1.	Summary Account Number:	TR6612FB3
2.	Summary Account Title:	esign ECRB Cross-drift.
3.	Summary Account MGR/ORG	Kimura

- 4. Status of Change: \_\_\_\_ Revised \_X\_ New
- 5. Scope Description: Develop designs and technical requirements for the second phase of the implementation of the Enhanced Characterization of the Repository Block. Specific AE activities include: Performing the title II design of the East West Cross Drift (Excavation Layouts, Ground Support, Construction Support Utilities, General Construction Specification), Review constructor submittals and technically accept the plans prepared by the constructor. A/E designed construction support utilities will consist of water supply, waste water collection, compressed air supply, drift lighting, power supply, communications, ventilation system, and fire protection. A/E scope of work consists of determination of requirements, development of supporting design basis analysis, development of design drawings and specifications. The A/E will review submittals on the constructor supplied muck conveyor, rail transport systems, typical mounting details for A/E designed utility systems, and typical utility location layouts. The A/E will determine and specify the type and extent of constructor submittals required for review.
- 6. Scope Differences from the Baseline: New Scope
- 7. Key Assumptions:
  - 1. See the General ESF Technical Basis that prefaces this section.
  - 2. The design of the ESF ECRB cross-drift will not preclude the potential extension of access to the Calico hills.
  - 3. The ECRB cross drift will extend from the TBM launch chamber in the North Ramp generally westward across the Solitario Canyon Fault.
  - 4. The design of ECRB cross drift utilities will be in accordance with OSHA 1926. Equipment and utility mountings will not be evaluated for seismic loads

- 5. The constructor will be responsible for the design of the cross drift muck conveyor and rail transport systems including modifications to existing ESF utility systems required to support the addition of these systems. Proposed modifications to existing systems will be submitted to A/E for review.
- 6. ECRB cross drift utilities will be construction support systems and not subject to the design requirements found in the ESFDR. Systems Engineering will provide a letter for the AE to this effect.
- 7. A/E developed design drawings and specifications will generally be schematics or flow diagrams which will specify equipment sizings, materials, general locations, Etc. The actual utility locations in the cross drift will be the responsibility of the constructor. Typical utility configurations will be submitted to A/E for review to ensure that any applicable requirements from testing or DIEs are met.
- 8. Utilities will not be required to remain operational during or after a seismic event.
- 9. All A/E work on cross drift utilities will be Non-Q.
- Design inputs will be required before Starter Tunnel design can start. QAP 3.12 inputs will be required from Science (DST Standoff, Coordinates of terminal end of cross drift), Constructor (Size requirements for TBM assembly and launch, Grade, Angle of departure from No. Ramp, TBM turning radius), Repository Design (Gradiant, Sill), SA (CA, Seismic requirements).
- 11. DIE will be completed before first analysis can complete checking (4 weeks from start of design)
- 8. Cost Rationale: CURRENT ESTIMATE \$505,887
- 9. Level III Milestones:
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

V  -	Vork Discipl	Shee	t		Rev.:	00
_	Discipl	ine:				
_	-		Mining			
	Prepar	ed by:	W. Kenne	edy		
	Review	ed by:				
ᅱ	Dead	Dave	laamaat	P	advat Ch	- al.
_	Units :	MHrs	Total	Units	MHrs	Total
			• 			
5		200	200	1	40	40
3	1	120	120	1	24	24
0	· ·	160	160	1		32
5	1	120	120	1	24	24
		<u></u>				
5	6	100	600	6	20	120
흿	1	100	100	<u> </u>	<u> </u>	20
4		100				<u>+</u>
8	6	24	144			
		308.8 231.6	308.8 231.6			
	Subto	tal MHr	2084.4	Subton	al MHrs MHrs	280
_		<u> </u>				
		5       1         5       1         5       1         5       1         5       1         5       1         5       1         5       1         5       1         5       1         5       1         5       1         5       1         6       1         8       6         1       1         8       6         1       1         5	5       1       200         5       1       120         5       1       120         0       1       160         5       1       120         5       1       120         5       1       120         5       1       100         5       1       100         5       1       100         5       1       100         8       6       24         308.8       231.6         Subtotal MHr       Subtotal MHr	5       1       200       200         5       1       120       120         5       1       120       120         0       1       160       160         5       1       120       120         5       6       100       600         5       1       100       100         5       1       100       100         5       1       100       100         5       1       100       100         5       1       100       100         6       24       144         308.8       308.8       308.8         231.6       231.6       231.6         Subtotal MHr       2084.4	5       1       200       200       1         5       1       120       120       1         0       1       160       160       1         5       1       120       120       1         5       1       120       120       1         5       6       100       600       6         5       1       100       100       1         5       6       24       144       144	5       1       200       200       1       40         5       1       120       120       1       24         0       1       160       160       1       32         5       1       120       120       1       24         5       1       120       120       1       24         5       1       120       120       1       24         5       6       100       600       6       20         5       1       100       100       1       20         5       1       100       100       1       20         5       1       100       100       1       20         6       24       144       144       144       144         1       100       100       1       20       16       144         1       100       100       1       20       1       144         1       100       100       1       20       1       144         1       100       100       1       1       1       1       1       1       1       1 <t< td=""></t<>

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	ate V	Vork	Shee	et	·	Date: Rev.:	06/(0.3) 00
		Dissipli		Geotech			
W.B.S/Title: 1.2.0.0.1.2 ESF TSL Excavations		Drenard	ne. A hv:	L H. Pve			
Job No.: Iask No.:	<del></del>	Review	d by: 3	S. Bonat	nian		
JN Descriptit: 125k:		EVE VIE IV		0.00.00			
ESF EVVX Drift Title II Design	 	<u> </u>			D	aduat CL	
Description		Units !!	MHrs	Total	Units	MHrs	Total
Analyses: Geotechnical Ground Support Loads Analysis Quasi-Static and Dynamic Analysis	40	1	320	320	1	64	64
						•	
Specifications (Including Inputs Lists):						• • •	
			·		·		
Drawings (Including Inputs Lists):							······································
	75		100	200		20	40
Rock Bolt & Accessones drawings			100			¥	
			<u> </u>			• •	
Review	12		74	96			
Review Constructor Design Inputs/Submittais							
			;				
Common Activities:							
Planning, Supervision & tech Supt 20% of discrete MHrs			123	123.2			
Design Review 13% of discrete Mars			52.4				
		Subtot	al M	831.6	Subto	tal MHrs	10-1
					TOTAI	_ MHrs	935.6
Notes/Assumptions:					•		
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Please note in the description if the product is new or a revision

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MGDS - ESF DESIGN Engineering Estimate Work Sheet					06/10.97 00
W.B.S/Title:       1.2.6.6.1.2       ESF TSL Excavations         Job No.:	Discip Prep± Reviev	line: red by: wed by:	<u>Civil/Stru</u> <u>M. Taylor</u> -	ctural r	
Description	Prod Units	luct Dev MHrs	/elopment Total	Product Units MHr	Check s Total
Analyses:		160	160	·	20 32
<u>Steel Sets Analysis "Non Q</u>					
Specifications (Including Inputs Lists):		: •		· · · · · · · · · · · · · · · · · · ·	
Steel Set Spec "Non Q" 20	1	160	160	<u> </u>	32 32
/		• • • • • • • • • • • • • • • • • • •			
Drawings (Including Inputs Lists):		-	··	: : b	
Review	2	24			
				·	
Common Activities:       Planning & Supervision       20% of discrete MHrs		73.6	73.6		
Design Review 15% of discrete withis		<u> </u>			
	Subto	otal M	496.8	Subtotal MH1	rs 64
Notes/Assumptions:				TOTAL MHrs	560.8

Please note in the description if the product is new or a revision

	MGDS - FSF	DF	ESIGI	N .			Date	66.16.97			
E	ngineering Estim	ate	e Wor	k Sh	eet		Rev.:	00			
					Dissipling SubSurface I Wilitigs						
W.B.S/110e: <u>1.2.0.0.1.2 ESF ISE</u>	Excavations		Descipi								
Job No.: 1	Job No.: 125K No.:			ta by: j	<u>-</u>	1150117 44	. J. MEE	<u>.u</u>			
JN Descriptn: T	JN Descriptn: Task: <u>Utilities</u>			ed by:							
ESF EWX Drift Title II Design							···				
			Produ	ict Dev	elopment	Pro	duct Ch	eck			
Description			Units :	MHrs	Total	Units	MHrs	· Total			
Analyses:						•	•				
<b>Construction Support Utilities Desig</b>	n Basis	58	1	460	460	<u> </u>	92	92			
Mech 160											
Elec 160											
Struct 40											
Specifications (Including Inputs Lists):								·			
ECR Electrical Equipment spec		5	1	40	40	1	8	8			
/			:			:					
						·					
Drawings (Including Inputs Lists):						;;					
Fresh water, waste water, compres	sed air	25	2	100	200	2	20	40			
Ventilation		25	2	100	200	2	20	40			
Power		25	2	100	200	2	20	40			
Lighting	······	13	1.	100	100	<u> </u>	20	20			
Periew		-13		100		••					
Review Constructor Design Inputs/S	Submittals	24	8.	24	192	·					
				· <u> </u>		·					
- <u></u>				•	··						
			•	. <u></u>							
Common Activities:				·							
Planning & Supervision	20% of discrete MHrs		:	298	298.4						
Design Review	20% of discrete MHrs		<u>.</u>	298	298.4						
								<u> </u>			
		-	Subtot		2088.8		MHrs				
						TOTAL	MHrs	2348.8			
Notes/Assumptions:											
				·				·			

\* Please note in the description if the product is new or a revision

1.	Summary Account Number:TR6DGA2B
2.	Summary Account Title:ECRB Title III
3.	Summary Account MGR/ORG: Kimura
4.	Status of Change: Revised _X New
5.	Scope Description: Provide Title III services for the construction and the continuation of design for the ECRB. Provide Title III services for No. & So. Portal area improvements.
6.	Scope Differences from the Baseline: New scope
7.	Key Assumptions:
	1. See the General ESF Technical Basis that prefaces this section
	2. This activity will not include the development of ground support performance parameters.
	3. ECRB Title III activities are in addition to the technical activities necessary to complete construction of the ESF main loop and associated surface facilities.
	4. Any as-builts, system descriptions or O&M related activities are not included in this Summary Account.
	5. Includes full time electrical to review installation for OSHA 1926 compliance.
	6. Will provide 3 shift coverage through April '98. Will provide follow on 1 shift coverage through July '98. Title III Coverage for ECRB ends July '98.
8.	Cost Rationale: - CUCRENT ESTIMATE \$937,752
9.	Level III Milestones:
1 <u></u> 0.	Level III Milestone Acceptance Criteria:

11. Attachments and References:

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MGDS - ESF D	ESIGN			· Date:	06/10/97
Engineering Estimat	e Work	Sheet	t	Rev.:	01
W B S/Title: 12613 ESE Support	Discip	iae:	Title III		
Ich No : Task No.:	Prepar	ed by:	C. Garre	t	
IN Descriptu: Task:	Review	ved by:			
ESE EWX Drift Title III Design					
	Prod	nct Deve	looment	Product Ch	eck
Description	Units	MHrs	Total	Units MHrs	Total
	;	per			
15/SEPT THROUGH 15/MAY	Weeks	Week	2220		
Drift Excavation overview 3 10 hour shifts 5 days per week		150	3230	• 	- <u></u> -
Alcove Excavation overview 1 10 hour shift 5 days per week	10	50	500	•	
		:		·	
Surface construction overview	13	40 .	520		
Design Engineering Support	45	16	720	· · · · · · · · · · · · · · · · · · ·	
(ECRs, Submittal Review, Design questions)		;	·		
Electrical Compliance to OSHA 1926 Inspection	45	50 :	2250	·	- <u></u>
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Common Activities:		1848	21.21		
Planning & Supervision 20% of discrete MHrs		1040			
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				·	
	Subto	otal MHr	11088	Subtotal MHrs	
				TOTAL MHrs	11088
Notes/Assumptions:					5.9613
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1.	Summary Account Number:TR6613GB1
2.	Summary Account Title: Design ECRB Alcoves
3.	Summary Account MGR/ORG: Kimura
. <b>4.</b>	Status of Change: Revised _X New
5.	Scope Description: Provide designs for the alcoves necessary to support the underground site characterization of the Solitario Canyon Fault and the Hydrological and Geochemical investigations.
6.	Scope Differences from the Baseline: New Scope
7.	Key Assumptions:
	1. See the General ESF Technical Basis that prefaces this section.
	<ol> <li>There will be three Test Alcoves, 3m x 4m x 100m ea. The alcoves will have 4-6 boreholes - 20-30 meters long ea. Alcoves will be located at various points, to be determined by TCO, along the ECRB Cross Drift.</li> </ol>
	3. There will be two Niches similar to the Moisture Studies (3.5x4x10?) The niches will have 8ea 15 to 20 meter holes
	4. It is understood that the excavation of these alcoves shall be after the completion of TBM operations and demob.
	5. AE alcove & niche designs will consist of excavation layouts based on criteria letters from the TCO and ground support.
8.	Cost Rationale:
9.	Level III Milestones:
10.	Level III Milestone Acceptance Criteria:

11. Attachments and References:

Fngineering Estimate '	HGIN Work	She	et	·	Dale;	06/10/1
Engineering Estimate					Biev.;	<u><u><u></u><u></u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u></u>
V.B.S/Title: 1.2.6.6.1.3 ESF TSL Testing	Discipl	ine:	Mining			
ob No.: Task No.:	Prepar	ed by:	W. Kenn	edy		
N Descripta: Task:	Review	red by:	-			
SF ECRB Test Alcoves & Niches Title II Design						
	Prode	uct Dev	elopment	Pı	roduct Cl	heck
Description	Units	MHrs	Total	Uaits	MHrs	Total
nalyses:						
NO New Analysis - Design will be based on				· ·····		
criteria letters from the TCO	, <b> </b>			· <u></u>	<u> </u>	
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pecifications (Including Inputs Lists):				-		•
	<b> </b>			·		
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rawings (Including Inputs Lists):			•	•		;
Icove Layouts - Plans 37.5	3	100	300	3	20	60
Icove Layouts - Profiles 37.51	3	100	300		20-	· 01
iche Plans & Profiles	<u>-</u>	100	200		20	
Review	<b></b>					
eview Constructor Design Inputs/Submittals		24				
	<u> </u>				- <u>-</u>	
ommon Activities:			<u></u> ,		<u></u>	
Planning & Supervision 20% of discrete MHrs	<b> </b>	200	200		<del></del>	
Design Review 15% of discrete MHrs		150				
· · · · · · · · · · · · · · · · · · ·	Subtor	tal MHr	1350	Subtot	al MHrs	20
	L <u></u>	<del></del>		TOTAL	. MHrs	155(
lotes/Assumptions:						
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Please note in the description if the product is new or a revision

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1.	Summary Account Number: TR6621GB2
2.	Summary Account Title: Conceptual Design of the Calico Hills Extension
3.	Summary Account MGR/ORG:Kimura
4.	Status of Change: RevisedX_ New
5.	Scope Description: Develop a Conceptual Design Report for the Extension of the ESF cross drift into the Calico Hills
6.	Scope Differences from the Baseline: New Scope
7.	Key Assumptions:
	1. See the General ESF Technical Basis that prefaces this section .
	2. The design of the ESF ECRB cross-drift will not preclude the potential extension of access to the Calico hills
	3. After the Site Characterization objectives are defined for the proposed Calico Hills investigation, the conceptual design process will determine the most effective configuration to meet these objectives. Various access options will be considered such as ramps with varying degrees of declines and vertical shafts. Interfaces with the potential repository will be considered. Costs and construction schedules will be developed for each defined option.
	4. Conceptual Design will be performmed in FY99.
8.	Cost Rationale:
9.	Level III Milestones:

- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

MGDS - ESF DES Engineering Estimate V	IGN Vork	Shee	t	· Date: Rev.:	66/10.97 QC
W.B.S/Title:       1.2.6.6.1.3 ESF TSL Testing         Job No.:	Discipline: <u>Mining</u> Prepared by: <u>W. Ker</u> Reviewed by:		Mining W. Kenno	edy	
Description	Produ Units	ct Deve MHrs	elopment Total	Product C Units MHrs	heck Total
Coordinate scientific input and select viable options 4 works		20	80		
Develop sufficient detail for each option to support	4	100	400	· · · · · · · · · · · · · · · · · · ·	
		80	320		
Cost Estimate for each option Construction Schedule for each option		80 20	80	1 10	<u>; 16</u>
Document results and recomendations into a conceptual Design Report	1	200	200	1 40	) 40
Common Activities:         Planning & Supervision       20% of discrete MHrs         Design Review       15% of discrete MHrs		232 174	232 174		
	Subtot	al MHr	1566	Subtotal MHrs	56
Notes/Assumptions:					
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2.	Summary Account Title: Design No. Portal Construction Support Facilities
3. <sub>.</sub>	Summary Account MGR/ORG: Kimura
4.	Status of Change: Revised _X New
5.	Scope Description: Provide designs for the ECRB Drift Muck Storage Pile.
	<ul> <li>EWX Drift Muck Storage Pile - Develop grading and drainage drawings.</li> </ul>
6.	Scope Differences from the Baseline: New Scope

#### 7. Key Assumptions:

1.

- 1. See the General ESF Technical Basis that prefaces this section.
- 2. Existing Surface Waste Water System drawings will be used.
- 3. Volume of the ECRB muck pile will be based on 1/8 of the Main Drift tunnel muck.
- 4. Surface conveyor and radial stacker will be used "as is" in their current location and configuration. NO design required.
- 6. No Surface Perched Water Evaporation Pond.

Summary Account Number: TR6311FB1

- 7. No modifications required to the existing Air Quality Permits.
- 8. Cost Rationale: COREGNE ESTIMATE 67,268
- 9. Level III Milestones:
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

M Engine	GDS - ESF D eering Estimat	ESIGI te Wor	N ·k Sh	ieet		- Date: Rev.:	<u> </u>
W.B.S/Title: <u>1.2.6.3.1.1 North Portal</u> Job No.: Task No. JN Descriptn: Task: Design No. Portal Construction Support Fa	.:	_ Discipli) _ Prepare _ Review	ne: td by: ed by:	<u>Civil/Stru</u> <u>H. Monta</u>	<u>ctural</u>		
Description		Produ Units	ict Dev MHrs	elopment Total	Units	roduct Ch MHrs	eck Total
Analyses: Muck Storage Pad (rev) Drainage Calculations			<u>60</u> 60	<u>60</u> 60	1 1	<u>12</u> 12	<u>12</u> 12
Specifications (Including Inputs Lists):				; ; ;			
					······································	······	
Drawings (Including Inputs Lists):							
Overall Site Plan (rev) No. Portal Site Plan (new) Finished Grading & Location Plan (new)			10 40 80	10 40 160	<u>1</u> <u>1</u> <u>2</u>	2 8 16	2 8 32
Storm Drain Details (new)			40	40	1	8	8
Common Activities:         Planning, Est. Supt & Supervision       20%         Design Review       15%	of discrete MHrs of discrete MHrs		<u>74</u> <u>55.5</u>	<u>74</u> <u>55.5</u>	· · · · · · · · · · · · · · · · · · ·		
		Subtc	stal M	499.5	Subt TOTA!	otal MHr L MHrs	74 573.5
Notes/Assumptions:							
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Please note in the description if the product is new or a revision

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1.	Summary Account Number:TR6312FB1
2.	Summary Account Title: Design So. Portal Support Facilities
3.	Summary Account MGR/ORG: Kimura
4.	Status of Change: Revised _X New
<b>5.</b>	Scope Description: Provide Title II designs for the So. Portal area support systems to provide access to the ESF via the So. Portal during ECRB Construction. AE Designed Systems include Security, Lighting, Power, Grounding Grid.
	<ul> <li>Security - Design Security Fencing for So. Portal Area.</li> </ul>
	<ul> <li>Power &amp; Lighting - Provide power &amp; lighting to So. Portal Facilities (from No. Portal), both permanent and temporary. Install a 750 kVA Mine Power Center (MPC).</li> </ul>
	<ul> <li>Grounding Grid - Provide separate ground system for So. Portal.</li> </ul>
6.	Scope Differences from the Baseline: New Scope
7.	Key Assumptions:
	1. See the General ESF Technical Basis that prefaces this section.
	2. No. Portal will be reserved for ECRB Construction Access, So. Portal will handle all visitor and scientific Access.
	3. Surface Rail Spur and Materials Storage and Handling Facilities will be designed by constructor.
	<ol> <li>TBM will be removed from So. Portal Pad before So. Portal Improvements are started.</li> </ol>
	5. Temporary items will be designed in accordance with OSHA 1926 and Specification Section 01500.

6. Permanent ESF Facilities will be designed to the ESFDR.

- 7. There will be NO Diesel Fuel System at the So. Portal. Constructor will provide mobile fueling at So. Portal.
- 8. Existing Pad size is adequate for all facilities.
- 9. Portable sanitation facilities will be used. This will consist of six Pot-a-potties located on the pad. No Design required
- 10. No permanent potable or non-potable water facilities. Water will be trucked in.
- 11. Road has a surface of 8"to 12" of compacted select fill. No Road improvements required. No Pad Grading & Drainage improvements required.
- 12. Compressed air will not be required on the South Portal Pad. Compressed air will be available at the portal entrance.
- 13. No Medical Facility required at So. Portal.
- 14. Construction Labor costs and Capital Equipment costs not included in AE estimate. Will be included in Construction estimate.
- 15. Portal Access Control and Security Station will be a trailer provided by Constructor. No AE design required.
- 16. There will be NO hardwire telephones at So. Portal

8. Cost Rationale: CURLENT ESTIMATE 101,226

- 9. Level III Milestones:
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

En	MGDS - ESF D gineering Estima	ESIGI te Wor	N 'k Sh	eet		. Date: Rev.:	66/10.97
Section South Portol		Discipli	ine: (	Civil/Stru	ctural		
W.B.S/Title: <u>South Portan</u>		Prenar	ed by:	H. Monta	lvo		
Job No.: 539	to SS Strict	Review	ed by:	-			
JN Descriptin:	N. <u>00 0000</u>						·······
Design So. Foldar Support racing				looment	' P	roduct Ch	eck
Description		Units	MHrs	Total	Units	MHrs	Total
Analyses:			•				
			:		; ; ;		·
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			;				·
Specifications (Including Inputs Lists):							
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		- <u> </u>	3				
			:				
Drawings (Including Inputs Lists):			:	-	:		
Overall Site Plan (rev)		1	20	20	1	4	. 4
So Portal Pad Grading Plan & Elevation	ons (rev)	2	40	80	2	8	<u> </u>
So Portal Pad Fencing Plan (new)			0				
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	•						
					·	•	
Common Activities:	20% of discrete MHrs		32 -	32			
Design Review	15% of discrete MHrs		24	24			
					Subse		
		Subton				MHrs	248 🗉
Notec/Assumptions:							
			<u>510.000</u>				
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an a	MGDS - ESF I	)ESIGI	N V Sh	eet	. Date:	66/10.97
			K 01		Kev.:	
W.B.S/Title: South Portal		Discipli	ne:	Mechani	cal	
Job No.:	Task No.:	Prepare	ed by:	R. Flye		<u> </u>
JN Descriptn:	Task:	Review	ed by:			
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Fieuse note in the description If the product is new or a revision

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1.	Summary Account Number: TR6621GB2
2.	Summary Account Title: Conceptual Design of the Calico Hills Extension
3.	Summary Account MGR/ORG:Kimura
4.	Status of Change: RevisedX New
5.	Scope Description: Develop a Conceptual Design Report for the Extension of the ESF cross drift into the Calico Hills
6.	Scope Differences from the Baseline: New Scope
7.	Key Assumptions:
	1. See the General ESF Technical Basis that prefaces this section
•	2. The design of the ESF ECRB cross-drift will not preclude the potential extension of access to the Calico hills
	3. After the Site Characterization objectives are defined for the proposed Calico Hills investigation, the conceptual design process will determine the most effective configuration to meet these objectives. Various access options will be considered such as ramps with varying degrees of declines and vertical shafts. Interfaces with the potential repository will be considered. Costs and construction schedules will be developed for each defined option.
8.	Cost Rationale: SEE ATTACHED - CURRENT ESTIMATE \$ 135, 454
9.	Level III Milestones:
10.	Level III Milestone Acceptance Criteria:
11.	Attachments and References:

# MGDS - ESF DESIGN **DESCRIPTION OF WORK**

Date:

0..02/97

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W.B.S		1.2.6.6.1.3			•		
W.B.S. Title		ESF TSL Testing	,				
P&S Accoun	t No.				·	-	
P&S Accoun	t Title		· · · · · · · · · · · · · · · · · · ·		·		
Summary A	count No.	TR6613FB?	<u></u>		2H80tbd		
Summary A	count Title	ESF ECRB Cond	ceptual De	sign o	f the Calico Hills Acce	SS	
Participant		MKE					
Type of Wor	k	Discrete	··	. <u> </u>			
Work Scope:	Develop a Hills. After the Si investigation	Conceptual Desig te Characterization, the conceptual	n Report f n objectiv design pr	or the es are ocess	Extension of the ESF defined for the propose will determine the most	cross drift into sed Calico Hill st effective co	o the Calico s - nfiguration to -
2	Four option	bjectives. Vario declines and vert . Costs and const	us access ical shafts ruction scl red.	opuon . Interf nedule	aces with the potentia s will be developed fo	l repository wi r each defined	li be l option.
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	MGDS - ESF DESIGN DESCRIPTION OF WORK Continuation	Date: Rev.:	<u> </u>	06/02/
W.B.S	1.2.6.6.1.3	<u></u>	····	
W.B.S. Title	ESF TSL Testing	<u></u>		
P&S Account No.	· · · · · · · · · · · · · · · · · · ·			
P&S Account Title	·	····		
Summary Account No.	TR6613FB?			
Summary Account Title	e ESF ECRB Conceptual Design of the Calico Hills Access			
Participant	MKE			
Type of Work	Discrete			
Work Scope:		······································		
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Analysis	9 Conne	480	) 	
Drawings			,	
Review Co	onstructor Design Inputs / Submittals			·
Common A	ctivities:			
Planning	& Supervision	232		
<u>Checkin</u>	g Review	<u> </u>	) }	
		1622		
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Engineering Estimate Work Sheet       Not.       20         W.B.S/Title:       12.6.6.1.3 ESF TSL Testing       Discipline:       Mining		MGDS - F	ESF DES	SIGN				Date:	06.02.9
W.B.S/Title:       12.6.6.1.3       ESF TSL Testing       Discipline:       Mining         Jab No.:	/	Engineering E	stimate `	Work	Sheet			Rev.;	00
Job No.:Task No.:Prepared by: W.Kennedy	W.B.S/Title: 1.2.6.6.1.3 ESF TS	L Testing		Discipl	ine:	Mining			
IN Descriptin:       Task:       Reviewed by:         ESF ECR8 Conceptual Design of the Calico Hills Access       Product Development       Product Check         Description       Product Development       Product Check         Coordinate scientific input and select viable options       4 weeks       4       20       80         Coordinate scientific input and select viable options       4 weeks       4       20       80         Develop sufficient detail for each option to support       4       100       400	Job No.:	Task No.:		Prepar	ed by:	W. Kenn	edy		
ESF ECRB Conceptual Design of the Calico Hills Access         Description       Product Development       Product Check         Units       NHI'rs       Total       Units       NHI'rs       Total         Coordinate scientific input and select viable options       4 weeks       4       20       80         Develop sufficient detail for each option to support       4       100       400       cocstestimate & construction schedule         (will include D size sketches)	JN Descriptn:	Task:		Review	ed by:	-		···	
Product Development         Product Check           Units         MHrs         Total         Units         MHrs         Total           Coordinate scientific input and select viable options         4 weeks         4 20 80	ESF ECRB Conceptual Design o	the Calico Hills Acce	SS						
Description         Units         MHrs         Total         Units         MHrs         Total           Coordinate scientific input and select viable options         4 weeks         4         20         80				Prod	uct Deve	lopment	Pr	oduct Ch	eck
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(will include D size sketches)	cost estimate & construction s	chedule			ىكېتىتى جىتىمىر				
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Common Activities: Planning & Supervision 20% of discrete MHrs 232 232 Design Review 15% of discrete MHrs 174 174 Subtotal MHr 1566 Subtotal MHrs TOTAL MHrs 16 Notes/Assumptions:									······································
Common Activities:       20% of discrete MHrs       232       232         Design Review       15% of discrete MHrs       174       174         Subtotal MHr       1566       Subtotal MHrs       15         Notes/Assumptions:       15       15       15			<u></u>						
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Please note in the description if the product is new or a revision

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1.	Summary Account Number: TR6613GB1
2.	Summary Account Title: Design ECRB Alcoves
3.	Summary Account MGR/ORG: Kimura
<b>4</b> .	Status of Change: Revised _X New

5. Scope Description: Provide designs for the alcoves necessary to support the underground site characterization of the Solitario Canyon Fault and the Hydrological and Geochemical investigations.

6. Scope Differences from the Baseline: New Scope

#### 7. Key Assumptions:

- 1. See the General ESF Technical Basis that prefaces this section. -
- There will be three Test Alcoves, 3m x 4m x 100m ea. The alcoves will have 4-6 boreholes - 20-30 meters long ea. Alcoves will be located at various points, to be determined by TCO, along the ECRB Cross Drift.
- 3. There will be two Niches similar to the Moisture Studies (3.5x4x10?) The niches will have 8ea. 15 to 20 meter holes
- 4. It is understood that the excavation of these alcoves shall be after the completion of TBM operations and demob.
- 5. AE alcove & niche designs will consist of excavation layouts based on criteria letters from the TCO and ground support.
- 8. Cost Rationale:
- 9. Level III Milestones:
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

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# MGDS - ESF DESIGN DESCRIPTION OF WORK

Date:

Rev.: <u>00</u>

06/02.97

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P&S Acco	unt Title					
Summary	Account No.	TR6613GB1				
Summarv	Account Title	ESF ECRB Test	Alcoves	& Niches	Title II Design	
Particinan	it	MKE				
Type of W	ork	Discrete			· · · · · · · · · · · · · · · · · · ·	· ·
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Engineering Estimate	e Wa	ork S	Shee	t			Rev.: (	00
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SF ECRB Test Alcoves & Niches Title II Design								
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1.	Summary Account Number. IRHOLZEBS	
2.	Summary Account Title: TBM Mobilization and Rehabilitation	
3.	Summary Account MGR/ORG:	
4.	Status of Change: Revised New	•

- 5. Scope Description: Rehabilitate the ECRB TBM and associated equipment consistent with the project requirements and mobilize the equipment to the ESF site at Yucca Mountain.
- 6. Scope Differences from the Baseline:

The Assessment Manufactor TD CC 19 ED

7. Key Assumptions:

1. See the General ESF Technical Basis that prefaces this section.

2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.

3. The required planning for the TBM rehabilitation is included in the Early Start ECRB CR.

4. This activity will start once there is agreement with the constructor on the usage rate for the equipment and will be complete once the equipment arrives at the ESF jobsite. Any follow on activities will be included in Summary Account TR6612FB6 - Install Excavation Equipment.

5. Any specialized equipemnt installed on the TBM system during rehabitation to meet YMP requirements. will be the property of the constructor at the completion of the work and will be demobilazed with the TBM.

- 8. Cost Rationale: \$2,717,450 See the enclosed construction cost estimate for details.
- 9. Level III Milestones: See the preceding milestone and deliverable summary  $\sum_{n=1}^{\infty} M_{n} M'$ .
- 10. Level III Milestone Acceptance Criteria:

Attachments and References:

o Data Sheet for the PK TBM

11.

. MAY 12 '97 08:40AM KIEWIT/PB ESF PAD SECTION 0 GENERAL INFORMATION

#### GENERAL SPECIFICATIONS -

MACHINE DIAMETER (WITH NEW CUTTERS): 16 FEET 5 INCHES

MAIN BEARING:

**CUTTERS:** 

MAXIMUM RECOMMENDED AVERAGE CUTTER LOAD:

MAXIMUM RECOMMENDED CUTTERHEAD THRUST:

**CUTTERHEAD DRIVE ASSEMBLIES:** 

CUTTERHILAD HORSEPOWER:

CUTTEREEAD SPEED:

**CUTTERHEAD TORQUE:** 

**BORING STROKE:** 

45.000 POUNDS

**ON 32 ASSEMBLIES** 

1,530,000 POUNDS

AC MOTORS/GEAR REDUC ERS/ HYDRAULIC CLUTCHES

TAPERED ROLLER TYPE

34 ROBBINS 17-INCH DISCS

1200 HP (SIX 200-HP WATER-COOLED MOTORS)

APPROXIMATELY 10 RPM

630,000 LB.-FT.

72 INCHES

#### HYDRAILIC SYSTEM:

MACHINE CONVEYOR:

4200 PSI

5000 PSI

TROUGHED BELT

**MODEL 166-245** 

P.Z

#### TBM Rebuild Assumptions developed by the CMO

We anticipate that the used TBM will require a general rebuilding which would include but not necessarily be limited to the following:

Disassemble, clean and inspect entire machine.

Replace worn or damaged components.

Replace structural fasteners.

Replace all seals, filters, hoses.

Rebuild hydraulic cylinders.

Rebuild drive motors and gear boxes.

Replace bearings.

Rebuild or replace main bearing.

Clean, inspect and replace as necessary all electrical components.

Clean and inspect vent ducts, repair or replace as rq'd.

Completely assemble machine, perform no load shop test of all systems and components. Paint one coat shop primer, one coat white finish.

Disassemble and ship to site.

Provide complete o&m manuals and assembly instructions.

Repair/replace railings and ladders as rq'd

In addition, special program requirements regarding fluid spills, and water use, and dust control will add the following:

Incorporate knock-down features that will allow removal of the TBM back out through the bored tunnel.

Provide an enhanced dust control system.

Rebuild or replace the water spray system on the cutter head.

Repair, replace or construct cutter head dust shield to effectively contain dust in the cutter head area.

Replace dust scrubber with unit sized to handle 1.5 times the anticipated tunnel air flows Configure the TBM vent system to have a minimum capacity capable of maintaining a 100 fpm tunnel air velocity.

- Frovide enclosed operator's eab with air conditioner/filter.

Provide water sprays on the muck conveyor both top and bottom.

Enclose conveyor where practical. Provide noise attenuation as feasible at all noise generating areas.

Replace hydraulic system piping and hoses with high pressure components.

Minimize storage capacity of organic-containing fluids to reduce spill potential.

Install drip pans.

Provide dry-type transformers if not already equipped.

Provide automatic fire suppression system.

Install closed loop hydraulic or coolant systems where feasible.

## Preliminary Schedule of Refurbishment of TBM



8/26/97 12:58 PM

1. Summary Account Number: TR6612GB5

Summary Account Title: Excavate ECRB Launch Chamber 2.

3. Summary Account MGR/ORG: McDonald

- \_\_X\_New 4. Status of Change: \_ Revised
- Scope Description: Excavate and support the ECRB Launch Chamber in accordance 5. which project requirements.
- 6. Scope Differences from the Baseline:

New Scope

7. Key Assumptions:

1. See the General ESF Technical Basis that prefaces this section.

2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.

3. This activity is limited to the activities associated with the excavation and installation of ground support for the ECRB TBM launch chamber. The installation of the electrical and mechanical systems necessary for the excavation of the ECRB cross drift shall be in Summary Account TR6612FB6 - Install excavation equipment

) where "

- 1,152.078 Cost Rationale: \$2,106,006 See the enclosed construction cost estimate for details. 8.
- Level III Milestones: See the preceding milestone and deliverable summary 9.
- Level III Milestone Acceptance Criteria: 10.
- 11. Attachments and References:

To:BILL KENNEDYcc:Ivan Cottle, John Eastlund, Lyman FileFrom:Toby WightmanDate:05/15/97 11:58:52 AMSubject:East-West Drift Launching Chamber and Starter Tunnel

As requested, our best evaluation of dimensional requirements from the information we have at this time is as follows:

1. Angle of departure from North Ramp - 45 degrees.

2. Total length of combined Launching/Starter Tunnel - 300 LF.

3. The first 150 LF of tunnel will be the assembly, marshalling and working area to support the tunneling activity. It will also contain the conveyor drive and takeup units electrical switchgear, rail switching etc. Dimensions should be 30 ft. wide X 23 ft high X 150 ft long.

3 The next 150 ft will contain the gripper saddles and sufficient room for the necessary TBM assembly for startup. It will be a horseshoe section, 22 ft. wide by 21 ft. high.

I realize that this is outside the currently justified rock design dimensions that you mentioned, but it is about the best that we can do at this time.

1.	Summary Account Number: TR6612FB3
2.	Summary Account Title: Establish South Portal Access to Alcoves
3.	Summary Account MGR/ORG: MCDONALD
4.	Status of Change: RevisedX New
5.	Scope Description: Construct the necessary modifications the South Portal and pad to provide effective alternative access to the ESF Main Loop down station from the North Ramp intersection with the ECRB launch chamber during ECRB construction.
6.	Scope Differences from the Baseline:
	New Work
7.	Key Assumptions:
	1. See the General ESF Technical Basis that prefaces this section.
	2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.
8.	519,363 Cost Rationale:\$ <del>520,402</del> - See the enclosed construction cost estimate for details.
9.	Level III Milestones: None

- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

1.	Summary Account Number: <u>IK0012GB0</u>	
2.	Summary Account Title: Install Excavation Equipment	
		•

3. Summary Account MGR/ORG: McDonald

4. Status of Change: \_\_\_\_ Revised \_\_\_\_ New

AND ALL TRACINC

- 5. Scope Description: Install all the necessary electrical and mechanical systems necessary for the excavation of the ECRB cross drift.
- 6. Scope Differences from the Baseline:
- 7. Key Assumptions:

1. See the General ESF Technical Basis that prefaces this section.

2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.

3. This activity will begin after the completion of the launch chamber excavation and the installation of ground support and will be completed with the beginning of the excavation of the ECRB cross-drift.

#### 974,850

- 8. Cost Rationale: \$976,802 See the enclosed construction cost estimate for details.
- 9. Level III Milestones:
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

- MAY 12 '97 08:41AM KIEWIT/PB ESF PAD SECTION 0 GENERAL INFORMATION

ELECTRICAL SYSTEM:

**INCOMING POWER:** 

TRANSFORMERS: (2)

MOTOR CIRCUITS:

CONTROLS AND LIGHTING:

MACHINE WEIGHT:

TURNING RADIUS:

4160V, 3-PHASE, 60 HZ

700 KVA EACH (4160V:460V) (NITROGEN-FILLED)

460V, 3-PHASE, 60 HZ

120V,60 HZ

**APPROXIMATELY 225 TONS** 

APPROXIMATELY 500 FEET


11.

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<b>I</b> .	Summary Account Number: TR6612GB7
2.	Summary Account Title: Excavate FCRB Cross-drift
3.	Summary Account MGR/ORG: McDonald
4.	Status of Change: RevisedX New
5.	Scope Description: Excavate and support the ECRB Cross Drift from the launch chamber through the intersection of the Solitario Canyon fault.
6.	Scope Differences from the Baseline: New work
7.	Key Assumptions:
	1.See the General ESF Technical Basis that prefaces this section.
	2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.
	3. This activity includes all the incidental activities necessary to accomplish the work. It includes but is not limited to:
	<ul> <li>o Installation of ventilation system</li> <li>o Installation of compressed air, water, communications, and mine waste water system.</li> <li>o Installation of the conveyor and transportation system.</li> <li>o Installation of all ground support.</li> </ul>
	o Installation of electrical systems.

- o Maintenance of TBM and other electrical/ mechanical systems within the ECRB cross-drift.
- o Installation of trackage
- o Small tools, supplies and other consumables

4. This activity excludes any construction or maintenance activities occurring within the ESF Main Loop

Acca Mr. SF Subsurface Design ast West Cross Block Drift Adgetary Estimate - Ground Support material requirements 11: Jerald W. Keifer

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irameters:

ift Diameter (Ft.)	16.5	Rockbolt Pattern	4' X 4'	
ift Diameter (m)	5.0	Conversion from (ft)	to(m)	

0.3048

ockbolts Super Swellex 3 m length with accessories per spec. 02165

umber of	Spacing	Arc distance	Circumter-	Degrees of	Distance	Bolts per	Bolts per
olts per	between	of coverage	ence of	coverage	between	ft of drift	m of drift
w .	bolts		drift		rings (Ft)		
7	4	24	51.8	167	4	1.75	5.74

elded Wire Fabric WWF 3X3X1.9X1.9

umber of	Minimum	Length of	Length of	Width of	Width of	Area of	Area per	Sq ft. WWF	Sq. ft. WWF
neets per	overlap	coverage	sheet	coverage	sheet	sheet 🔄	4 ft. ring	per ft. of	per m of
W	(11.)	<u>(ft)</u>	<u>(f1)</u>		<u>(ft)</u>	( <u>ft^2)</u>		drift	drift
2	0.5	12	13	4	5	20	40	10	32.8

May-97.

olled Cha	innels	C10 X15.3			
umber ər bolt w	Degree of coverage required	Circumfer- ence of drift	Length of channel required	Number of channel per ft of bolted drift	Number of channel per m of bolted drift
	69.5	51.8	10.0	0.25	0.820

5. See attachment for assumptions for the ground control installation details

- 6, 580, 977 Cost Rationale: \$9,444,304 See the enclosed construction cost estimate for details. 8.
- Level III Milestones: See the preceding milestone and deliverable summary 9.
- Level III Milestone Acceptance Criteria: 10.
- Attachments and References: 11.
  - o Ground control details

page 2 of 2

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eel sets	W6 X 15	full 360 degr	ree ring.
lumber er ring	: pacing between sets (ft)	Number of set per ft.	Number of set per m
1	4	0.25	0.82

aging C8 X 11.5 with clips,

ercentage	l'ercentage	Width of ,	Average	Arc	Number of	Degree of	Arc	Number of	Weighted	Lagging
1 partial	full lagging	lagging	width of	distance	lagging	Arc	distance	lagging	Average of	per ft of
igging		inches	gap on	springline to	for partial	full lagging	full	for full	lagging	Steel set
			partial	springline	lagged set		lagging (in)	set	per set	supported
			lagging (in)	(in)				1		drift
95%	5%	8	8	311	20	270	467	58	21.9	5,48

agging er m of teel set upported rift 17.96

<u>plit Set rockholts (pins) 0.9 m SS - 3</u>9 with face plate

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ins per	Distance	Number of	Number of
W	between	pins per	pins per
	row (ft)	ft of bolted	m of bolted
		drift	drift
2	4	0.5	1.64





#### DRAFT

#### PRELIMINARY EAST-WEST DRIFT EXCAVATION PLAN REV. 0 5/12/97

The detail of the the latest East-West Drift plan is very limited at this time. We know that it will probably be a 16.5 ft. diameter, 2600 meter long tunnel, spuring off the North Ramp tunnel at an angle to the left (south) side, then turning west and continuing across and above the repository phorizon at a +0.5% grade to a predetermined destination.

We would anticipate excavating a working chamber enlargement and starter tunnel at the North Ramp Intersection, that would be of sufficient size and configuration to accomodate rail switching and turnouts, conveyor transfer station, the drive and take-up units for the 24 inch conveyor, ventilation/conveyor and utility crossovers, electrical switchingear, plus a marshalling area for materials and supplies. The starter tunnel will need to accomodate gripper pads for launching the machine and will need to be of sufficient length to accomodate the TBM and minimal trailing gear to start mining. Excavation of the working chamber and starter tunnel is expected to be accomplished by a combination of drill/blast and mechanical (roadheader) methods.

The invert segments in the mainline tunnel at the intersection will likely be removed and replaced with a cast-in-place invert, extending into the working chamber and starter tunnel.

While the chamber excavating and outfitting is underway, the TBM will be shipped and partially assembled at the North Portal yard. We anticipate that the 16.5 ft TBM, with cutterhead attached, can be tranmed down the North Ramp tunnel to the launching site without removing the vent line or utilities in the main tunnel. At the launching site, the TBM will be moved into the gripper saddle and assembly completed to the extent necessary to begin excavation without the conveyor. We would expect to use the initially assembled machine to excavate sufficient tunnel necessary for installation of 24" conveyor and the remaining backup system. Mucking of this portion of the tunnel would either be by rail car to the outside dump, or more likely, by front end loader to a temporary transfer conveyor.

When sufficient tunnel has been driven to do so, the permanent 24" continuous conveyor will be installed. The remainder of the tunnel will be excavated by TBM with continuous conveyor haulage. Ground support, ventilation and backup utilities will be installed in accordance with A/E supplied design as the tunneling progresses. It is likely that niches will need to be excavated for such things as conveyor booster stations, transformers and other, similar support equipment, as this tunnel will have a smaller clearance envelope. This activity should be factored into the tunneling duration projections for scheduling purposes.

Precast invert segments are not anticipated. Rail will be mounted on steel or timber ties, or some

C5

combination of both.

Very little more can be added to this summary until more specific detail is available relative to QARD controls, governing Safety and Health standards, ventilation and support utility design, special equipment specifications and other design features.

1,	Summary Account Number: TR6613GB2
2.	Summary Account Title: Excavate ECRB Alcoves
3.	Summary Account MGR/ORG: McDonald
4.	Status of Change: RevisedX New
5.	Scope Description: Excavate testing alcoves and niches to provide access to underground site characterization testing.
6.	Scope Differences from the Baseline: new work
7.	Key Assumptions:
	1.See the General ESF Technical Basis that prefaces this section.
	2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.
	3. See attached sheet for required sizes and timing.
	4. Excavation will be drill and blast
8.	Cost Rationale:\$1,478,655- See the enclosed construction cost estimate for details.
9.	Level III Milestones: None
10.	Level III Milestone Acceptance Criteria:

11. Attachments and References:

o memo

To:	Ivan Cottle
cc:	Ned Elkins, Ron Oliver, Ralph Rogers
From:	Kevin Kinter
Date:	06/23/97 02:36:17 PM
Subject:	Information for E-W Drift Construction Schedule

After reviewing the Schedule that you provided me last week the following comments are offered: The Main excavation would be from 2+40 to 24+50

The Solitario Extension would be from 24+50 - 28+05

Excavation for Alcove and Niches (associated with ECRB) would be reduced to 3 alcoves (~4mX4m)

one alcove in the area where the E-W drift crosses over the ESF (@30m)

one alcove somewhere near the drift level location of the Yucca Mountain Crest (@30m) one alcove that runs parallel between the upper two splays of the solitario fault (~100m)

We expect the mining for all alcoves to take in the area of 78 days, to follow the TBM excavation, but may be before TBM demobe. Additional niches will be included in this drift, but will be planned in the FY 98 and/or 99 annual planning process.





1	Summary Account Number: TR6612GB2	
2.	Summary Account Title: ECRB TBM Demobilization	
3.	Summary Account MGR/ORG: McDonald	_
4.	Status of Change: RevisedX_ New	

- 5. Scope Description: Demobilize the ECRB TBM from the underground and transport to the point of origin
- 6. Scope Differences from the Baseline:
- 7. Key Assumptions:

1. See the General ESF Technical Basis that prefaces this section.

2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.

3. This activity will include all necessary activities occurring after the excavation to the final ECRB cross-drift station. Includes the Demob chamber and associated ground support.

#### 827, 332

8. Cost Rationale: \$828,990 -See the enclosed construction cost estimate for details.

- 9. Level III Milestones:
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

1.	Summary Account Number: TR6613GB1
2.	Summary Account Title: ECRB Sampling and Mapping Support
3.	Summary Account MGR/ORG: McDonald
4.	Status of Change: Revised _X_ New
5.	Scope Description: Provide craft labor, materials supplies and equipment fort the support of the sampling and mapping program behind the TBM
6.	Scope Differences from the Baseline:
7.	Key Assumptions:
	1. See the General ESF Technical Basis that prefaces this section.

2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.

3. See the attached memo that addresses the support requirements

- 8. Cost Rationale:\$276,764 See the enclosed construction cost estimate for details.
- 9. Level III Milestones: None
- 10. Level III Milestone Acceptance Criteria:

#### 11. Attachments and References:

1. Requirements memo and discussion

To:Steven Beasoncc:Daniel Soeder, Michael Chornack, Ralph Rogers, Kevin Kinter, Ned ElkinsFrom:Ivan CottleDate:05/14/97 11:39:14 AMSubject:Re: Mapping Requirements in the Enhanced Repository Block Characterization Drift<br/>(a.k.a. E-W drift)

Thanks for the info, I discussed your requirements in a meeting with PK and the CMO. Everything is OK with the exception of the 200 continuous degrees. We will have a 16.4 ft. hole, there will be about a 40in. fanline on the back center line and a set of tracks on the invert centerline. The left rib will have a 24 in conveyor. There will be pipes for air, water (in and out) plus power cables and communication lines. With the exception of a smaller fanline there is about the same quantity of utilities as the main loop with a one third reduction of "wall space". If you must have 200 degrees, we will need to consider a two stage approach. During TBM demob it will probably be necessary to remove the fanline, if so mapping can catch the "gap" in the 200 degrees at that time. I will set up a PK testing support account to provide the required services and equipment for your data collection.

To:	Ivan Cottle
cc:	Daniel Soeder, Michael Chornack
From:	Steven Beason
Date:	05/13/97 03:12:41 PM
Subject:	Mapping Requirements in the Enhanced Repository Block Characterization Drift (a.k.a. E-W drift)

Exact requirements for the FY-98 drifting are still a bit sketchy at best. I hope to sit down with Ned Elkins and Dick McDonald later this week and discuss possibilities for possible configurations which might benefit both construction and mapping. That procedure was followed prior to construction of the ESF which resulted in the development of the mapping area on the trailing gear of the present TBM. I do not believe that configuration will end up being the case for the coming excavation. With present thinking, I believe it will be expedient to have the mapping team in the area behind the trailing gear. Here are the basic requirements as I know for now:

1. The walls must be thoroughly cleaned with an air/water blowpipe prior to mapping. This must be a responsibility of the constructor and is a ASTM requirement for underground mapping. In the past however, this has always been a real pain to initiate and enforce. Is there a chance we can make this a contractural requirement for the constructor?

2. Placement of utilities must be such that no less than 200 continuous deg. of the periphery of the tunnel are unobstructed for mapping. This will be the most difficult issue to deal with. Constructors are notoriously protective of anyone messing with where their stuff is hung, mostly because they are not used to restrictions of this kind. Hopefully, we can come up with some innovative ideas that will allow peaceful coexistence of mining and mapping. Perhaps temporary placement of utilities at the trailing gear, with permanent placement occurring behind us.

3. Construction of an independent platform from which photography, mapping, and sampling can occur. Perhaps a small rubber-tired vehicle, through which supply trains could pass. The platform must be able to move independently of the TBM trailing gear to allow the mapping team and photography crew adjust to the daily footage mined.

4. Continuous access to standard electricity and outside phone lines. If we are to meet emerging requirements for quick downloads of data, the team will need continual access to standard electrical service (110VAC, 60hz) and a standard phone line for dumping data to the surface.

These are the requirements I know of at this time. As things develop, these may change, or be augmented as necessary.

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<b>l</b> .	Summary Account Number: TR682FA1
2.	Summary Account Title: ECRB Direct Supervision and Engineering
3.	Summary Account MGR/ORG: McDonald
4.	Status of Change: RevisedX New
5.	Scope Description: Provide ECRB direct supervision and engineering from the start of the TBM rehabilition to the completion of the crossdrift.
6.	Scope Differences from the Baseline:
7.	Key Assumptions:
	1.See the General ESF Technical Basis that prefaces this section.
	· · · · · · · · · · · · · · · · · · ·

2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.

3. Work in the ESF Main Loop will be excluded from this activity.

- 1 834.849
- 8. Cost Rationale: \$2,047,417 See the enclosed construction cost estimate for details.
- 9. Level III Milestones: None
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

1.	Summary Account Number: TR682FAI
2.	Summary Account Title: Lease Constructors Equipment for the ECRB
3.	Summary Account MGR/ORG: McDonald
4.	Status of Change: RevisedX_ New
5.	Scope Description: Provide lease or rental payments to the constructor for ECRB equipment.
6.	Scope Differences from the Baseline:
7.	Key Assumptions:
	1.See the General ESF Technical Basis that prefaces this section.
	2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.
	3. Includes but is not limited to the TBM, trailing gear, and conveyor
8.	1,995.613 Cost Rationale: <del>\$1,822,182</del> See the enclosed construction cost estimate for details.
9.	Level III Milestones: None
10.	Level III Milestone Acceptance Criteria:
11.	Attachments and References:

- Summary Account Number: TR682GA1
   Summary Account Title: ECRB Muck Handling
   Summary Account MGR/ORG: McDonald
   Status of Change: \_\_\_\_\_ Revised \_\_\_\_\_ New
   Scope Description: Prepare a surface area to receive ECRB muck and transport and spread the muck from ECRB TBM operations.
   Scope Differences from the Baseline:
- 7. Key Assumptions:

1. See the General ESF Technical Basis that prefaces this section.

2. This activity will be supported from the ESF General Support accounts which will be defined as part of the FY98 ESF planning.

#### 484,061

- 8. Cost Rationale: \$419,800 See the enclosed construction cost estimate for details.
- 9. Level III Milestones: None
- 10. Level III Milestone Acceptance Criteria:
- 11. Attachments and References:

## Adjustments to the Construction Estimate

Since the 10June97 CR for the ECRB two basic changes have occurred:

1. The length of excavation has been extended for 2300 meters to 2815 meters to support the complete characterization of the Solitario Canyon Fault.

2. Scientific requirement have changed for alcove construction.

These two changes have resulted in modifications to the associated time related costs.

The following markups have been developed to reflect changes to the original construction estimate included in the 3JUN97 ECRB CR.

ADJUSTMENT FOR ITEM 05 - EXCAVATE ECRB

# LURRENT DATA

MAN HOURS 81,692

- LABOR 2981,440 PM 2,277,631 EQUIP 8,819 SUPPLIES 2,708,656
  - TOTAL DIRECTS 7.976,546 TOTAL COST 8,877,896

MARK-UP = 1.113

2300 METER TOTAL 90M LAUNCH CHAMBER, ZZIO TON 84 TOTAL PRODUCTION DAYS

# REVISED DATA

• TOTAL LENGTH 2816 - 90m LAUNCH, 2726 TBM f = 1.233• ASSUME 20m/DAY BEYOND 25+00 THROUGH THE FAULT 200m @ 30m/DAY = 7DAYS 316 m @ 20m/DAY <u>16DAYS</u> ADD <u>23</u> PRODUCTION DAYS TOTAL DAYS = 84+23 = 107 f = 1.273 , DUSTMENTS

81,692 × 1.273 = 103,994 MAN HOUR S 2,981,440 2,277,631 8,819 ¥ 1.273 3,795,373 LABOR 2,808,319 1.233 PM 15,227 1.273 EQUIP 1.233 3, 339, 77 3 SUPPLIES Z, 708, 656 9,954,692 X 1.113 11,079,572 +.247 V REUISED TOTAL COST 2,201,676 INCREASE

# ITEM 6 · EXCAVATE ALCOUES

THE ORIGINAL ESTIMATE FOR THE EXCAUNTION OF ALCOVES ASSUMED MECHANICIAL EXCAULTON AND IS NOT CURRENTLY APPLICABLE, FK PROVIDED A SUMMARY DRILL AND BLAST ESTIMATE FOR THE POJULIES CR. THIS DATA WILL BE FACTORED TO DEVELOP THE REDISED ESTIMATE

PK FATA

DIRECT COST ESTIMATE - 1,802,808 + 11% LOADS = 2,006, 50 140 METER OF JULLAND ELAST TOTAL DURATIONS 83 DAYS - 32,380 MHRS 3 SHIFTS/DAV 23 MEN UG / 24 HRS 14 MEN SURFACE SUPPORT ZAHRS.

APPLICABLE FACTORS

PK LABOR COST 32,380 X 42/HR = 1,360 MITLS, SUPPLIES, & EQUIP = 2,007 - 1360K = 647 UNIT PRICE FOR NOW-LABOR 647K -140 = 4621/METER.

THE ESF MAIN LOOP WILL BE ON A SINGLE DAY SHIFT DURING ALCOVE EXCAVATION

ASSUMED DAY SHIFT CREW (SUPPORT PROUDOED BY DAY CRED - FOLEMAN 5-miNERS

BACK SHIFT CREW - FOREMAN I- MECH. 5- MINELS 1- ELECT

- 2- TRAINCREW 1 - TOPMAN
- 1 C.W-ACT MUT?
- 1- WALKER 13/ SHIFT

TOTAL CREW SIZE / 24ARS



LABOR COST/DAY

32 ×9 × 42 = \$12,100

# ACTIVITY DIRATION

THE THREE ALCONE ARE SEPERATED BY SEVERAL -JUDRE METERS. THEREFOR ASSUME THAT EXCAULATION WILL OCCUR IN SEQUENCE. ASSUME VENTILATION IS ESTABLISHE FOR BLASTING IMMEDIATELY AFTER LOADING AND NO OTHER WOLK IS OCCURRING IN THE CROSS DRIFT. DULL WITH SMALL JUMBO, MULK WITH ST3 · · · · -DRILL, BLAST, SMOKE MUCK, AND SUPPORT CYCLE IS 12HUR ASSUME 2m/ROUND TYPICIAL PRODUCTION 4m/DAY  $160m \div 4m/DAY =$ 40 DAY 5 ADDERS SET-UP & TRAR DOWN 9 ALCOUR 3dA X3 NDAY @ / 2D 54 DAYS

ESTIMATE

 $MTLS, EQUIP, E SUPPLIES <math>\frac{4}{4621}/m \times 160m = 739,36$ LABOR = 12,100/10AY X 54 DAYS 653,40TOTAL COST PER METER  $\frac{4}{8705}$ MANHAURS  $32 \times 9 \times 54 = 15,552$ 

RESOURCE DISTRUBUTION TBM DEMDE DATE - ISJUL 98 54 DAVS PRODUCTION = 2.5min CUMPLETE LATE SEPT 98

July	MAN/HRS 3110	278,55 Z
AUG	. 6220	557, 104
SEPT	6220	557, 104

GENERAL ADJUSTMENT FOR TIME RELATED INDIR

ADJUSTMENT BY ITEM

ITEM 8 - SAMPLING AND MAPPING SUPPORT

man hours Labor	2043 76403	¥ 1.273 ×1.273	= 2600 mHE: 97,261 X 1.113 108,251
		REUSED TOTAL	+31,848 260,163 \$292011

U ITEM 9 - DIRECT SUPERVISION/ENG.

MAN HOURS 41,347 LABOR 1,729,224

17 MONTH IN CURRENT ESTIMATE

ITEM 10 - LEASE TBM EST 1.712,907 ADD IMO  $f = \frac{13}{12}$ IJULY97 TO IAUG98 REUISED TOTAL = 1.855,649

ITEM 11 MULK HANDLING MAN HOURS 5035 X1.273 = 6409 LABOR 201,810 X.273 X 1.113 = A = 61,319 394,625 + 61,319 = 455,944

> SEPT - DEC FER - JUNE JUNE - SEFT

			. (								(		
rrison Knucksen Corp. "nber: ECRB,3 roject: ECRB (Buckjet) Rev. Alcove Rammts.			Burdened Cost Summery Sorted By: Constructio Area (Costs Adjusted to Bid Quantities)									05/30/97 1:04 pm Page: 1	
rstactio	Are Description	Quentity	Matheurs	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Nisc.	Total Direct Cost	Indirect Costs	Total Cost	
1.FB3 2.FB3 3.G85 4.G86 5.G87 6.G82 7.G82 8.G81 9.FA1 0.FA1 1.GA1	TEM Mobilization/Rehab. South Portal Improvements Launch Chember Sta. 0+00 to 0+90 Install Drift Excendion Equip. Excende ECRB Sta.0+90 to 23+00 Excende ECRB Sta.0+90 to 23+00 Excended of Alcoves 3m X 4m X 100m Demobilization of TEM a Sta 23+00 Sampling and Mapping Suport ECRB Direct Supervision/Engineering Lesse Construction Equipment for ECRB North Portal Muck Modification		2,613 37,624 18,597 81,692 42,496 14,438 2,043 41,347 5,035	102,011 1,363,665 686,033 2,981,440 1,555,314 537,676 76,403 1,729,224 201,810	23,269 72,437 2,277,631 38,674 11,209	12,238 4,644 8,819 15,543 5,797 1,539,000 51,848	2,295,125 314,245 330,385 134,318 2,708,656 267,314 146,735 151,549 89,692			2,275,125 439,525 1,778,705 824,995 7,976,546 1,861,302 700,154 233,749 1,729,224 1,539,000 354,559	259,349 49,666 200,994 93,224 901,350 210,327 79,117 26,414 195,402 173,907 40,055	2,554,474 489,191 1,979,699 918,219 8,877,896 2,071,629 779,271 260,163 1,924,626 1,712,907 394,624	
	REPORT TOTALS:		245,885	9,233,756	2,423,220	1,637,889	6,438,019			19,732,884	2,229,815	21,952,699	
: <b></b>	Rounding Error:		•1	-0	1	1	-0			1	1	2	
	Exact Totals:		245,884	9,233,756	2,423,221	1,637,890	6,438,019			19,732,885	2,229,816	21,952,701	

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Horrison Knudsen Corp. Project: ECRB (Budget) Rev. Alcove Rammats. -Humber: ECRB.3 Sheet No. 9. , Fuge 1 Printed: 05/30/97 @ 1:03 pm

Sheet No: 999999 Operation: Constructor, G & A, & Fee Quantity: 1,0000 LS Sheet Type: Indirect Estimator: rbp Date: 05/30/97 Revision: 3

Line-Type Group/Code	Description		Labor	Perm. Matils	Equíp.	Supplies.	Sub- Contracts	Misc.	Total Cost
1.00-Note	1. G & A 								
2.00-Note	Direct Cost\$19,732,685							•	
	G&A @ 6% 1,183,973	•							
	S/T 20,916,858								
	Fee a 5%1,045,843								
	Total \$ 21,962,701								
	Total G & A, & Fee\$ 2,229,816					`			
3.00-Lump Sum GA-F/9999	G & A, & Fee	· Lump Sum						2,229,816	2,229,816
4.00-Note									
5.00-Grand S/T	Subtotal .							2,229,816	2,229,816
·	TOTALS for Sheet No. 999999:	1.00 LS					<u>_</u>	2,229,816	2,229,816

rrison Kn mber: EC	idsen Corp. 18.3	Cost & Est Sort	imate Summary ed By: Constr	(Cnstrctn. ructio Area	Area)				05/30/97 12:30 pm
oject: EC	B (Budget) Rev. Alcove Rammits.	(Costs	Adjusted to f	Sid Quantitio	HS)			·	Page: 1
	Are Description	Duentity	Hachours	Labor	Perm. Matile	Faulo.	Supplies	Sub- Contracts	Total Hisc. Cost
F83	TBH Mobilization/Rehab.	1 LS					2295125.000 2,295,125		2295125.000 2,295,125
83	South Portal Improvements	1 LS	2,613.250 2,613	102,010.990 102,011	23,269.365 23,269		314,245.398 314,245		439,525.753 439,525
85	Launch Chamber Sta. 0+00 to 0+90	1 LS	37,624.235 37,624	1363645.015	72,437.348	12,238.451 12,238	330,384.662 330,385		1778705.476 1,778,705
86	Install Drift Excevation Equip.	1 LS	18,596.500 18,597	686,032.820 686,033		4,644.480 4,644	134,317.504 134,318		824,994.804 824,995
87	Excavate ECR8 Sta.0+90 to 23+00	1 LS	81,691.740 81,692	2981439.640 2,981,440	2277631.280 2,277,631	8,818.646 8,819	2708656.255 2,708,656		7976545.821 7,976,546
82	Excavation of Alcoves 3m X 4m X 100m	1 LS	42,496.000	1555314.400	38,674.458 38,674		267,314.263 267,314		1861303.121 1,861,302
182	Demobilization of TBM a Sta 23+00	1 LS ·	14,437.900	537,876.040 537,876		15,543.270 15,543	146,734.664 146,735		700,153.974 700,154
81	Sampling and Mapping Support	1 LS	2,043.000 2,043	76,402.800 76,403		5,796.800	151,548.888	·	233,748.488 233,749
AI	ECRB Direct Supervision/Engineering	1 LS	41,347.000 41,347	1729224.251			·		1729224.251
AI	Lesse Construction Equipment for ECRB	1 LS				1539000.000			1539000.000
AT	North Portal Muck Modification	1 LS	5,034.726 5,035	201,809.582	11,208.750	51,848.275 51,848	89,691.934 89,692		354,558.541 354,559
	REPORT TOTALS;	••••••	245,885	9,233,756	2,423,220	1,637,889	6,438,019		19,732,884
87888888	Rounding Error:	*********************	• • • •	-0	1	**************************************	-0	***************************************	**************************************
	Exact Totale:		745 R84	9.233.756	2.423.221	1 637 890	A 438 010		10 773 846

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lorrison Knudsen Corp. Jumber: ECRB.3 Project: ECRB (Budget) Rev. Alcove Rammts.	4,( Sorted By:	Direct Cost Su Constructio A	Y				05/30/97 12:30 pm Page: 1		
Sheet No. Description	Quantity	Manhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
Constructio Area 01.FB3: TBM Mobilization/Rehab. Activity 010A: Mobilization of TBM & Accessories A000 Mobilization of used TBM machine	1 LS					160,125			160,125
Activity 010B: Rehabilitate/Rebuild to Spec A001 Rehab.Used TBH as required	1 LS					2,135,000			2,135,000
Subtotal, TBM Mobilization/Rehab.						2,295,125			2,295,125

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Horrison Knudsen Corp. Number: ECRB.3 Project: ECRB (Budget) Rev. Alcove Rammats.	4.( Sorted By:	) Direct Cost ! : Constructio /	Summary Area, Activit			05/30/97 12:30 pm Page: 2			
Sheet No. Description	Quantity	Hanhours	Labor	Perm. Mat'ls	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
Constructio Area 02.FB3: South Portal Improvements Activity 020A: Access Control Facility A002 South Portal Improvements	1 LS	200	7,500			34,694			42,194
Activity 0208: Yard rail installation A003 Rail System Yard area		400	15,000			22,850			37,850 ·
Activity 020C: Materials Storage & Handling Facilit A004 Haterial Storage & Handling	γ] 1 LS	400	15,000			65,550		· -	80,550
Activity 0200: Power Substation & Feed A005 South Portal, Substation/Electrical/E	tc 1 LS	1,613	64,511	23,269		191,152			278,932
Subtotal. South Portal Improvements		2.613	102.011	23.269		314.246	•••••	•••••	439.526

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orrison Kn unber: EC roject: EC	rrison Knudsen Corp. 4 nber: ECRB.3 Sorted B oject: ECRB (Budget) Rev. Alcove Rommts.			.0 Direct Cost Summary y: Constructio Area, Activity								
Sheet No.	Description	Quantity	Manhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost		
Construct Activity	io Area 03.685: Launch Chamber Sta. 0+00 to 0+90 030A: Launch Chamber Preparation											
A010	Launch Chamber Preparation	1 LS	6,165	223,475		1,968	138,067			363,510		
Activity	0308: Launch Chamber Excav & Support				70 511	•	474 000					
AU12	Laurch Chamber Excavation ' Unit Costs:	7,000 LY	3.324	120.535	10.074	1.230	19.146			1,056,888		
Activity	030C: Launch Chamber Concrete Floor & Drains											
A013	Launch Chamber conc.floor	1 LS	8, 191	296,427	1,922	1,661	58,298			358,307		
••••••	Subtotal, Launch Chamber Sta. 0+00 to 0+90	••••••	37,624	1,363,645	72,438	12,238	330,385		•••••	1,778,706		

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Morrison Knudsen Corp. Number: ECRB.3 Project: ECRB (Budget) Rev. Alcove Rammats.	4.0 Direct Cost Summery Sorted By: Constructio Area, Activity									
Sheet No. Description	Quantity	Manhours	Labor	Perm. Mat'ls	Equip.	Sucol ies	Sub- Contracts	Misc.	Total Cost	
Constructio Area 04.GB6: Install Drift Excavation Equip. Activity 040A: Unload TBM & Assemble & L.Chamber Face A014 Hachine erection in Launch Chamber	T LS	18, 137	668,453		3,974	76,209		<u></u>	748,637	
Activity 0408: Install 24" Conveyor to Transfer Point A015 Install 24" Conveyor to Transfer	1 LS	230	8,790		335	29,054			38,179	
Activity 040C: North Ramp Belt Transfer Modification A016 North Ramp Conveyor Transfer		230	8,790		335	29,054			38,179	

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Subtotal, Install Drift Excevation Equip. 686,033 134,317 18,597 4,644

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forrison Knudsen Corp. Junber: ECRB.3 'roject: ECRB (Budget) Rev. Alcove Rammts.		4.0 Direct Cost Summary Sorted By: Constructio Area, Activity								
							·			05/30/97 12:30 pm Page: 5
Sheet No.	Description	Quantity	Manhours	Labor	Perm. Matils	Equip.	Supplies	Sub-	Misc.	Total
Constructi Activity 0	o Area 05.687: Excavate ECRB Sta.0+90 to 23+00 50A: Excavation Drift with TBM Boring									
A018	Hachine Ecavate the ECBR Drift	115	75,008	2,721,484	2,277,631	7,925	2,690,931	•		7,697,971
Activity 0	508: Saturday Maintenance Service									
A019	Saturday Maintenance Work	1 LS	6,684	259,956		894	17,725			278,575
••••••	Subtotal, Excavate ECRB Sta.0+90 to 23+00		81.692	2.981.440	2.277.631	8.819	2.708.656		•••••	7.976.546

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Morrison Kn Number: ECF Project: ECF	udsen Corp. 18.3 18 (Budget) Rev. Alcove Rommits.	4.0 Sorted By:	Direct Cost Constructio	Summary Area, Activit	Y	•			·	05/30/97 12:30 pm Page: 6
Sheet No.	Description	Quantity	Manhours	Labor	Perm. Mat'ls	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
Construct	o Area 06.GB2: Excevation of Alcoves 3m X 4m X 100m									
P 1300	R/H Heading Crew, Day Shift, Alcove Unit Costs:	50 SHIFT	4,050 81.000	144,415 2,888.307			7,708 154.163			152,124 3,042.470
p 1301	R/H Heading Crew, Second Shift Unit Costs:	50 SHIFT	4,050 81.000	144,415 2,868.307			7,708 154.163			152,124 3,042.470
P 1302	R/H Heading Crew, Third Shift Unit Costs:	50 SHIFT	4,050 81.000	144,415 2,888.307	•		7,708 154.163			152,124 3,042,470
P 1303	Support Crews, Alcove & Other Exc. Unit Costs:	50 SHIFT	14,010 280.200	525,713 10,514.261			38,792 775.843			564,505 11,290.104
P 1320	Exc. EquiptOperation Unit Costs:	50 SHIFT					37,099 741.983			37,099 741,983
•••••	Subtotal, Sta.5+00 U.L.U. Excavation	••••••	26,160	958,959			99,016		••••••	1,057,975
Activity	0608: Sta.5+00 U.L.U. Ground Support							•		
P 1321	Ground Support Unit Costs:	100.00 METER			12,891 128.915		142			13,034 130.338
Activity	060C: Sta,5+00 U.L.U. Utilities Etc.									
P 1304	Utilities Unit Costs:	50 SHIFT					26,420 528.392			26,420 528.392
Activity	0600: Sta.5+00 U.L.U. Scientific Support	)					•			
P 1350	Scientific Support	0.3400 LS	218	7,133			2,323			9,456
Activity	061A: Sta.9+00 Main Cross Over Excavation	1								
P 1300	R/H Heading Crew, Day Shift, Alcove Unit Costs:	10 SHIFT	810 81.000	28,883 2,888.307			1,542 154.163	•		30,425 3,042.470
P 1301	R/H Heading Crew, Second Shift Unit Costs:	10 SHIFT	810 81.000	28,883 2,888.307			1,542 154.163			30,425 3,042.470
P 1302	R/H Heading Crew, Third Shift · · · Unit Costs:	10 SHIFT	810 81.000	28,883 2,888.307			1,542 154.163			30;425 3,042.470
P 1303	Support Crews, Alcove & Other Exc. Unit Costs:	10 SHIFT	2,802 280,200	105,143 10,514.261			7,758 775.843			112,901 11,290.104
P 1320	Exc. EquiptOperation	50 SHIFT					37.099			37.099

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orrison Knuds unber: ECRB. roject: ECRB	en Corp. 3 (Budget) Rev. Alcove Rammits.	4.0 Sorted By:	Direct Cost Constructio	Summary Area, Activit	Y			05/30/97 12:30 pm Page: 7
		A	ttanhauna	t shee	Perm.		Sub-	Total
Constructio	Area 06.682: Excavation of Alcoves 3m X 4m X 100m		Martioura	Labor	nat is	Equip. Suppries	Cultiacta	
Activity 061	A: Sta.9+00 Main Cross Over Excavation Unit Costs:	J				741.983		741.983
	Subtotal, Sta.9+00 Main Cross Over Excavation		5,232	191,792		49,482		241,274
Activity 061	B: Sta.9+00 Main Cross Over G.Support		•					
1321	Ground Support Unit Costs:	100.00 METER		•	12,891 128.915	. 142 1.423		13,034 130.338
Activity 061	C: Sta.9+00 Main Cross Over Utilities Etc	10 CHUCK				5 28/		5 384
1304	Unit Costs:	IO SHIFT				528.392		528.392
Activity 061	D: Sta.9+00 Main Cross O.Scientific Support	0.7700.10	344	6 037		2.255		0.178
1350	scientific support	0.3300 12	211	0,923		2,233		9,178
Activity 062	A: Sta. 11+00 M.L.U.Excavation	10 00157		28 887		4 5/2		70 / 25
1300	Unit Costs:	IO SHIFT	81.000	2,888,307		1,542		3,042.470
1301	R/H Heading Crew, Second Shift Unit Costs:	10 SHIFT	810 81.000	28,883 2,888.307		1,542 154.163	•	30,425 3,042.470
1302	R/H Heading Crew, Third Shift Unit Costs:	10 SHIFT	810 81.000	28,883 2,888.307		1,542 154.163		30,425 3,042,470
1303	Support Crews, Alcove & Other Exc. Unit Costs:	10 SHIFT	2,802 280,200	105,143 10,514.261		7,758 775.843	•	112,901 11,290,104
1320	Exc. EquiptOperation Unit Costs:	50 SHIFT				37,099 741,983	ı	37,099 741,983
	Subtotal, Sta.11+00 N.L.U.Excavation		5,232	191,792		49,482	•••••	241,274
Activity 062	B: Sta.11+00 H.L.U.Ground Support							
1321	Ground Support ' Unit Costs:	100.00 METER			12,891 128.915	142 1.423		13,034 130.338
Activity 062	G: \$10.11:00_M.L.W.WIIIIIes_Etc							
1504	Utilities Unit Costs:	10 SHIFT				5,284 528.392		5,284 528,392
								· .

lorrison Knu lumber: ECRI Project: ECRI	dsen Corp. 8.3 8 (Budget) Rev. Alcove Rammts.	4.0 Sorted By:	Direct Cost Constructio	Summery Area, Activit	<b>:</b>					05/30/97 12:30 pm Page: 8
iheet No.	Description	Quantity	Hanhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
Constructio	o Area 06.682: Excavation of Alcoves 3m X 4m X 100m					ورواد الجنبة وتتهويهم				
<sup>3</sup> 1350	Scientific Support	0.3300 LS	211	6,923			2,255		•	9,178
Activity O	65A: Sta.xx+xx Moisture Study Niches Exc.	10 601	810	78 881			1 5/2			30 425
, 1200	, Unit Costs:	IO SHIFT	81.000	2,888.307			154.163			3,042.470
P 1301	R/H Heading Crew, Second Shift Unit Costs:	10 SHIFT	810 81.000	28,883 2,888.307			1,542 154,163			. 30,425 3,042.470
P 1302	R/H Heading Crew, Third Shift Unit Costs:	10 SHIFT	810 81.000	28,683 2,888.307			1,542 154.163			30,425 3,042.470
• 1303	Support Grews, Alcove & Other Exc. Unit Costs:	10 SHIFT	2,802 280,200	105,143 10,514.261			7,758 775.843	·	· · -	112,901 11,290.104
P 1320	Exc. EquiptOperation Unit Costs:	10 SHIFT					7,420 741.983			7,420 741.983
P 1321	Ground Support Unit Costs:				128.915		1.423			130.338
	Subtotal, Sta.xx+xx Moisture Study Niches Exc.		5,232	191,792	•••••		19,803	•••••	· · · · · · · · · · · · · · ·	211,595
Activity 0 1304	<u>65C: Moisture Study Niches Utilities Etct</u> Utilities Unit Costs:	10 SHIFT					5,284 528.392			5,284 528.392
· · · · · · · · · · · · · · · · · · ·	Subtotal, Excevation of Alcoves 3m X 4m X 100m	••••••	42,496	1,555,314	38,673	•••••	267,314	••••••		1,861,301

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lorrison Knudsen Corp. Amber: ECRB.3 – Project: ECRB (Budget) Rev. Alcove Rammts.	4.0 Sorted By:	D Direct Cost : Constructio	Sunnery Area, Activit	y					05/30/97 12:30 pm Page: 9
theet No. Description	Quantity	Manhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
Constructio Area 07.GB2: Demobilization of TBM & Sta 23+00 Activity 070A: Disassemble TBM & Haul to Surface Store A020 Demobilization TBM & Conveyor	1 LS	14,438	537,876		15,543	146,735			700,154
Subtotal, Demobilization of TBM A Sta 23+00		14,438	537,876		15,543	146,735		•••••	700, 154

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orrison Knudsen Corp. mber: ECRB.3 roject: ECRB (Budget) Rev. Alcove Rammts.	4.0 Sorted By:	) Direct Cost S : Constructio A	ummary rea, Activit	<b>y</b>					05/30/97 12:30 pm Page: 10
neet No. Description	Quantity	Manhours	Labor	Perm. Hatils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
Constructio Area 08.GB1: Sampling and Happing Support Activity 080A: Hobilization of Mapping Loco & Cara									
A021 Hob.Happing Locomotive & Charger	1 [5					26,688			26,688
Activity 0808: Mobilization of California Switch									
A022 Hob California Switch to site	1 LS					16,013		•	16,013
Activity DBOC: Clean Rock Surface & Move Mapping Car									
A023 Hove Happing Car & Clean Rock	1 LS	2,043	76,403		5,797	108,849			191,048
Subtotal, Sampling and Mapping Support	·····	2,043	76,403_	••••	5,797	151,550	• • • • • • • • • • • • • • • • • • • •		233,750

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Morrison Knudsen Corp. Number: ECRB.3 Project: ECRB (Budget) Rev. Alcove Rammats.	4.( Sorted By:	) Direct Cost : Constructio	Sunmery Area, Activit	Ŷ					05/30/97 12:30 pm Page: 11
Sheet No. Description	Quantity	Manhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
Constructio Area 09.FAI: ECRB Direct Supervision/Engineering Activity 090A: Supervision & Overhead P 090A Supervision & Overhead	115	41,347	1,729,224						1,729,224
Subtotal, ECRB Direct Supervision/Engineering		41,347	1,729,224				••••••		1,729,224

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Yorrison Knudsen Corp. Yumber: ECRB.3 Project: ECRB (Budget) Rev. Alcove Rammats.	4.1 Sorted By:	D Direct Cost : : Constructio /	Sunnary Area, Activit	ÿ					05/30/97 12:30 pm Page: 13
chant No	Quantity	Nanhoura	1 ebos	Perm.	Equip	fumpling	Sub-	Nice	Total
Constructio Area 11.GA1: North Portal Muck Hodification Activity 110A: ECRB Muck Ped Stripping Top Soil		na nou a	Labor	<u>nar.ra</u>	Equip.	Suppries	Contracts		Cost
A024 North Portal Muck Area Topsoll Unit Costs:	4,500 CY	680 0.151	25,878 5.751		5,171 1.149	8,971 1.993			40,020 8,893
Activity 1108: ECRB Muck Pad Drainage Modifications	· 								
AU25 NEW MUCK pag drainage	115	178	0,224	. 11,209	τų.	2,210			19,933
Activity 110C: ECR8 Muck Ped Disposal Operation A026 Huck Disposal operation Unit Costs:	100,000 CY	4,177 0.042	169,708 1.697		46,387 0.464	78,512 0.785			294,606 2,946
Subtotal, North Portal Muck Modification	- • • • • • • • • • • • • • • • • • • •	5.035	201.810	11.209	51.849	89.693			354.561

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4.0 Sorted By:	Direct Cost Su Constructio An	mmary rea, Activity						05/30/97 12:30 cm
								Page: 12
Quantity	Manhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
T EA				1,539,000				1,539,000
	••••••		•••••	1,539,000				1,539,000
				•				
·. ·								
	1	]	]	]	1,539,000 1,539,000	1,539,000 1,539,000	1,539,000 1,539,000	1,539,000 1,539,000

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Horrison Knuc Number: ECRE Project: ECRE	dsen Corp. 8.3 8 (Budget) Rev. Alcove Rammts.	4. Sorted By	D Direct Cost : Constructio	Sunnary Area, Activi	ity .					05/30/97 12:30 pm Page: 14
Sheet No.	Description	Quantity	Hanhours	Labor	Perm. Matils	Equip,	Supplies	Sub- Contracts	Misc.	Total Cost
	REPORT TOTALS:		245,885	9,233,756	2,423,220	1,637,890	6,438,021			19,732,887
************	Rounding Error:		•1	-0	1	0	-2	*********		•2
		*****	245,884	9,233,756	2,423,221	1,637,890	6,438,019	*****	********	19,732,885

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Horrison Knudsen Corp. Project: ECRB (Budget) Revised Facility Rqrmnts. Number: ECRB.3

Sheet No: P 1300 Operation: R/H Heeding C Quentity: 80.0000 SHIFT	rew, Day Shift,	Alcove	Parameter Hrs/Shft:	- Duration S 8.00	S Calc Hrs:	ulated 640.00	Composite TBM crew day Crew installs rockbolt	shift head s/wire mesh/	ing - crew or /channel.	nl <b>y.</b>	
Sheet Type: Standard Estimator: rbp Date: 05/28/97 Revision:		•	Snit/Day: Days/Wk: Days/Mo: Critical:	5.00 No	Snrt: Days: Week: Mos:	26.67 5.33 1.27	Testing Alcoves, 3m x	rrod.Rate nvday 4m x 100m	days	•	
1.0 Constructio Area 2.0 Activity 3.0 Estimator	Estimate Code - O6.GB2 O60A O61A O62A O65A RBP	Excevation of Alc Sta.5+00 U.L.U. E Sta.9+00 Main Cro Sta.11+00 M.L.U.E Sta.xx+xx Moistur Pettibon	oves 3m X 4m xcavation ss Over Exca xcavation e Study Nich	x 100m wation wes Exc.	•• Que	50.0000 10.0000 10.0000 10.0000 10.0000	Sta 5+00 ULU 100 9+00 MCO 20 11+00 MLU 20 17+00 LLU 0 22+00 SCF 0 Niches similar to mois	2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1	50 10 10 0 0 <b>s, 3.5</b> m x 4 r	<u>n x 10m</u>	
							55	2	Use 5 Use 5 80 days	(3 shift/day)	

Line-Type	Group/Code	Description	Quantity Manhours	Labor	Perm. Matils I	Equip. Suppl	Sub- es Contracts	Misc.	Total Cost
1.00-Note		1. Alcove Excevation			······································		•		
2.00-Note		Figure production 0 2 m/day							
		100 m/ 2 m/day = 50 days							
3.00-Crew	TWO /02TW	Shifter	1.00 Each 1.000	33.659					33.659
4,00-Crew	THO /01TW	Driller	1.00 Each 1.000	32.781					32.781
5.00-Crew	TOP /03TW	Operator-Roacheader	1.00 Eech 1.000	41.032					41.032
6.00-Crew	THO /01TH	Hiner	3.00 Each 3.000	98.343					98.343
7.00-Crew	TOP /04TW	Operator-2.5 FEL (6)	1.00 Each 1.000	41.032	•		•		41.032
8.00-Crew	TOP /02TW	LOCO OPERATOR	1.00 Each 1.000	40.668					40.668
	•								_
9.00-Crew	two /03tw	BRAKEMAN +	1.00 Each 1.000	33.408					33.408

Morrison Knudsen Corp. Project: ECRB (Budget) Revised Facility Rommts. Number: ECRB.3

Sheet No. P. ., rage 2 Printed: 05/30/97 & 12:21 pm

Line-Type	Group/Code	Description	Quantity M	anhours	Labor	Perm. Matils	Equip.	Sub- Supplies_Contracts	Misc.	Total Cost
10.00-Crew S/T (Primary)	Begins on 3.00	Crew/Spread Cost per Hour Production Rates: 0.1250 SHIFT / Crew Hour 0.0139 SHIFT / Manhour 8.0000 Crew Hours / SHIFT < 72.0000 Manhours / SHIFT	640.00 Hrs	9.000 5,760	320.923 205,391		_,			320.923 205,391
11.00-Add-on	LADD/TL	Portal/Lunch Travel (12.500% of Labor into Labor) (Ref: Subtotal Line 10.00)	12.50 %	720	25,674				·	25,674
12.00-Grand S/T		Subtotal		6,480	231,065					231,065
13.00-Add-on	STS /05 .	Small Tools & Supplies & 5% (5.000% of Labor into Supplies) (Ref: Subtotal Line 12.00)	5.00 %					11,553		11,553
14.00-Grand S/T		Subtotal		6,480	231,065			11,553	. <u>.</u>	242,618
15.00-Add-on	TAX /1	State/County Sales/Use Tax & 6.75% (6.750% of Permanent Matls, Supplies,) (Ref: Subtotal Line 14.00)	6.75 X					· 780		780
16.00-Range S/1	Begins on 1.00	Subtotal		6,480	231,065		··· .	12,333		243,398
17.00-Add-on	LADD/WR	Work Rules Shift Extra (0.000% of Labor into Labor) (Ref: Subtotal Line 16.00)	0.00 X							
18.00-Grand S/T		Subtotal	· ····	6,480	231,065		*	12,333	·	243,398
		TOTALS for Sheet No. P 1300: Unit Costs:	80.00 SHIF	6,480 81.000	231,065 2,888.307	•		12,333 154,163		243,398 3,042.470
		Average labor cost per manhour:	•		35.658			•		•

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Morrison Knudsen Corp. Project: ECRB (Budget) Revised Facility Rqnmnts. Number: ECRB.3

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Sheet No. P Page 1 Printed: 05/30/97 @ 12:21 pm

Sheet No:	sheet No: P 1301			• • • • • • • • • • •	<ul> <li>Duration</li> </ul>	XNS			
Operation:	R/H Heading C	rew, Second Shif	Ft	Parameter	<b>'S</b>	Calc	ulated		
Quantity:	80.0000 SHIFT	•	H	rs/Shft:	8.00	Hrs:	640.00		
Sheet Type:	Standard	÷	Si	hft/Day:	3.00	Shft:	80.00		
Estimator:	rbo		D	ays/Wk:	5.00	Days:	26.67		
Date:	05/28/97		D	ays/Mo:		Veek:	5.33		
Revision:			C	ritical:	No	Most	1.27		
		Estimate Code				Que	ntity		
1.0 Constru	ctio Area	06.G82	Excavation of Alcov	es 3m X 4n	s X 100m		-		
2.0 Activit	<b>y</b>	060A	Sta.5+00 U.L.U. Exc	avation			50.0000		
	•	061A ·	Sta.9+00 Hain Cross	Over Exce	wation		10.0000		
		062A	Sta. 11+00 M.L.U.Exc	avation			10.0000		
		065A	Sta.xx+xx Moisture	Study Nich	ies Exc.		10.0000		
3.0 Estimat	or	88P	Pettibon	• • • • •					

Line-Type	Group/Code	Description	Quantity P	lanhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
1.00-Note		1. Alcove Excavation									
2.00-Note	•	Figure 2 m/day									
		100 m / 2 m/day = 50 shifts							·		
3.00-Crew	W150\ 041	Shifter	· 1.00 Each	1.000	33.659			•			33.659
4.00-Crew	THO /01TW	Dritter	1.00 Each	1.000	32.781						32.781
5.00-Crew	TOP /03TW	Operator-Roacheader	1.00 Eacl	1.000	41.032						41.032
6.00-Crew	THO /01TH	Miner	3.00 Eacl	n 3.000	98.343						98.343
7.00-Crew	TOP /04TW	Operator-2.5 FEL (6)	1.00 Eacl	n 1.000	41.032						41.032
8.00-Crew	TOP /02TW	LOCO OPERATOR	1.00 Eac	h 1.000	40.668						40.668
9.00-Crew	THO /03TH	BRAKEMAN	1.00 Eac	h 1.000	33,408			•	ě		33.408
10.00-Crew S/T (Primary)	Begins on 3.00	Crew/Spread Cost per Hour Production Rates: 0.1250 SHIFT / Crew Hour 0.0139 SHIFT / Manhour .8.0000 Crew Hours'/ SHIFT < 72.0000 Manhours / SHIFT	640.00 Hrs	9.000 5,760	320.923 205,391		•		<u> </u>		320.923 205,391
11.00-Add-on	LADD/TL	Portal/Lunch Travel (12,500% of Labor into Labor) (Ref: Subtotal Line 10.00)	12.50 %	720	25,674			•			25,674

Sheet No. P 1301, Page 1

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orrison Knudsen Corp. roject: ECRB (Budget) Revised Facility Romants, under: ECRB.3 Sheet No. P , rage 2 Printed: 05/30/97 a 12:21 pm

Line-Type	Group/Code	Description	Quantity_M	anhours.	Labor	Perm. Matils	Equip.	Supplies	Sub-	Misc	Total Cost
12.00-Grand S/T		Subtotal		6,480	231,065						231,065
13.00-Add-on	STS /05	Small Tools & Supplies & 5% (5.000% of Labor into Supplies) (Ref: Subtotal Line 12.00)	5.00 %					11,553			11,553
14.00-Grand S/T	<u></u>	Subtotal		6,480	231,065			11,553			242,618
15.00-Add-on	TAX /1	State/County Sales/Use Tax & 6.75% (6.750% of Permonent Matls, Supplies,) (Ref: Subtotal Line 14.00)	6.75 %					780			780
16.00-Range S/T	Begins on 1.00	Subtotal		6,480	231,065	·		12,333	······································		243,398
17.00-Add-on	LADD/WR	Work Rules Shift Extra (0.000% of Labor into Labor) (Ref: Subtotal Line 16.00)	0.00 %					•			
18.00-Grand S/T	····	Subtotal	<u> </u>	6,480	231,065			12,333	· <u>····</u> .		243,398
		TOTALS for Sheet No. P 1301: Unit Costs:	80.00 SH11	6,480 81.000	231,065 2,688.307			12,333 154.163			243,398 3,042.470
		Average labor cost per manhour:			35.658						

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ison Knudsen Corp. ect: ECRB (Budget) Revised Facility Rqnmts. er: ECRB.3

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Sheet No. P Payer / Printed: 05/30/97 a 12:21 pm

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ine-Type	Group/Code	Descript	ion		Juantity	Manhours	Labor
5.0 Estimate		RBP	Pettibon				
•		062A 065A	Sta. 11+00 M.L.U.Excavation Sta. xx+xx Moisture Study Nich	es Exc.		10.0000	
.0 ACTIVITY		061A	Sta.9400 Main Cross Over Exce	wation		10.0000	
.0 Construx	tio Area	Estimate Code - 06.682	Excevation of Alcoves 3m X 4m	n X 100m	Que	ntity	
evision:	-		Critical:	No	Mos:	1.27	
itimator: ite:	rbp 05/28/97		Days/Wi: Days/Mo:	5.00	Days: Week:	5.33	
iest Type:	Standard		Shft/Day:	3.00	Shft:	80.00	
veration:	80.0000 SHIFT	ew, inita shirt	rarameter Hrs/Shft:	8.00	Hrs:	640.00	LXEW IN
eet No:	P 1302			- Durat	005		COMPOSI

	CREW INSTALLS	ROCKBOLTS/WIRE	MESH/CHANNE	L	
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ine-Type	Group/Code	Description	Quantity Ma	rhours	Labor	Perm. Mat'ls	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
1.00-Note		1. Alcove Excevation									
2.00-Note	-	Figure 2 m / day									
		100 m / 2 m/day = 50 shifts									
3.00-Crew	WISON ONI	Shifter	1.00 Each	1.000	33.659						33.659
4.00-Crew	THO /01TH	Driller	1.00 Each	1.000	32.781						32.781
5.00-Crew	TOP /03TW	Operator-Roadheader	1.00 Each	1.000	41.032						41.032
6.00-Crew	THO /01TH	Hiner	3.00 Each	3.000	98.343						98.343
7.00-Crew	TOP /04TH	Operator-2.5 FEL (6)	1.00 Each	1.000	41.032						41.032
8,00-Crew	TOP /02TW	LOCO OPERATOR	1.00 Each	1.000	40,668						40.668
9.00-Crew	THO /03TW	BRAKEMAN	1.00 Each	1.000	33.408						33,408
0.00-Crew S/T (Primory)	Begins on 3.00	Crew/Spread Cost per Hour Production Rates: 0.1250 SHIFT / Crek Hour 0.0139 SHIFT / Manhour 8.0000 Crew Hours / SHIFT < 72.0000 Manhours / SHIFT	640.00 Hrs	9.000 5,760	320.923 205,391				<u></u>		320.923 205,391
1.00-Add-on	LADO/TL	Portal/Lunch Travel (12,500% of Labor into Labor) (Ref: Subtotal Line 10.00)	12.50 X	720	25,674						25,674

ison Knudsen Corp. ect: ECRB (Budget) Revised Facility Rqnmnts. er: ECRB.3

Sheet No. P ., Fuge 2 Printed: 05/30/97 @ 12:21 pm

xe. Iype	Group/Code	Description	Quantity_H	onhours.	Labor	Perm. Motils	Sub- Equip. Supplies Contracts	Total Misc. Cost
.00-Grand S/T		Subtotal		6,480	231,065			231,065
.00-Add+on	STS /05	Small Tools & Supplies & 5% (5.000% of Labor into Supplies) (Ref: Subtotal Line 12.00)	5.00 %				11,553	11,553
.00-Grand S/T	<u></u>	Subtotal		6,480	231,065		11,553	242,618
••00•Add-on	tax /1	State/County Sales/Use Tax & 6.75% (6.750% of Permanent Matis, Supplies,) (Ref: Subtotal Line 14.00)	6.75 %				780	750
5.00-Range S/1	Begins on 1.00	Subtotal	<u></u>	6,480	231,065		12,333	243,398
7.00-Add-on	LADD/NR	Work Rules Shift Extra (0.000% of Labor into Labor) (Ref: Subtotal Line 16.00)	0.00 %					
.00-Grand S/T		Subtotal ,		6,480	231,065		12,333	243,398
		TOTALS for sheet No. P 1302: Unit Costs:	80.00 SHIF	6,480 81.000	231,065 2,888.307	<del></del>	12,333 154.163	243,398 3,042.470
		Average labor cost per menhour:			35.658			

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ison Knudsen Corp. ect: ECRB (Budget) Revised Facility Rormits. er: ECRB.3

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Sheet No. P . Faul 1 Printed: 05/30/97 @ 12:21 pm

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cet No: P	1303	Alcone & Other	- Evo			Note:					•	
intity: 50 ieet Type: 51 itimator: rt ite: 0 evision:	5/28/97		EAC.									
.0 Construct .0 Activity i.0 Estimator	id Area	Estimate Code 05.GB2 050A 051A 052A 065A RBP	Excevation of Alcoves 3m X 4m X 100 Sta.5+00 U.L.U. Excevation Sta.9+00 Main Cross Over Excevation Sta.11+00 M.L.U.Excevation Sta.xx+xx Moisture Study Niches Exc Pettibon	Qua )m 	50.0000 10.0000 10.0000 10.0000					·	·	
ine-Type	Group/Code	Descrip	tion	Quantity	Manhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total Cost
1.00-Note		1. Supp	ort Crews						•			
2.00-Unit Cos	t CMP /912	Portal	Support-Day Shift	80.00 SHI Extension	F 17.600 1,408	550.229 44,018			13.216 1,057			563.445 45,076
3.00-Unit Cos	t CMP /914	Portal	Support-Swing Shift	80.00 SHI Extension	F 17.600 1,408	550.229 44,018			13.216 1,057			563.445 45,076
4.00-Unit Cos	t CMP /916	Portal	Support-Third Shift	80.00 SHI Extension	F 8.000	236.992 18,959						236.992 18,959
5.00-Unit Cos	t CMP /919	R/H Mec	h Haint Crew-Day	80.00 SHI Extension	F 27.000 n: 2,160	1,119.141 89,531			87.320 6,986		1	,206.461 96,517
6.00-Unit Cos	t CMP /920	R/H Mec	h Maint Crew-Swing	80.00 SHI Extension	IF 18.000 n: 1,440	749.853 59,988			87.320 6,986			837.173 66,974
7.00-Unit Cos	t CMP /922	R/H Mec	h Haint Crew-3rd Shift	80.00 SHI Extension	F 9.000 n: 720	369.288 29,543					· • <del>-</del>	369.288 29,543
8.00-Unit Cos	t CMP /924	Electri	cal Maint Crev-Day	80.00 SHI Extension	IF 36.000 n: 2,880	1,577.430 126,194				۲	1	126,194
9.00-Unit Cos	t CHP /926	Electri	cal Maint Crew-Sying	80.00 SHI Extension	F 36.000 1: 2,880	1,589.112 127,129					1	,589.112 127,129
10.00-Unit Cos	t CMP /928	Electri	cal Maint Crew-3rd Shift	80.00 SHI Extension	IF 18.000 n: 1,440	794.556 63,564						794.556 63,564
11.00-Unit Cos	t CMP /936	Portal	Control-Day Shift	80.00 SHI Extension	IF 16.000 n: 1,280	497.936 39,835		×				497.936 39,835

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Sheet No. P 1303, Page 1.

-rison Knudsen Corp. sject: ECRB (Budget) Revised Facility Rommts. mber: ECRB.3

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ine-Ivpe	Group/Code		Quantity_Manhours	Labor	Perm. Matis Equip.	Sub-	- Total Misc. Cost
2.00-Unit Cost	CMP /938	Portal Control-Swing Shift	80.00 SHIF 16.000 Extension: 1,280	497.936 39,835			497,936 39,835
3.00-Unit Cost	CMP /940	Portal Control-3rd Shift	80.00 SHIF 16.000 Extension: 1,280	497.936 39,835			497,936 39,835
14.00-Unit Cost	CMP /950	Buil Gang-Day	80.00 SHIF 18.000 Extension: 1,440	592.884 47,431			592.884 47,431
15.00-Unit Cost	CMP /952	Bull Gang-Swing	80.00 SHIF 18.000 Extension: 1,440	592.884 47,431			592.884 47,431
16.00-Unit Cost	: CMP /954	Bull Geng-3rd	80.00 SHIF 9.000 Extension: 720	297.855 23,828			297.855 23,828
17.00-Grand 5/1		Subtotal	22,416	841,141		16,086	857,227
18.00-Add-on	STS /05	Small Tools & Supplies & 5% (5.000% of Labor into Supplies) (Ref: Subtotal Line 17.00)	5.00 X			42,057	42,057
19.00-Grand 5/1	r <u></u>	Subtotal	22,416	841,141		58,143	899,284
20.00-Add-on	TAX /1	State/County Sales/Use Tax 2 6.75% (6.750% of Permanent Hatis, Supplies,) (Ref: Subtotal Line 19.00)	6.75 X		·	3,925	3,925
21.00-Note							
22.00-Grand 5/1	1	Subtotal	22,416	841,141		62,067	903;208
		TOTALS for Sheet No. P 1303; Unit Costs;	80.00 SHIF 22,416 280.200	841,141 10,514.261		62,067 775.843	903,208 11,290,104
		Average labor cost per manhour:		37.524			

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Sheet No. P ... Page 1 Printed: 05/30/97 @ 12:21 pm .

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9,900 71.190

10,679

86.800 13,020

2,000.000 6,000 ·

39,599

39,599

rrison Knudsen Corp. oject: ECRB (Budget) Revised Facility Rommits. mber: ECRB.3

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Sheet No: P 1304 Operation: Utilities Ouentity: 80.0000 SHIFT Sheet Type: Standard Estimator: rbp Date: 05/28/97 Revision:	·							
1.0 Constructio Area 2.0 Activity · 3.0 Estimator	Estimate CodeOS.GB2Excavation of Alcoves 3m X 4m X 1OGOCSta.5+00 U.L.U. Utilities Etc.OGICSta.9+00 Main Cross Over UtilitieOG2CSta.11+00 N.L.U.Utilities Etc.OG5CMoisture Study Niches Utilities IRBPPettibon							
Line-Type Group/Code	Description	Quantity Manhours	Labor	Perm. Matils	Equíp.	Supplies	Sub- Contracts	Tota Misc. Cos
1.00-Note	1. Temporary Utilities for Alcoves Including the Cost of Damage to the Utilities.					•		
2.00-Unit Cost MATE/P10	Vent Line, 18"	150.00 METE Extension:				66.000 9,900		66.00 9,90
3.00-Unit Cost MATD/A3	Waste Water Line 6"Victaulic W/Couplings	150.00 METE Extension:				71.190 10,679		71.19 10,67
4.00-Unit Cost MATD/A1	Air Piping 8 <sup>44</sup> Victalic W/Couplings	150.00 METE Extension:				86.800 13,020		86.80 13,02
5.00-Unit Cost MATF/A22	Electrical Power for Utilities	3.00 MONT Extension:				2,000.000 6,000		2,000.00 6,00
6.00-Range S/T Begins on 7.00-Note	2.00. Subtotal					39,599	- <u>-</u>	39,59
8.00-Grand S/T	Subtotal			······		39,599		39,59
9.00-Add-on \$1\$ /05	Small Tools & Supplies @ 5% (5.000% of Labor into Supplies) (Ref: Subtotal Line 8.00)	5.00 %						
10.00-Grend S/T	Subtotal					39,599	<u> </u>	39,59

Sheet No. P 1304, Page 1

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orrison Knudsen Corp. roject: ECRB (Budget) Revised Facility Rqnmits. unber: ECRB.3

			Perm.	\$ub-	Total
Line-Type Group/Code 11.00-Add-on TAX /1	Description State/County Sales/Use Tax 0 6.75% (6.750% of Permanent Matls, Supplies,) (Ref: Subtotal Line 10.00)	<u>Uentity_Herhours</u> 6.75 %	Labor Matila_	<u>Equip. Supplies Contracts</u> 2,673	2,673
12.00-Note	Subtotal			42,271	42,271
•	TOTALS for Sheet No. P 1304:	80.00 SHIFT		42,271 528.392	42,271 528.392

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Unit Costs:

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ison Knudsen Corp. ject: ECRB (Budget) Revised Facility Rommts. per: ECRB.3

heet No: P 1320 peration: Exc. Equipt( uantity: 160.0000 SHIFT heet Type: Standard stimator: rbp ate: 05/28/97 evision:	Operation I		
	Estimate Cod	Excevation of Alcoves 3m X 4m X 100m	Quantity
2.0 Activity	060A	Sta.5+00 U.L.U. Excevation	50.0000
•	D61A	Sta.9+00 Main Cross Over Excavation	50.0000
	062A	Sta.11+00 N.L.U.Excavation	50.0000
3.0 Estimator	065A RBP	Sta.xx+xx Moisture Study Niches Exc. Pettibon	10.0000

ine-Type	Group/Code	Description	Quantity Marhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Misc.	Total - Cost
1.00-Note		1. Equipment					•			
2.00-Unit Cost	EOPU/P9001	Roacheader, Alpine AM 75	750.00 HR Extension:				100.000 75,000			100.000 75,000
3.00-Unit Cost	E0PU/MK931	9318 LOADER/BACKHOE	380.00 HR Extension:				7.730 2,937			7.730 2,937
4.00-Unit Cost	Eqpu/Jhyd4	2 BOOM HYDRAULIC JUMBO W/BASKT	150.00 HR Extension:				54.130 8,120			54.130 8,120
5.00-Unit Cost	EQPU/LCD25	DSL LOCOMOTIVE - 25 TON	750.00 HR Extension:				23.800 17,850			23.800 17,850
6.00-Unit Cost	EQPU/CARMN	MAN CAR	150.00 HR Extension:				1.240 186			1.240 . 186
7.00-Unit Cost	EQPU/CARMK	MUCK CAR	600.00 HR Extension:				1.900 1,140			1.900 1,140
8.00-Unit Cost	EQPU/CARFT	FLAT CAR	240.00 HR Extension:				1.240 298	•		1.240 298
9.00-Unit Cost	EQPU/VF 25	Vent Fan 25 hp, 18"	1600.00 HR Extension:				1,000 1,600			1.000 1,600
10.00-Unit Cost	EQPU/LITES	TURNEL LIGHTING - 1000 LF	1600.00 HR Extension:				2.550			2.550 4,080
11.00-Range S/1	Begins on 3.00	Subtotal			····		36,211			36,211
12.00-Note										

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ison Knudsen Corp. ject: ECRB (Budget) Revised Facility Rements. per: ECRB.3 

ne-Type	Group/Code	Description	Quantity_Manhours	Labor	Perm. Matils	Equip	Sub- Supplies_Contracts	Misc	Total Cost
.00-Grand S/	/T	Subtotal					111,211		111,211
.00-Add-on	STS /05	Small Tools & Supplies @ 5% (5.000% of Labor into Supplies) (Ref: Subtotal Line 13.00)	5.00 X						
i.00-Grand S/	/Ţ,	Subtotal					111,211	<u> </u>	111,211
5.00-Add-on	TAX /1	State/County Sales/Use Tax & 6.75% (6.750% of Permonent Matis, Supplies,) (Ref: Subtotal Line 15.00)	6.75 %				7,507		7,507
7.00-Note		• ••.					•		
8.00-Grand S	/1	Subtotal				<del></del>	118,717	<u> </u>	118,717
· · · · · · · · · · · · · · · · · · ·		TOTALS for Sheet No. P 1320; Unit Costa:	160.00 SHIFT				118,717 741.983	<u></u>	118,717

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Sheet No. P , .age 1 Printed: 05/30/97 @ 12:21 pm

Total

69.290 34,645

> 2.640 1,584

5.000 400

36,629

36,629

36,629

2,472

Cost

Misc.

Morrison Knudsen Corp. Project: ECRB (Budget) Revised Facility Rommts. Humber: ECRB.3

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Sheet No: P 1 Operation: Gró Quentity: 300 Sheet Type: Sta Estimator: rbp Date: 05/ Revision:	321 und Support .0000 METER ndard 28/97			·				
1.0 Constructio 2.0 Activity 3.0 Estimator	Esti Area 05.0 0608 0618 0628 0658 RBP	mate Code B2 Excevation of Alcoves 3m X 4m X 100 Sta.5+00 U.L.U. Ground Support Sta.9+00 Main Cross Over G.Support Sta.11+00 M.L.U.Ground Support Sta.xx+xx Hoisture Study Niches Exc Pettibon	Quentity 100.0000 100.0000 100.0000 -					
Line-Type	Group/Code	Description	Quantity Manhours	Labor	Perm. Matile	Equíp.	Supplies	Sub- Contracts
1.00-Unit Cost	MATA/A3	Super Swellex Bolt 3.0M	500.00 EA Extension:		69.290 34,645			
2.00-Unit Cost	MATA/A2	WF 3 x 3 x H1.9 x H1.9	600.00 SM Extension:	·	2.640 1,584			
3.00-Unit Cost	PATA/AB	Wire Mesh support Pins	80.00 EA Extension:				5.000 400	
4.00-Range S/T	Begins on 1.00	) Subtotal			36,229		400	
5.00-Note					•			•
6.00-Grand S/T	·	Subtotal	<u> </u>		36,229		400	
7.00-Add-on	STS /05	Small Tools & Supplies & 5% (5.000% of Labor into Supplies) (Ref: Subtotal Line 6.00)	5.00 %					
8.00-Grand S/T		Subtotal			36,229		400	
9.00-Add-on	TAX /1	State/County Sales/Use Tax @ 6.75% (6.750% of Permonent Matis, Supplies,) (Ref: Subtotal Line 8.00)	6.75 %		2,445		27	
10.00-Note		•						

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11.00-Grand S/T Subtotal 38,674 427 39,101

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orrison Knudsen Corp. roject: ECRB (Budget) Revised Facility Rqrmmts. umber: ECRB.3

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Line-Type	Group/Code	TOTALS for Sheet No. P 1321: Unit Costs:	300.00 METER		38,674 128.915	427 1.423		39,101 130,338
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Aorrison Knudsen Corp. Project: ECRB (Budget) Revised Facility Romants. Number: ECRB.3

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Sheet No: P 1 Operation: Sci Ouantity: 1.0 Sheet Type: Sta Estimator: rbp Date: 05/ Revision: 1.0 Construction 2.0 Activity 3.0 Estimator	350 entific Support 000 LS ndard 28/97 Estima 0 Area 06.682 0600 0610 0620 RBP	te Code Excevation of Alcoves 3m X 4m X Sta.5+00 U.L.U. Scientific Suppo Sta.9+00 Main Cross 0.Scientific Sta.1+00 M.L.U.Scientific Suppo Pettibon	urations Calculo DO Hrs: 60 DO Shft: 2 OO Days: 7 Week: es Mos: Quant 100m . rt 0 Suppor 0 rt 0	eted 40.00 80.00 26.67 5.33 1.27 ity 0.3400 0.3300 0.3300					÷	
Line-Type	Group/Code	Description	Quantity Ma	nhours	Labor	Perm. Mat'ls	Equip.	Sub- Supplies. Contracts	Misc.	Total Cost
1.00-Note	· .	<ol> <li>Figure one man for the curation of the alcove work. Approx 80 days, 1 shifts, 8 hr/shift = 640 mh.</li> <li>Allow for electrical, 8 misc. supplies, at \$10/mh x 8 x 80 = \$6,600.</li> </ol>						•		
2.00-Crew	THO /01TH	Hiner-Turnel	1.00 Each	1.000	32.781					32.781
3.00-Crew S/T (Primory)	Begins on 2.00	Subtotal, Hourly Cost Production Rates: 0.0016 LS / Crew Hour 0.0016 LS / Manhour 640.0000 Crew Hours / LS 640.0000 Manhours / LS	640.00 Hrs	1.000 640	32.781 20,980					32.781 20,980 ·
4.00-Unit Cost	sup /02	Supplies, Scientific Support	1.00 LS Extension:					6,400,000 6,400		6,400.000 6,400
5.00-Range S/T	Begins on 1.00	Subtotal		640	20,980			6,400		27,380
6.00-Add-on '	TAX /1	State/County Sales/Use Tax & 6.75% (6.750% of Permanent Matla, Supplies,) (Ref: Subtotal Line 5.00)	6.75 %					432 '		432
7.00-Range S/T	Begins on 1.00	Subtotal ·		640	20,980			6,832	·	27,812
8.00-Note						•	•	•		•
9.00-Range 5/1	Begins on 1.00	Subtotal		640	20,980			6,832		27,812
****************	*********	:=====================================	**************		Riziy <del>78232</del> 1			esternesternesternes Sheet	. No. P 135	O, Page 1

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4orrison Knudsen Corp.
>roject: ECRB (Budget) Revised Facility Remmts.
vumber: ECRB.3

Sheet No. P rage 2 Printed: 05/30/97 & 12:21 pm

Line-Type	Group/Code	Description	Quantity	Marhours	Labor	Perm. Matils	Equip	Sucolles_	Sub- Contracts	Misc	Total Cost
10.00-Add-on	LADD/WR	Work Rules Shift Extra (0.000% of Labor into Labor) (Ref: Subtotal Line 9.00)	0.00 %					_			
11.00-Grand S/T		Subtotal		640	20,980			6,832	-		27,812
······		TOTALS for Sheet No. P 1350:	1.00 LS	640	20,980			6,832	<del>_,,</del> ,	<u> </u>	27,812
·		Average labor cost per manhour:			32.781						

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2.0 Activity 3.0 Estimator

Morrison Knudsen Corp. Project: ECRB (Budget) Rev. Alcove Rommits. Number: ECRB.3

> 090A REP

Sheet No: Operation: Oughtity: Sheet Type: Estimator: Date: Revision:	P 090A Supervision & 1.0000 LS Standard rbp 05/30/97 3	overhead			•
1.0 Constru 2.0 Activit	ictio Area Sy	Estimate Code 09.FA1 090A	ECRB Direct Supervision	Supervision/Engineering & Overhead	

Pettibon .

INCLUDES LABOR COSTS ONLY FOR SUPERVISION ABOVE FOREMAN / SHIFTER LEVEL, ENGINEERING, SURVEYING, OFFICE, PURCHASING, WAREHOUSE, SAFETY, MEDICAL AND YARD PERSONAL.

				-	•		•			
Line-Type	Group/Code	Description	Quantity Hanhours	Labor	Perm. Matils	Equip.	Supplies	Sub- Contracts	Tota Misc. Con	al 51
1.00-Unit Cost	OSAL/GR-16-2	Shift Supt., Gr. 16	18.00 MO 173.000 Extension: 3,114	7,000.000 126,000					7,000.00 126,00	)() )()
2.00-Unit Cost	OSAL/GR-15-2	Turnel Walkers, Gr. 15 (4 ea x 17)	68.00 M0 173.000 Extension: 11,764	6,400.000 435,200					6,400.00 435,20	)0 00
3.00-Unit Cost	OSAL/GR-15-2	Elec. Supt. Gr. 15, (3 ea x 17)	51.00 M0 173.000 Extension: 8,823	6,400.000 326,400				•	6,400.00 326,40	)0 00
4.00-Unit Cost	OSAL/GR-14-2	Equipt. Supt. Gr. 14, (2 ea x 17	34.00 MO 173.000 Extension: 5,882	5,800.000 197,200					5,800.00 197,20	)0 00
5.00-Unit Cost	OSAL/GR-13-2	Shift Engineer, (13) (4 ea x 17)	68.00 MO 173.000 Extension: 11,764	5,200.000 353,600					5,200.00 353,60	00 00
6.00-Range S/T	Begins on 1.00	SUB-TOTAL MANAGEMENT BASE SALARIES	41,347	1,438,400					1,438,4	00
7.00-Add-on	ADD /FICA	FICA (7.650% of Labor into Labor) (Ref: Subtotal Line 6.00)	7.65 %	110,038					110,0	38
8.00-Add-on	ADD /OHRET	ESOP & 401(k) PLAN (5.000% of Labor into Labor) (Ref: Subtotal Line 6.00)	5.00 %	71,920	·				71,9	20
9.00-Hanhour	OSAL/FSUI	FUI & SUI (Ref: Subtotal Line 6.00)	41347.00 Mirs Extension:	0.217 8,972	·			٩	0.2 8,9	17 72
10.00-Manhour	OSAL/BENEFIT	SALARIED EMPLOYEE BENEFIT COST (Ref: Subtotal Line 6.00)	41347.00 Milrs Extension:	2.416 99,894					2.4 99,8	16 94
11.00-Range S/T	Begins on 1.00	MANAGEMENT & SUPERVISOR SALARIES	41,347	1,729,224					1.729.2	24
13 00 Haba			•	- •		•				

12.00-Note



Sheet No. P ... rage 2 Printed: 05/30/97 a 12:57 pm

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Line-Type Group/Code	Description	Quantity Hanhours	Labor	Perm. Hat'ls	Equip.	Supplies_(	Sub- Contracts	Hisc.	Total Cost
13.00-Grand S/1	Subtotal	41,347	1,729,224						1,729,224
<u>.</u>	TOTALS for Sheet No. P 090A;	1.00 LS 41,347	1,729,224			- <u></u>			1,729,224
	Average labor cost per menhour:		41.822						•
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#### Morrison Knudsen Corp. Project: ECR8 (Budget) Revised Facility Rqnmts. Number: ECR8.3

Sheet No. ., rage 1 Printed: 05/30/97 @ 12:21 pm

Sheet No:	A026				•• Durati	ons	
Operation:	Muck Dispos	al operation		Paramete	<b>FS</b>	Cal	culated
Quantity: Sheet Type:	100000.0000 Standard	CY		Hrs/Shft: Shft/Day:	8.00	Hrs: Shft:	3060.00
Estimator:	MLA			Days/Wk:	5.00	Davs:	127.50
Date:	05/28/97			Days/Mo:		Week:	25.50
Revision:	••••			Critical:	Yes	Mos:	6.07
		Estimate C	de			-	
1.0 Constru	ctio Area	11.GAI	North Portal Mucl	<pre>Modificati</pre>	on		
2.0 Activit	Y	110C	ECRB Muck Pad Die	sposal Opera	tion		
3.0 Estimati	br	MLA	Aarestad				

There is approx 100,000 cy of muck to dispose of over 6 months time which amounts to approx 260 cy per shift. The handling method assumed is as follows.Discharge from the 36"stacker will be picked up with the front end loader and tranmed to the new muck storage area. The D8 dozer will spread the muck as required. The production is assumed to be 35cy/hr = 2860 hrs plus alcove part time shown below.

Add 200 hours for handling the alcove muck. (Approx. 2,500 cy.)

Figure 3,060 crew hours.

Line-Type	Group/Code	pescription	Quantity_M	anhours	Labor	Perm. Matils	Equip,	<u>Supplies</u>	Sub- Contracts	Misc.	Total Cost	
1.00-Note		•							•			
2.00-Crew	OP /040P	Operator - Heavy (c.o1.)	1.00 Each	1.000	40.483						40.483	
3.00-Crew	EQP /6538C	TRACTOR, 250-300 HP COMMON	0.50 Each	0.230	9.438		9.090	15.530			34.057	
4.00-Crew	EQP /4843R	LOADER, CAT 9660, 3 CY ROCK	0.50 Each	0.135	5.540		6.070	8.505			20.114	
5.00-Crew S/T (Primary)	Begins on 2.00	Subtotal, Hourly Cost Production Rates: 32.6797 CY / Crew Hour < 23.9412 CY / Manhour 0.0306 Grew Hours / CY 0.0418 Manhours / CY	3060.00 Hrs	1.365 4,177	55.460 169,708		15.159 46,387	· 24.035 73,547	•		94.654 289,642	
6.00-Add-on	TAX /1	State/County Sales/Use Tax & 6.75% (6.750% of Permonent Matis, Supplies,) (Ref: Subtotal Line 5.00)	6.75 X					4,964			4,964	
7.00-Note												
8.00-Grand S/T		Subtotal		4,177	169,708		46,387	78,512			294,606	-
		TOTALS for Sheet No. A026: Unit Costs:	100000.00 CY	4,177 0.042	169,708 1.697		46,387 0.464	78,512 0,785			294,606 2.946	-
	•	Average Labor cost per manhour:			40.630							
										· .		

steer to. A026, Page 1

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## TECHNICAL BASIS FOR THE REQUIRED ACTIVITIES FOR THE ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK

1. Summary Account Number: TR682FAK

- 2. Summary Account Title: <u>Ventilation System Testing and Monitoring Underground in the</u> ECRB Cross Drift
- 3. Summary Account MGR/ORG: Tommy Touchstone/ M&O
- 4. Status of Change: \_\_\_\_ Revised \_\_\_\_ New
- 5. Scope Description:

Provide a ventilation monitoring program for; the collection of operating performance data from the primary and auxiliary ventilation systems, dust control equipment and operations dust control practices, and for the collection of underground air quality samples for total and respirable nuisance and silica dust levels. Provide data collection to quantify water consumption and usage for dust control. Purchase and install up to three pairs of dust samplers to measure total and respirable dust levels in the ESF and ECRD cross drift.

Provide management, technical and support staff to implement the monitoring programs in the field and in the office. Develop and maintain underground ventilation system layout drawings and system operating performance data, using the VNETPC ventilation software, including; engineering analyses, data compilation and modeling, CAD drawings, report writing and other documentation.

The final product of this work scope will be the preparation and issuance of a monthly "Ventilation System and Dust Control Monitoring Program Report" to the M&O Construction Manager. This report will include: engineering sketches and schematics of the as-built ventilation and dust control systems, installed instrumentation, scientific procedures implemented for data collection, engineering analyses, data, scientific findings and recommendations in hard and electronic document form.

As part of the normal operations provide weekly update reports to the M&O Construction Management.

Scope Differences from the Baseline:

Not included in previous planning or the baseline

Key Assumptions:

A. Summary Account TR842FA1, (Total and Respirable Dust Levels in the ESF and ECRD Cross Drift) will provide the collection and analysis of particulate matter air quality samples taken within the underground ESF and ECRD tunnel area. Both total suspended matter (TSP) and respirable (PM-10) size dust samples will be taken at up to three sampling stations. Gravimetric analyses will be performed on all samples to determine airborne dust levels as an average mass concentration during the sampling period. Optical analyses will be performed by an outside contractor on some filters to determine type of mineral captured on the filters. The number of samples, installation, operation and analyses will be included in this account.

B. This program will *enhance* Site Construction Operations by providing: ventilation system operating data to support ECRB construction operations and management decisions for system changes to benefit worker health and safety. It will enhance primary ventilation system operations and performance, dust generation and mitigation planning, management of water for dust suppression, and the maintenance of dust collection equipment. In addition, timely reporting of results to the M&O management will be provided.

C. This program will *also enhance* Site Construction Operations by providing: timely gathering of data to support scientific data requirements, management decisions for system adjustments of the ECRB water balance, and the maintenance of scientific instrumentation and equipment.

D. The estimate assumes the resources necessary to perform the assigned tasks including management, technical and administration staff resources.

E. The estimate assumes funding approval and completion of the ECRB Phase I early scope.

F. The estimate assumes work scope to commence July 1, 1997 and completion by September 30, 1998, and does not include planning for Calico Hills excavation.

G. The estimate assumes that funding for other organizations participation is described in other Statements of work as noted (TCO, DIE, CMO, A/E).

### 8. Cost Rationale:

- A. Period of activities, July 1, 1997 through September 30, 1998, including: Phase I, Detailed Program Planning & Procurement, July 1 thru Sept 30, 1997 Phase II, Monitoring & Data Collection, Oct 1, 1997 thru Sept 30, 1998
- B. Ventilation engineer (0.5 FTE) to manage and integrate the program with the M&O,

write procedures, address issues, and review of data, and prepare the monthly Monitoring Program Summary Report. The ventilation engineer must show a high level of expertise and experience in underground ventilation system monitoring, computer modeling, and report writing, and must be familar with the applicable OSHA standards.

C. Design engineering, procurement, installation, maintenance of test monitoring equipment (0.30 FTE).

D. Ventilation Field Technician (1.0 FTE) for data collection and system monitoring. The field technician must be experienced in underground ventilation system monitoring techniques, equipment usage, equipment calibration and reporting.

E. Administration staff support (0.2 FTE).

F. Air sample analyses to be provided to cover up to two locations consisting of one each PM10 and TSP samplers operating on a five day excavation schedule.

G. TR682FAK, FY97 cost @ \$ 47,334 and FY98 cost @ \$ 191,430 Total cost @ \$ 238,764

9. Level III Milestones: None

10. Level III Milestone Acceptance Criteria: None

11. Attachments and References: None

06/04/97

# TECHNICAL BASIS FOR THE REQUIRED ACTIVITIES FOR THE ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK

- 1. Summary Account Number: <u>TR842FA1</u>
- 2. Summary Account Title: Air Quality/Meteorology
- 3. Summary Account MGR/ORG: Mike Harris, Environment, Safety and Regional Programs
- 4. Status of Change: \_\_\_\_Revised X New\_\_\_
- 5. Scope Description:

Provide for the collection and analysis of particulate matter air quality samples taken within the underground ESF and ECRB tunnel area.

6. Scope Differences from the Baseline:

Not included in previous planning or the baseline

7. Key Assumptions:

In support of proposed Summary Account TR682FAK, Ventilation System and Monitoring Underground in the ECRB, particulate matter air quality samples taken within the underground ESF and ECRB tunnel area will be collected and analyzed. Both total suspended matter (TSP) and respirable (PM-10) size dust samples will be taken at up to three sampling stations. Gravimetric analyses will be performed on all samples to determine airborne dust levels as an average mass concentration during the sampling period. Optical analyses will be performed by an outside contractor on some filters to determine type of mineral captured on the filters. The number of samples, installation, operation and analyses will be included in this account.

Effort includes three sampling stations consisting of one each PM10 and TSP samplers operated four days per week for three gravimetric and one optical analysis run each.

Period of performance is July 1, 1997 through September 30, 1998, and includes two phases.

<u>Phase I - July 1, 1997 through September 30, 1997</u> Detailed program planning, writing operating procedures, and equipment acquisition.

### <u>Phase II - October 1, 1997 through September 30, 1998</u> Monitoring and data collection, data compilation, and documentation

8. Cost Rationale:

#### Phase I

Other Direct Costs

Sampler purchase for two sampling stations, each consisting of one each PM10 and TSP samplers:

PM10 samplers = \$18,000 (3 x \$6,000 each) TSP samplers = \$9,000 (3 x \$3,000 each)

Phase II & III

Other Direct Costs

Special membrane filters for optical analysis and sample analysis costs:

Gravimetric samples = \$3,510 (702\* filters x \$5 each)

Sample analysis = \$2,570 (257\* filters x \$10 each) + \$46,800 (234 filters x \$200 each)

\* includes spare filters

Labor

Meteorological Technician (0.75 FTE) for data collection, station monitoring, preventive maintenance, calibration, operation, and filter preparation for data collection.

Meteorologist (0.2 FTE) for ensuring compliance with current regulatory requirements, training and direction for the technician validating and analyzing data.

9. Level III Milestones:

None.

### 10. Level III Milestone Acceptance Criteria:

None.

11. Attachments and References:

See proposed Summary Account TR682FAK, Ventilation System and Monitoring . Underground in the ECRB.

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C Activity	Activity Cit	Orig Dur	Early Start	Early Finish		Y97	FY98	- Fγ99	EY00	FY01	FY02
ECRB Intern Perioritian 125	Complete Data Enhancement to TSF	plication Annual II		16MAY97		Comple	te Data Enhancement (	g TSP/LA			
130	TSPA Sensitivity for LA Initial Data	216	04JAN99*	05NOV99		IOMAI	04J	TSPA Sensitiv	ity for LA Initial Data E 2005NOV99		
-120	Documantation of TSPA	66	08NOV99	10FEB00		ł		OBNO	Documantation of 1	SPA	
	LA Preparation & Review Without Ea	ast-West 68	17FEB00*	22MAY00	-	ł			LA Preparatio	h & Review Without E	st-West Data
100	Submit LA to NRC	-vvest 463	23MAY00	28FEB02					23MAY00	eration & Review With	East-West Data
SODAVIE	anning anning anning anning anning			UTMARU2		ł	·				Submit LA to NR
200	Plan Repository Data Enhancement	60	06MAR97	08AUG97	Plar	Repost	ory Data Enhancemen	t			
210	CR Approval	0	•• •	17JUN97*		CR A	AUG9705MAR97A			ļ	
Repositor	ツロシロ日本語言語を思いてい		NI LEE	期情報目		<b>T</b>		· · ·· ··-	• • • • • • • • • • • • • • • • • • • •		-
140	Phase 1 Complete Design Input to T	SPA-VA 154	27FEB97	13OCT97	Pha:	e 1 Con	plete Design input to	SPA-VA			
150	Phase 2 Design for LA Initiation	456	14OCT97	03AUG99		AOCTO	Phase 2 Design for L	A Initiation			
300	Complete Data Enhancement to LA	Design 0		03AUG99					omplete Data Enhancer Mai Icon	ent to LA Design	
160	Phase 3 Support to LA Development	t 630	04AUG99	07JAN02					hase 3 Support to LA D	velopment	
ECRB Early	Start Activities								COLNEL POSTI E FAX: BOOT	LINE CONTRACTOR STATE	ESTEROTJANOZ
E SECONDO	TSYSAEngxIntegrationSupport	tifor ECREMENTE	in the state	A SHINE		Į .					
SE000200	SE Support to ECPR Early Start	29	19MAY97	26JUN97	ļ	Launch 1026JU	Chember Design Supp 197 19MAY97	ort			
SE000M4	Complete ICD Rev. 0		27JUN97	03NOV97		125 21	ipport to ECRB Early 5 a003NOV9727JUN97	tert .		[	
112/212/212/212		U	75. 16 . 19 (S . 11	03NOV97		_i	€03NOV97	·····			
SC10010	Develop TBM Requirements		19MAY97	28MAY97		Develor	TBM Recuirements				
SC10000	QAP 3.12 Design Input for Launch C	chamber 10	19MAY97	30MAY97		26MAY	97 19MAY97* 2 Design Input for Lau	nch Chamber			
SC10020	Initial Launch Chamber Design	20	02JUN97	27JUN97.		Tottlet	97 19MAY97 sunch Chamber Desk	n i			
SC10030	Launch Chamber Design	50	30JUN97	05SEP97		Laun	N9702JUN97 ch Chamber Design				
SCM030M3	Complete Launch Chamber Design	0		05SEP97	100.00		psEP97 omplete Launch Chan	ber Design	1		
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SC10040	TBM Selection and Acquisition	24	29MAY97	01JUL97	1	TBM 5	ection and Acquisitio	n -			
SC10050	TBM Rehab Planning	51	02JUN97*	11AUG97		TBM R	hab Planning AUG9702.KU97*				
joct Start joct Finish in Dote n Dote	93MAR97 01MAR92 19MAR92 19MAR97 03JUL97 03JUL97	ECAB		Yucc	a N	lour	ntain Proje	ct	Sheet 1 of 16	I	
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	Activity	Activity	Orig Dur	Early . Start	Early Finish :	FY97   FY98 FY99 FY99 FY00 FY01 FY02 11 [	<u>ül</u> t
	SC10060	Constructability Review, Launch Chamber	80	30JUN97	17OCT97	Constructability Review, Launch Chember Design	ndaritetetetetetetetetetetetetetetetetetete
	SC10080	Develop Pre-Construction Checklist	24	01JUL97*	01AUG97	Develop Pre-Construction Checklist	
	SC10070	Job Safety Analysis for Launch Chamber	45	01JUL97*	01SEP97	Job Easty Analysis for Launch Chamber	
	SC10090	Launch Chamber Pre-Construction Review	80	01JUL97*	20OCT97	Launth Chember Pre-Construction Review	-+-
EC	<b>RB</b> Direc	t Activities			I		
	<b>The how of the how of</b>		Sec.	and the state of	as dense		
1	SC1000	Approval of ECRB CR	38	19MAY97	09JUL97	Approved of ECRB CR	
	RESHLISE	2. Design NaPortal Construction Portugat	14.1.8		建筑制度		
	5C10520	Design Muck/Conveyor Systems	55	18JUN97*	02SEP97	Design Much/Conveyor Systems	
	RUSTZEE	Design South Portal Facilities For					
	5610530	Design S. Ponal Support Facilities	66	18JUN97*	17SEP97	Design S. Portel Support Facilities	
i.	10001/GE	Design ECKB Cross Dring Parage					
				04AUG97	21NOV97	04AU397*Estation21NOV97	
	SC10110	Develop Revised Method for Muck Handling	50	25AUG97	31OCT97	25/UG975ucj310CT97	
	SCM040M3	Design Cross Drift	0		21NOV97	A'   Design Cross Drift 1' ◆21NOV97	
	IREE12EE	AIRTBM Mobilization & Rehabi Hilling			BERGIN		
	SCM100M3	Legin IBM Lease	0	10JUL97*		Begin TBM Leese ◆10JUL97* i	
	SC10130	Ship TBM	5	10JUL97	16JUL97	Śnip (TŚŃ) / 10.00 (1971) - 10.00 (1971) - 10.00 (1971) - 10.00 (1971) - 10.00 (1971) - 10.00 (1971) - 10.00 (1	
	SC10132	Inspect TBM	25	17JUL97	20AUG97	Inspect TBM 17.N.S. 9762004 IG97	
	SC10134	Order Parts for TBM	30	17JUL97	27AUG97	Vorder Parts for TBM	
8	SC10136	Refurbish TBM	66	28AUG97	01DEC97	Weburbish TBM	
	SC10138	Ship TBM	13	02DEC97	18DEC97		
	SCM110M3	TBM on Site	0	19DEC97		02DEC97416DEC97	
•1	RELEGEN	5 ESASOUID ROMALACCESS 10/Alcoves		STREET, STREET, ST			
	C10150	Establish South Portal Access to Alcoves	46	01AUG97	03OCT97	Establish South Portal Access to Alcoves	
1	RUSPEC	2011 CRBUBM Demoby Dimension		any ipanat	17.22		
	C10160	TBM Demob	22	24JUN98	24JUL98	ТВМ Ретор	
1	R6812GE	15% ExcavaluteCRB(Launch(Chamberry		2721236.8	(74.34)得得		
i s	C10170	Launch Chamber Excavation (Sta 0+00 to	65	15SEP97	16DEC97	Paunch Chamber Excavation (Sta 0+00 to 0+90)	
S	CM050M3	Complete Launch Chamber Exc. (Sta 0+00 to	0		16DEC97	TasterariteDEC97	
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foct F & Date	Inish I	91MAR92 AMAGEMENTATION Progress Bar 19MAY97 AMAGEMENTATION Critical Activity			Yuco	a Mountain Project	
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松	Activity	Activity, history	, Orlg	Earty :	is Early :	FX97	11	FY98		FY99	FY00	::s+ [	FY01	FY02 -	
		Description hit at the	Dur	Start	Finish							ШП	типт		ЦПЛ
Ϊ.	UROBIZGI	Bozinstall, Excavation/Equipment						× ×		Å				2)11300371498017687711271	
	SC10180	Install Excavation Equipment	22	2 19DEC97	21JAN98		190509	Install Excay 7821JAN90	vetion	Equipment	ļ				
	11.664.2CI	BALEXCAVALUECREROTOSUDILICA		DENE	W.P. Hitte		[			· · · · · · · · · · · · · · · · · · ·					
	SC10190	Equipment Shakedown (Sta 0+90 to 2+40)	10	22JAN98	04FEB98	{ }	22.JA	Equipment : JAN96804FEB98	n Shah	akedown (Sta 0+90 to ;	2+40)			<b>,</b>	
	SC10200	Install Conveyor	5	05FEB98	11FEB98			Anstall Co	1 Conveyor			•			
1	SCM060M3	Begin Exc. Across the Rep. Block (2+40 to	C	) 12FEB98				Degin Ex	ic. Adr	oss the Rep. Block (	(2+40 to 25+00)				
	SC10210	Exc. Across the Repository Block (2+40 to	- 62	12FEB98	01JUN98		12FE	896 <b>•</b> Exc. Acm	oss th	• Repository Block (	2+40 to 25+001	{			
	SCM120M3	Complete Repository Cross Drift			01 11 1109		2F		JUN9	B Renaskary Cross					
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SC10300 Construction Planning 5 08SEP97 12SEP97	Construction Planning														
SC10310 Develop JSA's 90 010CT97*09FEB98	Develop JSA's														
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SC10400 Prepare Muck Area 44 03NOV97 07JAN98	Propers Muck Area														
SC10410 Muck Disposal 182 22JAN98* 080CT98	Which Disposel														
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SC10360 Detailed Program Planning 66 01JUL97* 30SEP97	Detailed Program Planning														
SC10370 Monitoring & Data Collection 261 010CT97 120CT98	Monitoring & Data Collection														
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SL547A1	FY98 PA Support for ECRB - Phase II	261	01OCT97*	12OCT98	0	OCT97	FY98 PA Support for E	CRB - Phase II 120CT96			
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SPSD11B1	Collect SD_11 Rock Properties Samples	60 60	23APR08*	17.11 11 08	2		Collect SI	0-11 Rock Properties 5	amples		1
S0127815	Collect Bock Properties Samples in ESE		01 11 08*	2055008	-		23APR98*1222917.A Colle	1.90 ct Rock Properties Sa	noies in ESF		
SF527015	Test SD 11Semples and Property Departs		20 11 10 00	1000000		1	01JUL98*E-12	30SEP95 SD-11Samples and P	enare Reports		
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SP327825	Test Rock Prop Samples and Prepare Rep in	61	0100198	29DEC98		1	01OCT95	CENTROCK FIDE SIMP	az ang stabéte Kab it	ESF	
SPSD11B6	Finalize SD-11Reports	61	19OCT98	15JAN99			190071	SECTENSION STATIS	3 		
SPSD13A1	Collect SD-13 Samples	80	04DEC98	30MAR99	2	1	04DE	Collect SD-13 San 98*EXEL30MAR99	pies.		
SP327B35	Finalize Therm & Mech Lab Reports	62	30DEC98	29MAR99			300	Finalize Therm 8 EC9815/28129MAR99	Mech Lab Reports		
SPSDDM4	Subm TDIF Data Rpt for SD-11 Thermal Tests	0		15JAN99				Subm TDIF Dat	A Rpt for SD-11 Therm	al Tests	
SPSDFM4	Subm TDIF Data Rpt for SD-11 Mech Tests	0		15JAN99	1			Subm TDIF Dat	Rpt for SD-11 Mech 1	Tests	
SP327PM4	Subm TDIF Data Rpt for Mechanical Lab Test	0		29MAR9	9	1		Subm TDI	Data Rpt for Mechani	cal Lab Test	
SPSD13A3	Test SD-13 Samples and Prepare Reports	64	31MAR99	29JUN99		• •••		Test SD-13	Samples and Prepare	Reports	-   +
SPSD13A6	Finalize SD-13 Rock Properties Reports	64	30JUN99	295FP99	-		}	31MAR99129JU	N99 Ize SD-13 Rock Proper	ties Reports	
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	SP3B3G10	ESF Geophysical Logging	218	01DEC97*	080СТ98		01DEC	ESF Geophysical ( 97*EXTEN/Lin/Operation	Logging BDAOCT98			
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	SP3E2100	Prepare test Plans & Prelim Design	219	01OCT97*	12AUG98	0	OCT97	Prepere test Plans & F	relim Design AUG98	4		
	SP3E2130	Specify & Procure Instrumentation	240	02FEB98*	13JAN99		02	Specify & Proc FEB98*64234 128934	ure Instrumentation			
	SP3E2110	Prepare Level 4 Prelim Test Ping & Design	32	01JUL98*	14AUG98			01.1.1.98*27114	tre Level 4 Prolim Tes	Ping & Design		
	SP3E2AM4	Rpt: Prelim Test Planning & Design	0		14AUG98		]	T	: Prelim Test Plannin	g & Design		
	SP3E2140	Conduct Pre-Test T-H & T-M Predict Analyses	103	17AUG98	13JAN99	]			Induct Pre-Test T-H &	T-M Predict Analyses		
	SP3E2150	Conduct Pre-Test Characterization of Test	103	17AUG98	13JAN99				nduct Pre-Test Chera	eterization of Test Bed		
	SP3E2160	Install Heaters, Instr & Data Logger System	62	15OCT98*	14JAN99			1500708	Install Heaters, Instr	A Data Logger System		
	SP3E2BM4	Second Single Heater Test Heater Turn-On	0	· · · · •	15JAN99*			1500190	Second Single	leater Test Hester Tu	n-On	
	SP3E2180	Conduct Heating Phase	127	15JAN99	15JUL99				Conduct Heatin	n Phase		
	SP3E2190	Conduct Cooling Phase	124	16JUL99	11JAN00	1	ļ	13	Con	duct Cooling Phase		
	SP3E2200	Conduct Post-Test Characterization Test Bed	54	12JAN00	27MAR00				1010Laartan	Conduct Post-T	est Characterization T	st Bed
	SP3E2210	Analy Data & Prep Drft Sec Sngl Htr Tst Fnl	63	12JAN00	07APR00	[	{		12	Analy Data & Pi	ep Drft Sec Sngl Htr Ti	it Fnl Apt
	SP3E2CM4	Draft Second Single Heater Test Final Rpt	0		07APR00	1	{		12	Dreft Seco	nd Single Heater Test	Final Rpt
	SP3E2230	Prep Second Single Heater Test Final Rpt	33	10APR00	24MAY00	1	{			Prep Seco	nd Single Hester Test	Final Rpt
	SP3E2DM3	Second Single Heater Test Final Report	0		24MAY00		ļ			10APR005824MAY	00 Single Heater Test Fir	al Report
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	SP6D100	Test Reqmnts input to Design & Construction	619	19MAY97	22OCT99	1	Test Re	mnta input to Design	A Construction			
	SP6D150	Planning & Field Test Representative Test	619	19MAY97	22OCT99		Plannin	& Field Test Represe	niztive Test Mgmnt			
1	23 Scientifi	c Activities Surface Based				[			The same and a print of 52	MILLOUISS 13MA131.		
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	SP32DBMA	Pretim Report on Vegent Aligant Disk of Veg	00	23APR98-	1/JUL98		1	23APR98*12121117.	4 Analy Hazard-Minera UL96	in 5D-11	.	
-	60 021 000	Prelim Report of Prazard Mineral Distriat TM	0		17JUL98		]	₽ <b>7</b> • ◆17.	im Report on Hezerd k JUL98	Vineral Distrat YM		
	CD220A144		08	04DEC98*	30MAR99		l	04DE0	Real-Time Analy I 98-155-15130MAR99	lazard-Mineral in ŠD-1	\$	
Ċ	TD10017	Previminary Report on Hazard Mineral Distr	0		30MAR99				Pretiminar \$30MAR99	Report on Hezerd Mi	erst Distr	
	SP322100	Stratigraphic Loggings of SD-11 Bombole	U.H.M.	RENTH 224		}						
÷.			230	23APK98"	JUMAR99	<b>]</b>	I	23APR98	Inic Loggings of SD-1	Borehole		·
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SP322200 Stratigraphic Loggings of SD-13 Borehole	147	16DEC98*	15JUL99			A 1605	Stratigraphic Log	gings of SD-13 Boreho	i die inerinatie die eest ont in	in the second second state and state and second second second second second second second second second second Second second
SP322DM4 Stratigraphy of SD-11 Drill Hole	0	[	30MAR99				Stratigraph	y of SD-11 Drift Hole		
, SP322CM4 Stratigraphy of SD-13 Drill Hole	0		15JUL99	1	1		Stre	grephy of SD-13 Drill	tole	
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SPCO100 Road Maintenance & Pad Construction SD-11	43	01OCT97*	02DEC97	] ,		Roed Mathtenance & I	ed Construction SD-1	1		
SP353G10 Drilling Engr Support ( Req FY98 Budget)	350	01DEC97	19APR99	1	0105	Drilling Engr Supr	ort ( Reg FY98 Budge	5		
SP353G20 SMF Support (Req FY98 Budget)	350	01DEC97*	19APR99	1	0106	SMF Support (Rec	FY98 Budget)			
SP353G30 Tracer Support (Req FY98/99 Budget)	350	01DEC97*	19APR99	Ϊ.	0105	Tracer Support (R	q FY98/99 Budget)			
SPSD11M3 Complete Construction of Drill Pad SD-11	0		22APR98			Complete	Construction of Drill (	ad \$D-11		
SPDSD11 Drilling for SD-11	169	23APR98*	22DEC98			Dritting fo	SD-11 Coord	nation & Schedule	issues to	
SPCO125 Road Modifications & Pad Construction SD-13	46	010CT98*	07DEC98	·		23APR93 [100][11]	Road Modifications &	ressed in FY98 P	anning	1
SPSD13M3 Start Drilling of SD-13	0	23DEC98		-		01OCT98*	Start Drilling of S	D-13	~	
SPDSD13 Drilling for SD-13	72	23DEC98	06APR09	{	ł	23DE	C98			
MIKIP/FALESET ISIKCOOTUNEIDIDESATURA	and a local	Partition	CONTINUES			23D	C98 SHEDGAPR99			
SP397A60 TCO Support to Surface Based Testing	619	19MAY97	220CT99		TCO Su	pport to Surface Base	Testing			
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SP3B1100 Geophysical Data Collection	609	02JUN97*	220CT99	1	Geoph	reical Data Collection				1
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SPG21A20 Construct USW SD-11 Lithostratigraphic Log	223	23APR98*	15MAR99	]	1		USW SD-11 Lithostra	igrephic Log		
SPG21A10 Construct USW SD-13 Lithostratigraphic Log	138	16DEC98*	02JUL89			1805	Construct USW 8	D-13 Lithostratigrapht	: Log	
SPG21CM Memo to TPO: Lithostratigraphic Contact	0		15JAN99*			1002	Memo to TPO: I	ithostratigraphic Con	act USW SD11	
SPG21DM Memo to TPO: Lithostratigraphy for USW	0		15MAR99				Memo to TP	O: Lithostratigraphy is	r USW SD-11	
SPG21AM4 Memo to TPO: Lithostratigraphic Contact	0		03MAY99				Time to	TPO: Lithostratigraph	c Contect USW SD13	
SPG21BM4 Memo to TPO: Lithostratigraphy for USW	0		02JUL99*		·			o to TPO: Lithostratign	phy for USW SD-13	
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SPG22A10 Prepare Predictive Cross Section and Memo	95	01JUL97*	14NOV97	1	Prep	re Predictive Cross S	ction and Memo			
SPG22M4 Memo to TPO: Predictive Cross Section and	0		14NOV97			Memo to TPO: Pred	ictive Cross Section a	nd Memo		
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SPG42A10 Conduct Mapping From Station 0+00 to 28+00	251 010CT97-30St	EP98 0 OCT97	A enduct Mapping From Station 8+00 to	28+00	na pre na manta a con a se a facto de la contra de la contr Interna de la contra de
SPG42GM Geo/Geotech Data fm Cross Block Drift	0 3051	EP98	Geo/Geotech Data \$305EP98	fm Cross Block Drift	
SPG42B10 Develop Predictive Geotechnical Memo	52 02SEP97* 14N	IOV97	reion Predictive Geolechnical Memo		
SP327AM4 Memo to TPO: Predictive Geotech. Analysis	0 14N	10V97	Memo to TPO: Predictive Geolech. Ai 14NOV97	alysis ECRB	
SP3VB10 · Prepare Draft Predictive Report for SD-11	22 02JAN98* 02FE	EB98	Propers Draft Prodictive Report fo	r SD 11	
SP3VB1M3 Predictive Report for Borehole SD-11	0 02M	MAR98	Predictive Report for Borehole ©2000	SD-11	
SP3VB20 Prepare Draft Predictive Report for SD-13	23 01SEP98* 020	CT98	01SEP98*2020CT98	tive Report for SD-13	
SP3VB2m3 Predictive Report for Borenoie SD-13 SP3VB30 Prepare Draft Analysis & Measurments SD-11	42 01APR99* 28M	10V98 1AY99	♦02NOV98 ₽ Prepar	e Dreft Analysis & Measur	nents SD-11 Rot
SP3V3M3 Analysis of Prediction & Measurments Rpt:	0 01JL	UL99	01APR99'8E9281	AAY99 nalysis of Prediction & Me	esuments Rpt: SD-11
SP3VB40 Prepare Draft Analysis & Measurments SD-13	43 01JUL99* 31A0	UG99	01JUL99*E	repare Draft Analysis & M E33) AUG99	esuments SD-13 Rpt
SP3VB4M3 Analysis of Prediction & Measurments Rpt:	0 3058	EP99		Analysis of Prediction	& Measurments Rpt: 5D-13
0033126GB14GablPhase)Movementinthe)UZALA		15.105			
SPH22S10 Collect Data on Boreholes SD-11 and SD-13	251 010CT98* 30SE	EP99	Coffect Data on B	veholes SD-11 and SD-13 Sal-30SEP99	
574223Ma Memo to TPO: Results of Data Collected	0 305	EP99		Memo to TPO: Results	of Data Collected BD 1/SD13
0033124FBDIMolstute,MonitoringUnitie)ESF		1992 Nov			
SPH36V10 Conduct Analysis on Water Balance in Cross	263 15SEP97* 30St	EP98 15 EP97 1	ep Data Pkg of Data Coffected Sep97-J <u>ADA JERELCISE (20</u> 12)05EP98     induct Analysia on Water Balance in C		
SPH36V20 Conduct Analysis of TBM Water Migration	196 22DEC97 30S	155EP97-15	Conduct Analysis of TBM Water M	gration	
SPH36V40 Prep Data Pkg of Data Collected Sep98-Jul99	263 15SEP98* 30St	EP99	9/"WEIPhuthi2194410(30SEP96    Prep Data Pkg of 0 15SEP06*015 20040557311	ta Collected Sep98-Jul99	
SPH361M4 Memo to TPO: Sep97-Jul98 Data Pkg to	0 305	EP98	Memo to TPO; Se \$305EP95*	p97-Jul98 Data Pkg to RPC	TDB
SPH363M4 Memo to TPO: Rstts of Analysis &	0 3051	EP90*	Memo to TPO: Rs \$305EP98*	its of Analysis & Interprete	tions
SPH364M4 Memo to TPO: Rsits of Analysis &	0 30SE 0 30SE	EP99*		Memo to TPO: Sep98-	Analysis & Intermetations
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SPSDBM	A4 Subm TDIF Data Rpt for SD-13 Thermal Tes	ts 0		29SEP99					Subm TDIF Data Rpt f	r SD-13 Thermal Test	i ali ali ali ali ali ali ali ali ali al
SPSDCM	A4 Subm TDIF Data Rpt for SD-13 Mech Tests	0		29SEP99					295EP99 Subm TDIF Data Rpt I 295EP99	or SD-13 Mech Testa	
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SP327D	10 Plan & Drill In-Situ Stress Boreholes	64	01JUL98*	30SEP98	]		Plan :	a Drill In-Situ Stress B	oreholes		
SP327F1	10 Drill Bhole & Collect Core for Bhole Jack	64	01JUL98*	30SEP98			Drift I Of JUL 98-101	Shole & Collect Core f 305EP98	or Bhole Jack Tests		
SP327D2	20 Conduct In-Situ Stress Tests	61	01OCT98	29DEC98			0100700	Conduct In-Situ Stres	s Tests		
F SP327F2	20 Perform Borehole JackTests	61	010CT98	29DEC98			010CT90	Perform Borehole Jac Bill 29DEC98	kTests *		
SP327D3	30 Analyze In-Situ Stress Data and Prepare	62	30DEC98	29MAR99		{		Analyze In-Stu	tress Data and Prepa	a Report	
SP327F3	30 Analyze Results and Prepare Report	62	30DEC98	29MAR99	·		300	Analyze Results	and Prepare Report		
SP327D	M4 Subm Data Analysis In-Situ Stress Report	0		29MAR99				Subm Data	Analysis In-Situ Stree	a Report	
SP327F	M4 Subm Data Analysis for Bhole Jack Report	ō		29MAR99				Subm Data	Analysis for Bhole Ja	t Report	
- Uskrak	KICELS Selsmic Vomography Testing for	ECRB	影作家	15:54:54							
SP327G	10 Analyze Results and Prepare Report	128	01APR98	30SEP98	1		Analyze Ro 01APR98*11055524	sults and Prepare Reg 305EP98	ort		
SP327G	M4 Subm Data Analysis for Bhole Jack Report	0		30SEP98	1	( · )		Subm Data Analysis f	or Bhole Jack Report		
URBER	AGE Num Situl Design Verincation for EC	RBANK	CALL ST					3035136		· · · · · · · · · · · · ·	
SP327H	10 Perform In-Situ Design Verfication for ECRB	128	01APR98	30SEP98			Perform In	Situ Design Verficatio 3055208	n for ECRB		1
SP327H	M4 Subm Data Analysis for Bhole Jack Report	0		30SEP98				Subm Data Analysis f	or Bhole Jack Report		
TILEFAL	AIFEERESIF MOISE Moniting / Drift's Seep's de		ALLEYS	SPERIOR H				30321-36		· · · · ···=	
SP33C02	25 Moisture Monitoring Predictions	154	01JUL97*	05FEB98	]	Mols	ure Monitoring Predic	10ns 97*			
SP33C0	50 Activity ID Activity descriptTBM Water	197	22DEC97	30SEP98		2205	Activity ID Activit	y descriptTBM Water	Migration		
SP33C10	00 Water Balance	263	22DEC97	06JAN99	1	2205	Water Balance				
SP33S3	M4 Ltr Rpt: Pred Local Plm Migr E-W Drift X-ove	r 0		30JAN98*			Ltr Rpt: Pred L	ocal Pim Migr E-W Dr	fit X-over Pt		
SP33T1	M4 Ltr Rpt: Modi Predict E-W Drft Impact Moist	ō	·	05FEB98			Ltr Rpt: Modi	Predict E-W Dritt Impe	t Moist Cond		
SP33T2N	M4 Ltr Rpt: Progr Moist & Wall Monit in E-W Dri	h Ö		30APR98		•	Ltr Rpt: 1	rogr Molst & Wall Mo	șit în E-W Drift		
SP33C60	00 In-Situ Testing	328	12JUN98*	28SEP99			◆ JOAPRS In-Situ	Testing			
: SP33C70	00 Testing	328	12.JUN98-	285EP99			12JUN98* <u>[35] 12</u> Testin	ALPHAN STRATES IN	285EP99		
SP33S4	M4 Ltr Rpt: Proor Ceilno/Niche Monit ESF Main	-		30 11 1108		·	12JUN98*[EF.T	ALEXIMATING STREET	285EP99		
SP33T3M	M4 Ltr Rot: Proor Dust Collect & Seenage	~		30 11 1108			<b>♦</b> 30J	UN98°	Montest Main Ditt		
SP33T4N	M4 Ltr Rpt: Progr LiBr Samp & Vert Temp & Per	~ c   0		31411008				UN98'	A Seepage Detection		
ATT	17MART CONTRACTOR	<u> </u>			<u>]</u>	<u>i.</u> y	<u> </u>	31AUG98*			
ject Finish	etmanes			Vucc	o N	lour	tain Droie		Sheet 6 of 16		
a Dette	93,04,97							CL			
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T PACTIVITY ?	Particle Provide Activity of the statistic	Orig i	Early +	Early	μĒ	¥97. 1.1.1.1	<b>FY98</b> 	FY99	FY00			代記
SP33S9M3	Rpt: Construction Water/Dust Control in	0		30NOV98	Territor 1		and a state of the	Rpt: Construction	Water/Dust Control In	Manager Statistics and a list	alla in Mint int all the	NERGI
SP33S6M4	Ltr Rpt: Alcove Test Plan & Tracer Test	0	<b> </b>	31DEC98				4 30NOV98* Ltr Rpt: Alcove	Test Plan & Tracer Tes	It Design		ľ
SP33T9M3	Rpt: Moisture Monitoring & Plume Evaluation	0		30411099	·	ļ	1	\$31DEC98*	or Moisture Monitoria	to & Plume Evaluation		
SP33S7M4	Ltr Rpt: Drft-Drft Hydro Interact E-W Drft & Alc	0		305EP00	;			•	SOAUG99*	n Interact E-W Dott & a		
11656666	15105 Wilfill allow Monitofilite Instantistics	ar Ball		TO HIGH ST		]		·	\$30SEP99*			
SP33G910	Conduct Moisture Monitoing ESF	131	01DEC97	05JUN98	1		Conduct Noisture	Monitoing ESF				
SP33G9M4	Ltr Rpt: Rsits Dust/Fiber Measur with Water	0	[	19MAR98		OIDE	97"INTERNIEROSJUN Ltr Rpt: Ret	rs Is Dust/Fiber Measur	with Water Use			
MIRES PER			Self of the									
SP33A100	Confirm UZ Hydrologic Flow Model	146	05FEB98*	01SEP98	7		Confirm UZ H	drologic Flow Model	Predictions			
SP33AAM4	Prediction of Ambient Cond of E-W Drift	0		01SEP98			P	ediction of Amblent	Cond of E-W Drift		1	
गरहोत्त्रभ	ULES A VESUIT (SUDDEL (S) and the state			同用限度			Y		•			
SP355A50	Drilling/Testing Assoc w/ Launch Chamber	62	15SEP97	11DEC97	1	SEP97	Critiling/Testing Assoc	w Launch Chamber (	Excav		1	
SP355A85	Driffing Engr Support (Req FY98/99 Budget)	534	15SEP97	22OCT99	1	SEP97	Ortifing Engr Support (	Reg FY98/99 Budget)	3122OCT99		{	
SP355A90	SMF Support (Req FY98/99Budget)	534	15SEP97	22OCT99		SEP97	MF Support (Reg FYS	/ssBudget)	1122OCT99	1	{	-
SP355A95	Tracer Test Support (Req FY98/99Budget)	534	15SEP97	22OCT99	] 1	SEP97	Tracer Test Support (R	q FY98/99Budget)	220CT99			
SP355A55	Drill - 9 Shifts for Launch Chamber Test	4	17DEC97	22DEC97		170	Drill - 9 Shifts for EC97122DEC97	Launch Chamber Ter			ĺ	
SP355A60	Drilling/Testing Assoc w/ Cross Drift Excav	83	22JAN98	19MAY98		2		Assoc w/ Cross Drift	Excav		<u></u>	
SP355A65	Constructor Test Support	363	04JUN98	08NOV99			Constr 04JUN98EBBE	ictor Test-Support		ļ ,		
SP355A75	Drilling/Testing Assoc w/ Alcoves/Niches	340	27JUL98	29NOV99			4 10mm	Ingitesting Assoc w	Alcoves/Miches Excav			{
11:X57174	3.Surfaced4Baseurest.coordination(o)	iig sai		Sales A						· [		-+-
5P39/B10	lest Requiremnets input to Design &	445	19MAY97	17FEB99	-	Test Re	guiremnets input to De	sign & Construction	MAY97*			
SP39/B20	Planning & Field Test Reprentative Test	619	19MAY97	22OCT99	<u> </u>	Plannin	A Field Test Repres	itive Test Momnt	2220CT9919MAY97*			<u> </u> .
SP39B100	Develop Predictions for E-M Drift	01	01444007									
SP39B1M3	Predictive Report	52	01/0097	ACDEC97	UATO	697 <b>-10</b>	SETIODEC97	W Dritt	1		1	
	AHANDPMEHNINA/BERGESABRASS	0		15DEC97	]		◆15DEC97*					
SP39C100	Develop Predictions for E-W Drift	76	01411697	1410107		De	velop Predictions for F	W D-IR				
SP39C1M2	Predictive Report			1505007	01AU	697 <b>•</b>	Predictive Report		[		í .	Í
				ISDEC97	<u> </u>	<u> </u>	◆15DEC97*		<u> </u>	<u> </u>		
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ict Start ict Finish	12MAR97 CONTRACTOR CONTRACTOR SALES								Sheet 7 of 18			
Data Data	19MAY97 Million Critical Activity 01JUL97			Yucc	a N	lou	ntain Proje	ct	•			
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SPH	136X30	Sample Bh's for Oxygen/Hydrogen/Is	sotopic	240	010CT97*	15SEP98	-		Sample Bh's for Oxyg	n/itydrogen/isotopic	Anaisis		
SPH	1373M4	Memo to TPO: Preliminary Interpreta	ations of	0		15SEP98	0	00197		SSEP98 fema to TPO: Prelimir	ary Interpretations of	Deta	
ST24	D - Svn	thesize Data/Write Ch 2.4. Hvd	rologic						T	1552190			
ENOG:	36221E	B31SynIDist&AnaliGeochron	AbelDett	Pdun			•	1					
SPC	23G10	Collect Calcite and Opal Data in Cro	ss Drift	40	010CT97*	28NOV97	0	00797	Collect Calcite and Op	al Data in Cross Drift			
. SPC	23G20	Collect Samples of Calcite and Opal		251	01OCT97*	30SEP98	0	OCT97	Collect Samples of Ca	cite and Opel Occurre 3055P98	nces		
SPC	233M4	Memo to TPO: ECRB Spatiotempor	el 🛛	0		28NOV97			Memo to TPO: ECI	B Spatiotemporal Pre	dictions		
SPC	234M4	Memo to TPO: Eval and Grade Pred	lictions	0		30SEP98*				Memo to TPO: Eval ar 305EP95*	d Grade Predictions		
SPC	235M4	Memo to TPO: Rsits Geochronologic	c/Isotopic	0		30SEP98				Memo to TPO: Reits G 305EP99	eochronologic/isotopi	c Analy	
SPC	23G50	Prep Report Describing Spatiotempo	oral Distr	240	01OCT98*	15SEP99		}	01OCT98-	Prep Report Describin	g Spatlotemporal Dist SSEP99		
SPC	23G30	Sample Fracture Fillings from Solita	rio	251	01OCT98*	30SEP99		Į	01OCT98*	Sample Fracture Fillin	bs from Sottario Cany (305EP99	on	
SPC	23640	Complete Numerical Age and Isotop		251	01OCT98*	30SEP99			01OCT98*	Complete Numerical /	ge and isotopic Analy 305EP99	219	
SPC	233M3/	Spatiotemporal Distribution of Perco	lation	0		15SEP99*	• • • • •				Spatiotemporal Distrib	ution of Percolation"	
0124		rologic Contratory Testing											
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SPH	1224	Inspect Air-K Testing Equip for Req	Maint	64	01JUL97*	30SEP97		inspi Exist	ct Air-K Testing Equip 30SEP9701.JJL97*	for Req Maint Needs	(	{	
SPI	1225	Prepare Listing of Req Maint & Calib	vration	64	01JUL97*	30SEP97		Prep	re Listing of Req Mair 30SEP9701JUL97*	t & Cellbration Needs		(	
	1224M4	Memo to TPO: Status Air-Permeabil	ity Tstg	0		30SEP97		} .	Memo to TPO: Status \$305EP97	Air-Permeability Tstg	Equip		
SPr SPr	1264	Conduct Air-K Testing in USW SD-1	1	63	15JAN99*	15APR99			15,	Conduct Ak-K	testing in USW SD-11		
S SPT	1274	Prepare Data Pkg Air-K Testing USV	N SD-11	63	16APR99*	15JUL99				Prepire D 16APR99	ita Pkg Air-K Testing	USW 8D-11	[
	1234	Conduct Air-K Testing in USVV SD-1	3	63	26APR99*	23JUL99		}		Conduct 26APR99*EEA1923J	Air-K Testing in USW : UL99	SD-13	
SDH	12041414	Memo to TPO: Air Permeability Istg	USW	0		14MAY99		1		Memo te 14MAY	TPO: Air Permeabliit 199°	Tsig USW SD-11	
SPH	1284	Prenare memo Air Dermeahilithe Tele		0	48 11 11 000	15JUL99*	ĺ	1		₩en • 15.	10 10 TPO: SD11 Air Pi JUL99*	ermeability Data to RP	9
SPH	1244	Prepare Data Pkg Aic K Tasting LISI	N 6D 12	P0 	16JUL99*	1500199		1		16.JUL 99 211	pere memo Air Permea 2150C799	billity Tsig USW SD-11	
SPH	1234MA	Memo to TPO: Air-Permashility Tate	10 1191A/	04 	20JUL99"	2500199				26.KJL99'bin	pere Deta Pkg Air-K T 4250CT99	eting USW SD-13	
SPH	1284M4	Memo to TPO: Air Permeability Tata				2540699		1 I		↓	ipmo to TPO; Air-Perm 25AUG99*	eebility Tatg in USW S	0-13
SPH	1294M4	Memo to TPO: SD13 Air Permeshili	v Data to			2500199		l			150CT99"	ermesbility Tstg USW S	jo-11
			, ouid io			200133	I	<b>I</b>		ÝYY	\$250CT99*	Air Permesbility Data	IO RPC
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'rhject Finish Jola Date	•	01MAR92 Building Bar				Yucc	a۸	lou	ntain Proie	ct			
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Activity a	Activity	:Orig :	Early	, Early ;	F TT	<u>Y97</u>	• •••• • <b>FY98</b> • • • •	FY99	• FY00;	State FY01 A state	THE STUDY OF THE STUDY
SPH254	Prepare Memo Air Permeability Tstg USW	61	260CT99	25JAN00	in and a	iridadina ka A			Prepare Memo Air P	methodist to the second	\$D-13
SPH254M4	Memo to TPO: Air Permeability Tstg USW	0		25JAN00		1		260CTS	911111225JAN00 Memo to TPO:	 Air Permeability Tstg.	USW SD-13
uleksikkia	IFUL VEROIS (ICHIE) ETCHIELZ LIGACIASUT	23.15									<u>├</u>
SPH36P10	Conduct Predictive Analysis	65	01JUL97*	01OCT97		Cond	uct Predictive Analysi 010CT9701.8.8.97*				
SPH36P30	Collect and Analyze Data SD-11	251	01OCT97*	30SEP98	•	ОСТЯ	Collect and Analyze D	ata 50-11 3055208			{ }
SPH36P20	Prepare Predictive Analysis Memo	22	02OCT97	03NOV97		POCTO	Prepare Predictive An	alysis Memo			
SPH375M4	Memo to TPO: Results of Predictive Analysis	Ō		03NOV97	Ì		Memo to TPO: Resu	its of Predictive Analy	ale		
SPH36P40	Prep/Sub Data Pkg APR 98 - Jul 98	128	01APR98*	30SEP98			Prep/Sub C	eta Phy APR 98 - Jul : 10055008	8		]
SPH36P50	Prep Memo Presenting Data/Rsits	128	01APR98*	30SEP98			Prep Memo	Presenting Data/Relt	Apr38-Aug98		
SPH36P60	Prep/Sub Data Pkg Aug 98 - Jul 99	293	03AUG98	30SEP99		1		Diserso Disub Data Pkg Aug 1	24 Jul - 2		
SPH376M4	Memo to TPO: Data Pkg Apr98-Jut98 to	0		30SEP98	[	[	<b>U</b> 3A0036 <b>1</b>	Memo to TPO: Data P	g Apr#8-Jul#8 to RPC	тра	
SPH377M4	Memo to TPO: Data/Rsits Conducted Apr-Aug	0		30SEP98	ł	l		Memo to TPO: Data/R	the Conducted Apr-A	g 95	
SPH36P70	Prepare Draft Report on Borehole Analysis	251	010CT98*	30SEP99		1		Prepare Draft Report	on Borehole Analysia		
SPH380M4	Memo to TPO: Prov Analy Pred vs Actuals,	Ō		01APR99*	· <b></b>		0100198	Memo to T	PO: Prov Analy Pred v	Actuals, SD-11	
SPH382M4	Memo to TPO: Prov Analy Pred vs Actuals,	0		01JUL99*				O1APR99	 o to TPO: Prov Ansly	red vs Actuals, SD-13	
SPH36P80	Prep/Sub Memo to TPO on Draft Report	64	01JUL99*	30SEP99				01J Prep	UL99° ¦Sub Memo to TPO on	Dreft Report	
SPH378M4	Memo to TPO: Data Pkg Aug98-Jul99 to	0		30SEP99		[	{ ·	01JUL99*	(305EP99 Momo lo TPO: Data P	g Augst-Juiss to RPG	anne
SPH379M4	Memo to TPO: Submit of Draft Interpretive	0	<b> </b>	30SEP99	ł	1	1		♦ 30SEP99 Momo to TPO: Subml	i of Draft interpretive f	Report
UCKSEPLIN	LIF PATHOLIUDIAUUSATIOSSILTOPOLICO	HENR			<b></b>				• 30SEP99		· • • • • • • • • • • • • • • • • • • •
SPH35Q10	Conduct Predictive Analysis of Cross Drift	87	01JUL97*	03NOV97	1	Conc	j fuct Predictive Analysi JERO2N(0)/9701 # # 97*	a of Cross Drift	]		
SPH35Q30	Prep/Sub Letter to TPO on Predictive Analysis	23	010CT97*	03NOV97		00797	Prep/Sub Letter to TP	on Predictive Analy	415		
SPH35Q50	Prep/Sub Data Pkg Ambient Condx/Prop	251	010CT97*	30SEP98		OCTO	Prep/Sub Data Pkg As	bient Condx/Prop Oc	97-Juiss	[	
SPH35Q20	AnalyzeAmbient Moisture Conditions Cross	502	01OCT97*	30SEP99			AnalyzeAmblent Hols	ure Conditions Cross	Drift		
SPH351M4	Memo to TPO: Analys Condx/Properties	0	, <b> </b>	03NOV97	¦ '		Wemo to TPO: Anal	vs Condx/Properties (	9305EP99 Cross Drift		
SPH35Q40	Prepare Draft Report on Cross Drift	241	01JUN98*	14MAY99			Prepar	Draft Report on Cros	Drift		
SPH352M4	Memo to TPO:Data Pkg Condx/Properties to	ō	, <b>├──</b> ───	30SEP98*	;		01JUN98*Hinis	Memo to TPO:Data P	93 kg Condz/Properties to	RPC/TOB	
SPH353M4	Memo to TPO: Rsits Analysis & Interp	0		30SEP98*				• 30SEP98* Memo to TPO: Rsits /	Analysis & Intern Oct9	7-Aug98	
SPH35Q60	Prep/Sub Data Pkg Ambient Condx/Prop	251	0100798	30SEP00	ŀ			30SEP98* Pren/Sub Data Pkn A	mblent Condx/Pron Or		
					<b>]</b>	.	₹010CT96	IL MARILE RUT DI	POSEP99		!!
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Activity	Activity Astaria	Orlg	Earty	Early	FY	<u> </u>	FY98	FY99	FY00	FY01.	FY02 Materia
STR DISS	Description 11	{Dur,!	Start "	Finish					entre non contrat set primerio en el	ant chi test territi territi dan and	nicht name bis ist in mit
SPH35Q70	Prep/Sub Letter to TPO on Draft Report	32	01APR99*	14MAY99				01APR99 214MAY9		eport .	
SPH356M4	Memo to TPO: Submit of Draft Interpertive	0		14MAY99				Memo to 14MAY	TPO: Submit of Draft)	nterpertive Report	
SPH354M4	Memo to TPO:Data Pkg Condx/Properties to	0		30SEP99*					Memo to TPO:Data Pk 30SEP99*	Condx/Properties to RP	СЛОВ
SPH355M4	Memo to TPO: Rsits Analysis & Interp	0		30SEP99*					Memo to TPO: Rsits A	nalysis & Intern Oct98 Au	ç99
Ulekkyy 17	BRANGROMINADIIIITARIBVEROGINIMITERI	lions).				h					
SPH35G10	Conduct Air-K/Hydrochem Tstg Solitario	85	12JAN99*	12MAY99		{ {	12.	Conduct Alr-K/I AN99 <b>7535661</b> 2MAY9	ydrochem Tsig Sollta 9	to Canyon	
SPH35GM	Memo to TPO: Start of Solitario Canyon Fit	0		15JAN99				Memo to TPO: 5	tart of Solitario Canyo	n Fit Tstg	
SPH35G20	Prepare Memo on Air-K/Hydrochem Testing	77	13MAY99	31AUG99	5				Memo on Air-K/Hydro	hem Testing	
SPH35KM4	Memo to TPO: Ratts of Tatg in Solitario	0		31AUG99	5			X	emo to TPO; Rsits of 1	stg in Soliterio Cenyon	
UCERSERVE	BAUSTOPIC SHIVE TO THE MICHINE		1949 (U					Y`	<u></u>		
SPH37A20	Conduct Chemical and Isotopic Char of Pore	240	01OCT98	15SEP99			0100785	Conduct Chemical and	d Isotopic Char of Port	Water	
SPH37A30	Prepare Report on UZ Pore Waters	240	010CT98*	15SEP99			0100798	Prepare Report on UZ	Pore Waters		
SPH37AM3	Unsaturated Zone Pore Waters	0		15SEP99			0100126		Unsaturated Zone Port	Waters	
DIGS SASSIE	ELEAWARI EDGALDE MAGES OF THE MESSAGE AND A					· <b> </b>		· · · ·	19961-34		
SPC34B	Compile Rsts of data Compilation and Hydro	97	19MAY97	030CT97	רי	Compile	Reits of data Compile	tion and Hydro Mdig			
SPC34A	Assemble and Evaluate Existing Ground	139	19MAY97	05DEC97	7	Assemb	e and Evaluate Existi	g Ground Water Che	Ļ	[ [	
SPC34C	Obtain/Analyze New Water samples fm Well	139	19MAY97	05DEC97	7	Obtain	natyze New Water sar	ples fm Wett WT-17			
SPC34BM4	Memo to TPO: Data Pkg of Existing S7 Chem			030CT97		142024	AlloSDEC9719MAY9 Memo to TPO: Deta P	r tg of Existing SZ Che	n Data		
SPC34CM4	Memo to TPO: Chem/leo Anive on Wir			0505097	;	1	030CT97 Memo to TPO: Ch	i miliso Aniys on Wir S	semples WT-17		
SPC34430	Broque and Assemble Sampling Equipment	70	OF LANOR	274000		•]}	OSDEC97 Procure and Ass	emble Sempling Equ	lbment		
SPC34A30			294 000	2700130		05J	N98"EEEE27APR98	erched Wite Encounte			
SPC34A10	Sample Perched Wir Encountered	220	2049490	25MAR9:	5		28APR98-217	25MAR99			
SPC34A2U	Sum ion and isotopic Data Collected	132	26MAR99	30SEP99	<u>'</u>			26MAR99-LELELELE	230SEP99		
SPC344M4	Memo to TPO: Ion and Isotopic FY99 Data	0	1	30SEP99	2		<b></b>		♦ 30SEP99	d Isotopic FY99 Data 3D1	1/13
UC33434	EGSPerched Water StsziHydramstor				ř.	Manha					j
SPH228	Monitor WT-24 Bh During Constr for Perched	85	02JUN97	30SEP97	<u>_</u>	P-FAV	305EP9702JUN97*	neur for reiched vritr			
SPH229	Cond Bh Hydraulic Tsts of Observed Perched	85	02JUN97	30SEP97	<u>_</u>	Cond E	in Hydraulic Tata of O 30SEP9702JUN97*	pserved Perched Wtr			
SPH228M4	Memo to TPO:Rsits of Perched-Water	0		30SEP97	7		Memo to TPO:Reits o \$305EP97	Perched-Water Hydr	rsulic Tst		
SPH228A	Monitor SD-6 Bh During Constr for Perched	165	03NOV97	30JUN98	8	рэмоле	Monitor SD-6 Bh Du	uling Constr for Perch	ndd Wtr		
SPH229A	Cond Bh Hydraulic Tsts of Observed Perched	165	03NOV97	30JUN98	8	DONOVA	Cond Bh Hydraulle	Tata of Observed Per	ched Wir		ļ
Project Blart	12MAR97 ANTHERETALTER Early Bar ECRO	<u> </u>					1	·····	Sheet 13 of 15	- <u>I</u>	
Project Finish Data Dolo	STRUMETZ (BRITTER BRITTER B			Yuc	ca I	Mour	ntain Proje	ect	•		
Run Dele	83.64.177			EC	CRE	3 - R	evision 15				
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15	Activity	1999年1月1日	Hista Activity Witte	12 Barlinger	.Oria :	-BEarty	Early &	. F	Y97	. mina EY98 Maint	FY99 year	····FY00 ·····	Table FY01 Louis	HARA- FY02MDA	A.1.
į,	》 ND N	影響作業	Description	out the	Dur	Start	Finish	ШÏ	ШЦ				C. C		<u>tiq</u>
	SPH22VM4	Memo to T	PO: Predicted Depth to P	erched	0	···	08JAN98*			Memo to TPO: F	redicted Depth to Per	hed Wir SD11	n der stein von die die geste im die sie 1	n an	
	SPH22YM4	Memo to T	PO: Predicted Depth to P	erched	0	<u>-</u>	01SEP98*			€06UALD0	emo to TPO: Predicted	Depth to Perched Wi	SD13		
	SPH22A40	Conduct Sa	Z Hydraulic Testing USW	SD-11	12	15DEC98*	31DEC98	1			Conduct SZ Hydr	ulic Testing USW SD-	11		
	SPH22A80	Prep Data	Pkg SZ Hydraulic Tstg US	SW SD-11	60	04JAN99*	30MAR99			1506	Prep Data Pkg S	Z Hydraulic Tatg USW	SD-11	}	
	SPH22TM4	Memo to T	PO: Rslts Hydraulic Testi	ng USW	0		29JAN99*			C4J	Memo to TPO:	Rsits Hydraulic Testir	9 USW 8D-11		
	SPH22A20	Conduct Pe	erched Water Testing US	W SD-13	11	12FEB99*	01MAR99				Conduct Perc	hed Water Testing US	W 5D-13		
	SPH22A50	Prep Data	Pkg Perched Wtr Tstg US	W SD-13	64	02MAR99	28MAY99	1		- 1	FEB99" OIMAR99 Frep Data Pi	g Perched Wir Tsig U:	\$W 8D-13		
	SPH22A60	Prep Memo	o Perched Water Tstg US	W SD-13	86	02MAR99	30JUN99		[ 1	a	2MAR99'DEC. Prop Memo I	p9 Perched Water Tsig US	W 8D-13		
	SPH22A30	Conduct S	Z Hydraulic Testing USW	SD-13	16	25MAR99	15APR99	1		c	2MAR99*165E1930JU Conduct Si	N99 C Hydraulic Testing US	W 8D-13		
	SPH22HM4	Memo to T	PO: Rsits Perched Wtr H	ydra Tstg	0		30MAR99				25MAR99"#15APR99 Memo to T	PO: Raits Perched Wir	Hydra Tstg		
ŀ,	SPH22UM4	Memo to T	PO: USW SD-11 Data Pk	g to RPC	0		30MAR99				Memo to T	I PO: USW SD-11 Data F	kg to RPC	}- <u></u>	
	SPH22A70	Prep Data	Pkg SZ Hydraulic Tstg US	SW SD-13	63	16APR99*	15JUL99				◆ 30MAR99 Prep Data	Pkg SZ Hydraulic Tat	USW SD-13		
	SPH22JM4	Memo to T	PO: Data Pkg Perched W	ater Tstg	0		28MAY99	1			16APR99"15.1	1199 In TPO: Data Pkg Perci	ned Water Tsig		
1	SPH22OM	Memo to T	PO: Rsits Hydraulic Testi	ng USW	0		28MAY99		, ,		◆28MA ₩emo (	799" • TPO: Raita Hydrauli	c Testing USW SD-13		
	SPH22MM	Memo to T	PO: Rsits of Bh Perched	Wir Tstg	ō	<u>-</u>	30JUN99*	}			◆28MA` ₩em	y99° o to TPO: Reits of Bh f	erched Wir Tatg		
	SPH22PM4	Memo to T	PO: USW SD-13 Data Pk	g to RPC	0		30JUL99*					199" no 10 TPO: USW \$D-1:	Data Pkg to RPC		
							[		·			VUL99'			
•	HERE	es and	ZecuanualiyorMiner	Alogyaoric									}	}	
	SP320200	Prediction	of Hazard-Mineral In SD-1	1	23	01DEC97*	02JAN98	]	01050	Prediction of Haza	rd-Mineral in SD-11		}		
	SP3202M4	Rpt: Comp	I Hazard-Mineral Pred in S	SD-11	0		02JAN98			Rpt: Compl Hazi	rd-Minersi Pred in SD	11			{
	SP320300	Prediction	of Hazard-Mineral in SD-1	13	22	03AUG98	01SEP98			Pre OJALIG98*ED	diction of Hezard-Min	rat in SD-13			
	SP3203M4	Rpt: Comp	Hazard-Mineral Pred in S	SD-13	0		01SEP98	[		P	pt: Compl Hazard-Min	ral Pred in SD-13	Ì		
	13,8,244,013	Ber Anely		944 J			-144 L. SV			T			·	ł	
	SP32S100	Analysis of	Hazardous Mineral fm E	SF	523	02JUN97*	22JUN99.	1	Analys	s of Hazandous Miner	1 frm ESF		ļ .		ļ
	SP32SAM4	Predictive I	Report on Hazard Mineral	Distr	0		19DEC97			Predictive Repor	on Hazard Mineral Di	19902JUN97*			
• 7	SP32SBM4	Prelim Rep	ort on Hazard Mineral Dis	str at YM	0		30JUL98*			◆19DEC97* Pre	im Report on Hazard	 Hineral Distrat YM	4		
	SP32SCM4	Final Repo	rt on Hazard Mineral Dist	r at YM	0		30JUN99*			●30	UUL96* ; Finel	Report on Hazard Min	erel Distr at YM		
	URREAME	Elevipolito	ION WORLDWARE INTELLE	ESWIDER	1.114	-(23) (A)	1410-21-420				<b>\$30</b> J	UN99.			
	SP321K10	Petrology o	of Flow Paths in E-W Drift	5	587	02JUN97*	22SEP99		Petroto	gy of Flow Paths in E-	W Drifts				
ojeci	l Viert	17MAR17	Constanting Safe Bar	ECRB		L		1			31871914 maane sha 18 183	225EP9902JUN97		l	<u></u>
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m De	Ha .	43.88.97										ſ		1	
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Ĩ	SP321RM4	Fast-Path Feature Mineral Input to L III	Pred 0		01DEC97*	di ini i		Fast-Path Feature	Mineral Input to L HI P	red Rp			
	SP321SM4	Progress Report on Characterization of	r 0		30SEP98*	•	1	<b>●</b> 01DEC97*	Progress Report on C	nerecterization of Fast	Path		
	SP321TM4	Final Report on Characterization of Fas	st-Path 0	; <b> </b>	30SEP99*				30SEP98*	 Final Report on Chara	sterization of Fast-Pet	•	
	11:4:4:4:441:	araphanananana an					·]			305EP99*			- -
	SP331500	Distr of CL-36 & Halides in E-W Drift	587	02JUN97*	22SEP99		Distr e	CL-38 & Halldes in E-	W Drift				1
	SP331AM4	Pred Distr of CL-36 & Chloride Porewa	iter 0		01DEC97*			Fred Distr of CL-J	& Chloride Porewate	22SEP9902JUN97* Concent			
	SP331BM4	Prog Rpt on Distr CL-36 & Chl Porwtr	0		30SEP98*			◆01DEC97*	Prog Rpt on Distr CL-	5 & Chi Porwir Conce	ntr		
	SP331CM4	Summ Rpt on Distr CL-36 & Chl Porwtr	r 0	·	30SEP99*		1		305EP96*	Summ Rpt on Distr CL	-38 & Chi Porwir Cond	entr	
	11:2:4:40:21:	elek esterniderandallimudarestade	PRED PRIM							• 30SEP99*		<b></b>	╌┼╼
	SP33C900	Drift/Drift Borehole Predictions	84	010CT97*	30JAN98	0	OCT97	Drift/Drift Borehole Pr	dictions	(			
	SP33S8M4	LtrRpt: Progr Test Site Char & Trcr Flow	w 0	11 A.	15OCT97*			LtrRpt: Progr Test Si 150CT97*	e Cher & Tror Flow C	กถิกท			
	SP33T8M4	LtrRpt: Progr Lab Measurmnt of Core &	<u>s</u> 0		15MAY98				rogr Lab Measurmnt	of Core & Semples			ł
	SP33S5M4	Rpt: Final on Fract Flow, Matr/ Interact	8 0		03AUG98		1	Rpt	Final on Fract Flow,	Matri Interact & Imbib			
	SP33T5M4	Rpt: Rslts & Eval of Drift/Drift Bh Hydro	o Intera 0	· · · ·	14AUG98			Re	t: Reits & Eval of Drift	Orift Bh Hydro Intera			
	12418124	Est. Minicial Elizabet Angle Elizabet	A COLUMN	STEE				······································	10030				
	SP34K100	Microbial Analysis	267	02JUN97*	17JUN98		Microb	at Analysis 79000000000000000000000000000000000000	9802JUN97*				
	SP34K1M4	Rpt: Predictive Rpt Microbial Analysis	0		01DEC97*			Rpt: Predictive Rp ©01DEC97*	Microbial Analysia				
	11831551F74M		Sectority of				[						+
	5P355A70	Unit Solitario Canyon Borehole	10	20MAY98	03JUN98			Drift Sol 20MAY95103JUN9	tarlo Canyon Boreho 8	fe 			
	SP3VB15	Review Draft Predictive SD-11 Report	<u>alenolenena</u>										+
	SP3VB25	Review Draft Pradictive SD-11 Report		OSPED98	02MAR98		c	OFED96 02MAR98	redicuve SD-11 Repo				
	SP3VB35	Review Drag Anatoria & Management		0500198	02NOV98		1	0500795	Moview Draft Predicti MozNOV98	ve SD-13 Report			
	SPTVBAS	Perden Drat Analysis & Measurement	23	01JUN99	01JUL99		1		Review 01JUN99501JU	d Draft Analysis & Mea 169	urement SD-11Rpt		
	under viewarde	Contraction of the second se	SD-13 21	01SEP99	30SEP99				015EP991	liview Draft Analysis & 305EP99	Messurement SD-13	tpt	
·	SPB2A25	Analyze Geophysical Logs from SD-11	477	40444 207	28 14 109		Anetro						+
	SP382C15	Conduct Neutron Log Analysia		19/14/19/	20141498			CONTRACT LOUIS IN	m 80-11 (97				
	SPB2C10	Phase I: Pro Tunzeline Manifesia		01JUL9/-	3000197			Anen 1900CT9701JUL97*	***	1			
	SP3R2DMA	Pot: Statue of Neutron Los Asstudio	105	01SEP97*	30JAN98	015	EP97-	1996 I: Pre-Tunneling	Monitoring		1		
ł		The Status of Heution Log Analysis	0	<u> </u>	30OCT97		l	Tipl: Status of Neutre \$300CT97	n Log Analysis				
Proje	et Start	12MARty?	<u></u>							Sheet 18 of 18			
Deta ( Run I	Cate Date	19MAY07 AMALEMENT AND A CONTRACT ACTIVITY			Yucc	a N	lour	ntain Proje	ct				
	C Prinevers System				EC	RB	- R	evision 15		.			
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Activity a	Description	Orig Dur,	T Early Start	Early, Finish	ţ,F	¥97 	FY98		FY00;;;	TRAN FY01	A FY025501	NT-1
SP3B2B10	Develop Petrophysical Predictions for SD-11	14	18DEC97*	08JAN98		18DE	Develop Petroph C97*B08JAN98	sical Predictions for :	5D-11	· .		
SPB2A2M4	Geophysical Logging Report for SD-11	0		26JAN98			Geophysicsi L \$26JAN98	ogging Report for SD-	t			
SP3B2CM4	Rpt: Results of Pre-Tunneling Monitoring	0		30JAN98			Rpt: Results o \$30JAN95	Pre-Tunneling Monit	oring			
SPB2C25	Phase II: Tunnel Monitoring	149	02FEB98*	01SEP98	1	0	Phase It: Tunn 2-E898*ABC-TURNED	) SEP98				
SP3B2B20	Develop Petrophysical Predictions for SD-13	12	17AUG98	01SEP98			17AUG98*1	evelop Petrophysical F )) SEP98	edictions for SD-13			l
SP3B2FM4	Rpt: Results of Tunnel Monitoring	0		01SEP98			*	Results of Tunnet	Monitoring			
SPB2C40	Phase III: Drift/Drift Tests	178	010CT98*	15JUN99			0100798	Phase III: Drift/Drift T	nsts 199			[
SPB2B25	Analyze Geophysical Logs from SD-13	89	22FEB99*	25JUN99		1		Anatyze Geo 22FEB99*1116562125JU	physical Logs from SD 1999	13		
SP3B2GM4	Rpt: Results of Drift/Drift Tests	0		15JUN99	]			Řpt:   ◆15,R	tesuits of Drift/Drift Te JN99	12		ĺ
SPB2B2M4	Geophysical Logging Report for SD-13	0		25JUN99	]			Geor ♦25J	hysical Logging Repo UN99	t for SD-13		
SPB2A3M4	Submittel of Records Packages for SD-11 &	0	· ·	01JUL99*	$\Box$		<u> </u>	Subi \$01J	nittat of Records Packs	ges for SD-11 & SD-13		

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