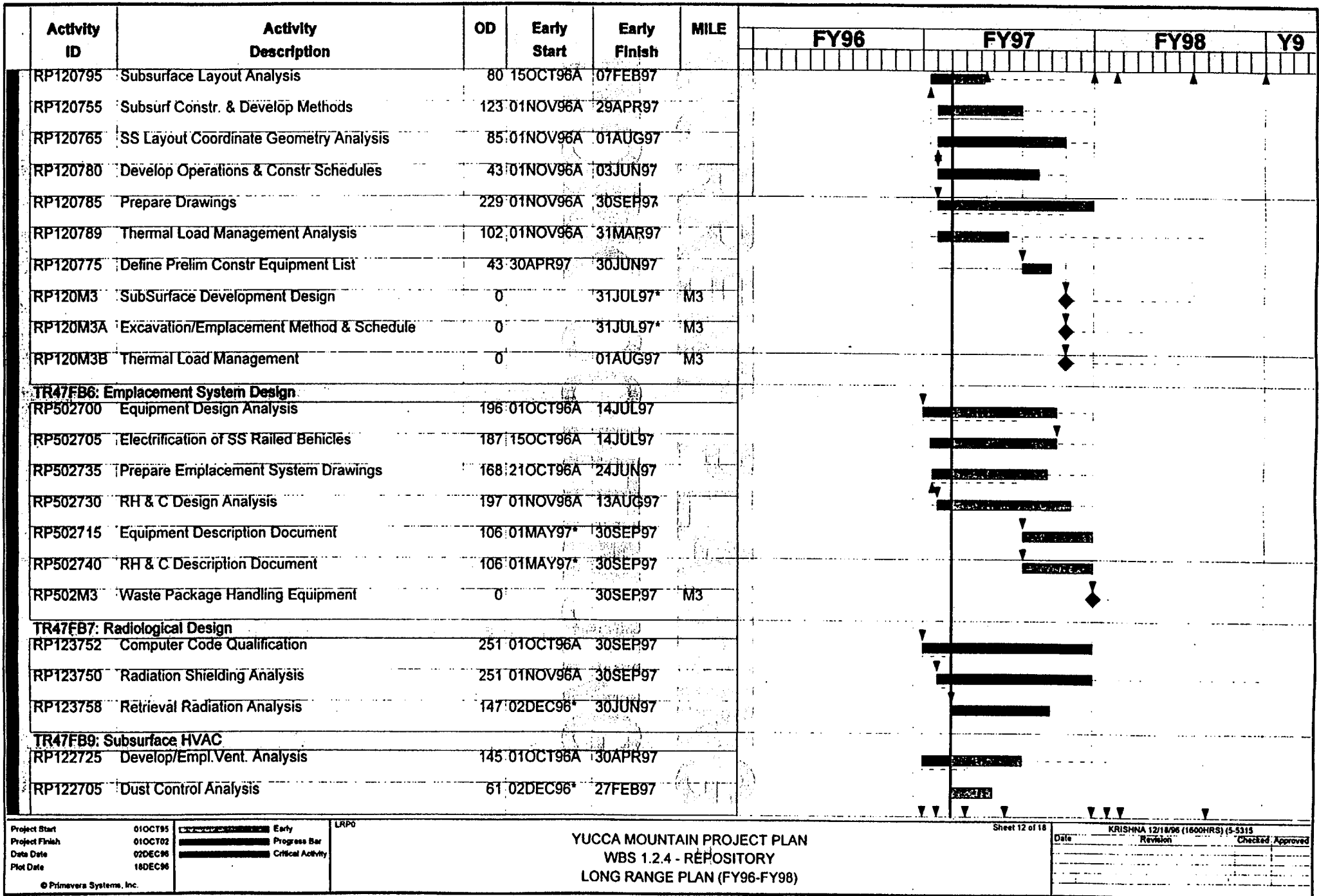
Project Start 01OCT95  
 Project Finish 01OCT02  
 Data Date 02DEC96  
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 WBS 1.2.4 - REPOSITORY  
 LONG RANGE PLAN (FY96-FY98)

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Project Finish 01OCT02  
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Plot Date 18DEC96

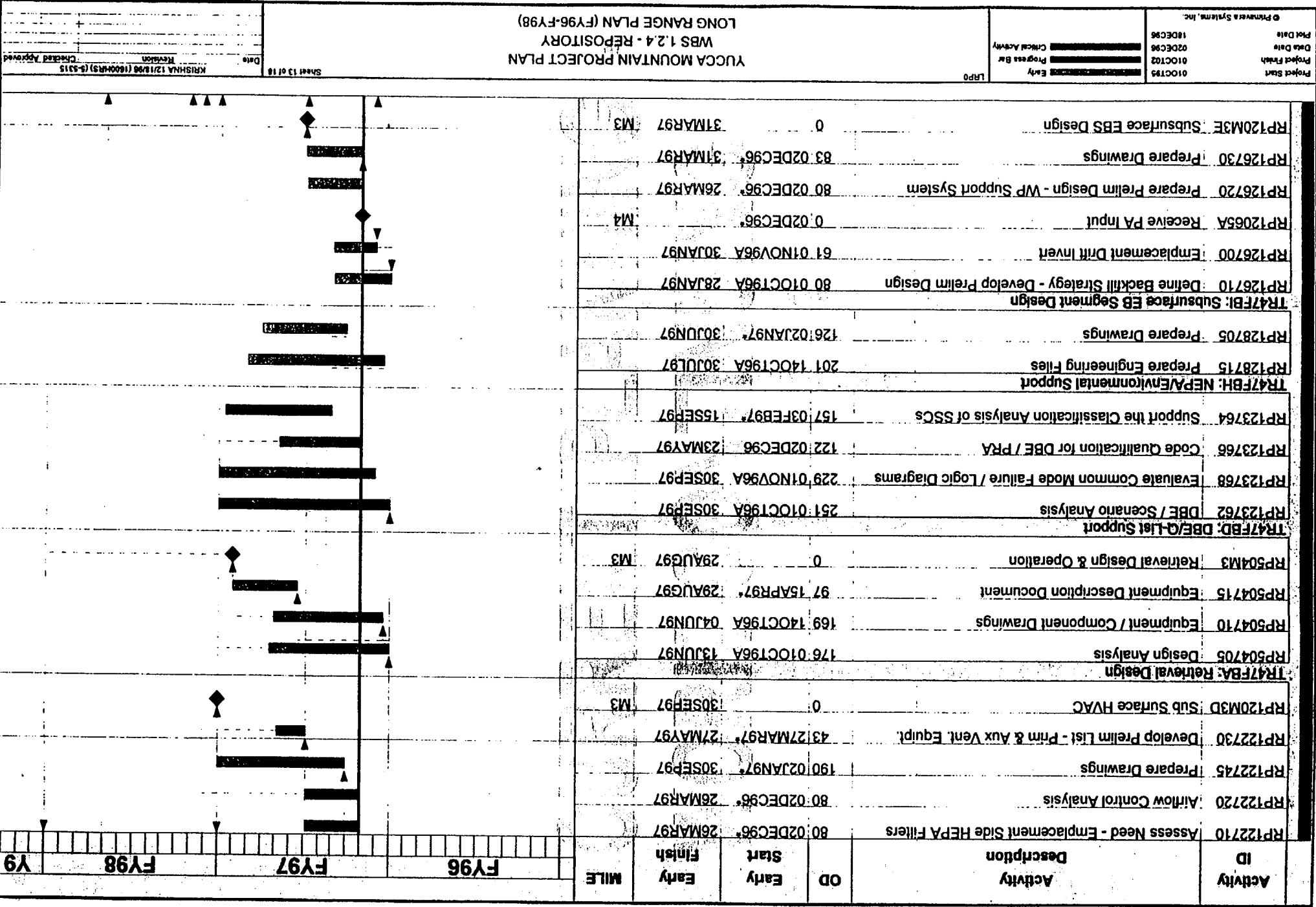
Early  
Progress Bar  
Critical Activity

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

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Date KRISHNA 12/18/96 (1600HRS) (5-5315)  
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Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9
RP47616	Develop Outline Specifications	106	01MAY98	30SEP98																																						
RP47626	Perform Analysis 4	64	01JUL98	30SEP98																																						
<b>TR47GB7: Subsurface Utilities</b>																																										
RP47900	System Evaluation	82	01OCT97*	30JAN98																																						
RP47902	System Schematics	49	03NOV97*	15JAN98																																						
RP47904	General Arrangements	63	01DEC97*	02MAR98																																						
RP47906	Assess Changes to Utility Sys. Requirements	74	03MAR98	15JUN98																																						
RP47912	Develop Overall Sys. Design Descriptions	149	03MAR98	30SEP98																																						
RP47908	Devel. System & Major Subsystem P&ID's	64	01APR98*	30JUN98																																						
RP47910	Develop One-Line Diagrams	75	01JUN98*	15SEP98																																						
<b>TR47GB8: Subsurface HVAC</b>																																										
RP47924	HEPA Filter Analysis	63	27MAR97	24JUN97																																						
RP47928	Backfill & Closure	102	01OCT97*	02MAR98																																						
RP47934	Design Guide for HVAC Design	61	01OCT97*	31DEC97																																						
RP47920	Isolation Airlocks	60	03NOV97*	30JAN98																																						
RP47938	Develop Drawings	212	01DEC97*	30SEP98																																						
RP47922	Emplac. Drift Vent/Radiation Doors & Regulators	64	02FEB98	01MAY98																																						
RP47930	Dust Control Monitoring Analysis	64	03MAR98	01JUN98																																						
RP47926	Ventilation Equipment	94	04MAY98	15SEP98																																						
RP47932	Emergency Ventilation & Evacuation Plans	85	02JUN98	30SEP98																																						
RP47936	Develop Outline Specifications	85	02JUN98	30SEP98																																						
<b>TR47GB9: Retrieval System Design</b>																																										
RP47500	Retrieval Scenario Analysis	101	01OCT97*	27FEB98																																						
RP47502	Retrieval Equipment Analysis	126	01DEC97*	29MAY98																																						
RP47504	Develop Retrieval Drawings	160	15DEC97*	31JUL98																																						

Project Start 01OCT95  
Project Finish 01OCT02  
Data Date 02DEC96  
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**YUCCA MOUNTAIN PROJECT PLAN**

**WBS 1.2.4 - REPOSITORY**

**LONG RANGE PLAN (FY96-FY98)**

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

Date Revision Checked/Approved

Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9											
RP47506	Develop Outline Specifications	106	01MAY98*	30SEP98																																																	
<b>TR47GBA: Seals/Decommissioning</b>																																																					
RP47950	Identify Requirements for Seals	22	01OCT97*	31OCT97																																																	
RP47952	Develop Preliminary Designs	79	03NOV97	27FEB98																																																	
RP47954	Produce Preliminary Drawings for VA	62	01DEC97*	27FEB98																																																	
RP47956	Refine Performance Criteria	44	02MAR98	30APR98																																																	
RP47964	Supt Sys. Engrg./Devel.Reqmts-B'fill,Sealing	128	01APR98*	30SEP98																																																	
RP47958	Reevaluate Seal Designs	106	01MAY98	30SEP98																																																	
RP47960	Refine Procd.Subsurface Closure/Decomm.	104	01JUL98*	01DEC98																																																	
RP47962	Develop Drawings	102	01SEP98*	29JAN99																																																	
<b>TR47GBB: DBE/Q-List Support</b>																																																					
RP123770	Computational Modeling-DBE Consequences	251	01OCT97	30SEP98																																																	
RP123772	DBE Anal.-Equipment Dsgn Anal.Top.Rpt.	166	03NOV97*	01JUL98																																																	
RP123776	Analysis & Writeup in Supt. of PISA	124	03NOV97	01MAY98																																																	
RP123774	Eval.Control & Monit.Sys.-Accident Scenarios	190	02JAN98*	30SEP98																																																	
RP123778	Technical Specifications Development	127	02JAN98*	01JUL98																																																	
RP123780	Develop DBE Design Guide	118	15APR98*	30SEP98																																																	
<b>TR47GBD: Subsurface EB Segment Design</b>																																																					
RP47970	Perform Analysis	176	01OCT97*	15JUN98																																																	
RP47972	Develop Outline Specs	158	02JAN98*	14AUG98																																																	
RP47974	Develop Drawings	169	02FEB98*	30SEP98																																																	
<b>TR47GBE: Ground Control Design</b>																																																					
RP47822	Update Design Inputs	61	01OCT97*	31DEC97																																																	
RP47836	ReEvaluate Approach-Database/Catalog	61	01OCT97*	31DEC97																																																	
RP47824	Update Eval.of Ground Support Materials	101	03NOV97*	31MAR98																																																	

Project Start 01OCT95  
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01OCT95 Early  
01OCT02 Progress Bar  
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**YUCCA MOUNTAIN PROJECT PLAN**

**WBS 1.2.4 - REPOSITORY**

**LONG RANGE PLAN (FY96-FY98)**

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Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9											
RP47820	Design Guide Development-Seismic	107	01DEC97*	01MAY98																																																	
RP47826	Upgrade Thermal & Thermomechanical Anal.	170	01DEC97	31JUL98																																																	
RP47832	Update List of Materials	62	02JAN98	31MAR98																																																	
RP47830	Prepare Drawings	169	02FEB98*	30SEP98																																																	
RP47834	Update Quantities, Charac, & Est. Service Life Matl	86	01APR98*	31JUL98																																																	
<b>TR47GBF: Excavation/Muck Handling Design</b>																																																					
RP47880	TBM Excavation Analysis	101	08MAY98*	30SEP98																																																	
RP47882	Secondary Excavation Analysis	101	08MAY98	30SEP98																																																	
RP47884	Raise Borer Excavation Analysis	101	08MAY98	30SEP98																																																	
RP47892	Develop Drawings	229	10JUN98*	07MAY99																																																	
RP47886	Secondary Excavation Analysis	129	01OCT98	08APR99																																																	
RP47888	Muck Removal Analysis	129	01OCT98	08APR99																																																	
RP47890	Develop Outline Specifications	150	01OCT98	07MAY99																																																	
<b>TR47GBG: Personnel &amp; Materials Transport</b>																																																					
RP47980	Perform Analyses	124	03NOV97*	01MAY98																																																	
RP47984	Develop Drawings	144	03NOV97	01JUN98																																																	
RP47982	Develop Equipment Description Document	128	01APR98*	30SEP98																																																	
<b>TR47GBH: NEPA/Environmental Support</b>																																																					
RP47870	Prepare New Engineering Files for Review	102	01OCT97*	02MAR98																																																	
RP47872	Rev. & Revise Existing Engineering Files	251	01OCT97	30SEP98																																																	
<b>TR47GBJ: Performance Confirmation Design</b>																																																					
RP47806	Remote Handling & Control	251	01OCT97*	30SEP98																																																	
RP47800	Update PC Parameters	32	01DEC97*	15JAN98																																																	
RP47802	Enhance PC Data Acquisition Strategy	62	01DEC97*	27FEB98																																																	
RP47804	Update PC Provisions into SubSurface Design	63	02JAN98*	01APR98																																																	

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**WBS 1.2.4 - REPOSITORY**

**LONG RANGE PLAN (FY96-FY98)**

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

Date Revision Checked Approved

Activity ID	Activity Description	OD	Early Start	Early Finish	MILE	FY96												FY97												FY98												Y9											
<b>TR47GBL:Personnel Safety &amp; Warning System Design</b>																																																					
RP47850	Eval.DBE's Devel.-VA Dsgn Activity	39	01OCT97*	28NOV97																																																	
RP47854	Devel.Asses.Plan for Each Event	53	15JAN98*	31MAR98																																																	
RP47856	Develop Recovery Plans	45	02MAR98	01MAY98																																																	
RP47860	Prepare Drawings	120	16MAR98*	01SEP98																																																	
RP47858	Prepare Documentation	64	15APR98*	15JUL98																																																	
<b>TR47GBM:Subsurface Facilities</b>																																																					
RP47404	Drainage System Analysis	82	01OCT97*	30JAN98																																																	
RP47406	Ventilation Openings Design	82	01OCT97	30JAN98																																																	
RP47410	Supplimental Thermal Analyses	165	01OCT97	29MAY98																																																	
RP47418	Shaft Headframes & Hoisting Systems	145	01OCT97*	30APR98																																																	
RP47426	Shaft Design Guide	83	01OCT97*	02FEB98																																																	
RP47420	Subsurface Construction Materials Handling Sys.	79	03NOV97*	27FEB98																																																	
RP47430	Develop Design Drawings	229	04NOV97*	01OCT98																																																	
RP47422	Personnel Support Facilities	84	01DEC97*	31MAR98																																																	
RP47408	Construction & Emplacement Schedules	84	02JAN98*	30APR98																																																	
RP47416	Ventilation Fans,Fan Hsngs,& HEPA Filter Sys.	190	02JAN98*	30SEP98																																																	
RP47402	Coordinate Geometry Calculations	86	02MAR98*	30JUN98																																																	
RP47400	Sursurface Conop Description	86	01APR98*	31JUL98																																																	
RP47414	Waste Emplacement Optimization Analysis	86	01APR98*	31JUL98																																																	
RP47424	Backfill Prep. & Handling Facilities	128	01APR98	30SEP98																																																	
RP47428	Equipment Outline Specifications	128	02APR98*	01OCT98																																																	
RP47412	Draft Thermal Management Plan	86	02JUN98	01OCT98																																																	

**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 Retrieval Study TR15FB3  
Retrieval 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 Treatment 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 1 TR251FB9  
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 1 TR251FB9  
Provide EMCR Rev 1 Draft to PA: January  
Issue EMCR Rev. 1: April

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

Delivery from Material Thermal Stability TR251FBK  
Provide data input to PA: July

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

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

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

Delivery from Other EB Segment Materials Tests TR255FB2  
Provide Data to PA: August

Delivery from Ceramic Materials Models TR256FB1  
Provide Data Input to PA: June

## **2. Initiation Criteria for Humid Air Corrosion**

Delivery from Critical Potential Measurements TR251FB4  
Provide Critical Potential Measurements Data to PA: January  
Provide Critical Potential Measurements Update Data to PA: August

Delivery from Thermogravimetric Analyses TR251FB5  
Provide Thermogravimetric Analysis Data to PA: January  
Provide Thermogravimetric Analysis Update to PA: September

Delivery from Relative Humidity Chamber Tests  
Provide 1st Batch Report to PA: July

## **3. Modes of Degradation other than Aqueous or Humid Air**

Delivery from Measure MIC TR251FB1  
Provide MIC Data Input to PA: January  
Provide MIC Data Input Update to PA: July

Delivery from other EB Segment Materials Test TR 255FB2  
Provide Data to PA: August

#### **4. Performance Related Basis for Design - Predictive Models and Basis**

Delivery from Determination of Near Field Environmental Impact TR22FB5  
Submit IOC to PA Describing Degradation Effects on EBS: August

Delivery from Ceramic Material Models TR256FB1  
Provide Data Input to PA: June

#### **5. Cathodic Protection Confirmation**

#### **6. Technical Basis for Corrosion Degradation Models**

Delivery from EMCR Revision 1 TR251FB9 (Collection point for Corrosion Models)  
Provide EMCR Rev 1 Draft to PA: January  
Issue EMCR Rev 1: April

Delivery from Measure MIC TR251FB1  
Provide MIC Data Input to PA: January  
Provide MIC Data Input Update to PA: July

Delivery from Critical Potential Measurements TR251FB4  
Provide Critical Potential Measurements Data to PA: January  
Provide Critical Potential Measurements Update Data to PA: August

Delivery from Thermogravimetric Analyses TR251FB5  
Provide Thermogravimetric Analysis Data to PA: January  
Provide Thermogravimetric Analysis Update to PA: September

Delivery from Relative Humidity Chamber Tests  
Provide 1st Batch Report to PA: July

Delivery from Electrochemical Basis for Galvanic Tests TR251FB7  
Critical Potential Test Data to PA: January  
Diff Area Ratios Test Update Data to PA: July

Delivery from Electrochemical Potential Testing TR251FBA  
Provide Potential Control Data to PA: January  
Provide Potential Control Update Data to PA: June

Delivery from Self-Loaded Crack Growth Tests TR251FBC  
Provide Data to PA: June

Delivery from Material Degradation Process Models TR251FBE  
Provide Crevice Corrosion Data to PA: July  
Provide SCC/HE/Prelim. Galv. Corr. Model Data to PA: September

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 Probabilistic 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 Reqmnts 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 OG32836FB1

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/Q-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  
Decommissioning Study: April 98 - October 98

Support System Studies TR42GB3  
Decommissioning: 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

**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 modeling to the Nuclear Waste Technical Review Board, the Nuclear Regulatory Commission, the State of Nevada, and other users  
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) 02Jan98, 31Mar98  
SE521805 Requirements Analysis (Bin 2 SDDs) 01Apr98, 30Jun98  
SE522810 Requirements Analysis (Bin 1 SDDs) 01Jul98, 30Sep98  
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 01Oct97, 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

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.

TECHNICAL PUBLICATIONS MANAGEMENT  
REVISED PENDING DELIVERABLE TRANSMITTAL

Page 1 of 1

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DATE: May 22, 1997 SLM:man:0833A  
TO: Stephen J. Brocoum WBS: 1.2.12.1.5  
FROM: Sandra L. Moore, Publications Production Supervisor *SLM* QA: N/A  
Technical Publications Management  
\*\*\*\*\*

Enclosed is the original YAR and revised text for pending deliverable #RP120MG1R1, WBS #1.2.4.2, Viability Assessment Design and Review Plan, B00000000-01717-4600-00070, Rev 1. ICN 1.

According to YAP-5.1Q, paragraph 5.4.5, b) The Requesting Organization must "Revise a "pending Deliverable" within 30 days and return to Paragraph 5.4.1 b). NOTE: For a "pending deliverable" that has been revised for processing, resubmit the original YAR to TPM."

If you have any questions regarding the information contained herein or concerns about the deliverable coordination process, please contact Mary Ann Nusbaum, TPM Production Coordinator at (702) 295-7173 or me at (702) 295-7162.

Enclosures:

Original YAR #0833A  
Z. Revised text for deliverable #RP120MG1R1

cc: w/o enclosure:  
C. R. Hastings, M&O



**TECHNICAL PUBLICATIONS MANAGEMENT  
REVISED PENDING DELIVERABLE TRANSMITTAL**

Page 1 of 1

\*\*\*\*\*  
DATE: August 15, 1997  
TO: Stephan J. Brocoun  
FROM: Sandra L. Moore, Publications Production Supervisor  
Technical Publications Management  
\*\*\*\*\*

SLM:man:0833A  
WBS: 1.2.12.1.5  
QA: N/A

Enclosed is the revised text for pending deliverable #RP120MG1R1, WBS# 1.2.4.2, Viability Assessment Design and Review Plan, B00000000-01717-4600-00070, Rev. 01, ICN 2.

According to YAP-5.1Q, paragraph 5.4.5, b) The Requesting Organization must "Revise a "pending Deliverable" within 30 days and return to Paragraph 5.4.1 b). NOTE: For a "pending deliverable" that has been revised for processing, resubmit the original YAR to TPM."

If you have any questions regarding the information contained herein or concerns about the deliverable coordination process, please contact Mary Ann Nusbaum, TPM Production Coordinator at (702) 295-6992 or me at (702) 295-7162.

Enclosures:

Copy of YAR #0833A (To be used as original YAR if AML does not have the original in their file.)  
2. Revised text for deliverable #RP120MG1R1

cc: w/o enclosure:  
C. R. Hasting, M&O

TRW Environmental  
Safety Systems Inc.

1180 Town Center Drive  
Las Vegas, NV 89134  
702.295.5400

**TRW**

WBS: 1.2.2, 1.2.4  
QA: N/A

Contract #: DE-AC01-91RW00134  
LV.EIO.RDS.05/97-019

May 22, 1997

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

Attention: Technical Publications Management

Dear Dr. Brocoum:

Subject: Resubmittal of Viability Assessment Design and Review Plan  
Document Identifier B00000000-01717-4600-00070, Rev. 1, ICN 1  
(Deliverable RP120MG1) (WBS 1.2.4.2)

Please find enclosed the Viability Assessment Design and Review Plan, Rev. 1, ICN 1, for Deliverable RP120MG1. This deliverable was originally submitted in December 1996 and resubmitted in March 1997. Acceptance of the resubmittal is pending corrections incorporated in the enclosure.

Should you have any questions, please contact me at (702) 295-5601.

Sincerely,



Richard D. Snell, Manager  
Engineering and Integration Operations  
Management & Operating Contractor

RDS/CAH/sjt

Enclosure:  
Viability Assessment Design  
and Review Plan, Rev. 1, ICN 1

cc w/o encl:  
S. L. Klapproth, M&O, Las Vegas, Nevada