0038

CYPRUS PLATEAU MINING CORPORATION
A Cyprus Amax Company

Willow Creek Mine
847 Northwest Highway 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4780

July 13, 1998

ACT/007/038 #2
Pam, Joe

Utah Coal Regulatory Program
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

Attention: Pamela Grubaugh-Littig

RE: Barn Canyon Ventilation Shaft and Emergency Escape Hoist, Permit Amendment, Cyprus Plateau Mining Corporation, Willow Creek Mine, ACT/007/038-98B, File #2, Carbon County, Utah

Dear Ms. Grubaugh-Littig:

The attached submittal is Cyprus Plateau Mining Corporation's (CPMC) response to the Division's Technical Analysis for the Barn Canyon shaft permit amendment dated April 2, 1998. This submittal includes a revised plan as well as responses to the Technical Analysis. The revised plan addresses the primary road issue along with CPMC's decision to not install a ventilation fan, but instead, install an emergency escape hoist.

To aid in reviewing this application, a table is attached listing the Technical Analysis items and where the responses can be found in the submittal. Also attached are the soil survey field sheets requested by Mr. Bob Davidson. CPMC's consultant (Hansen, Allen & Luce) did not provide a means for these to be incorporated into the MRP because they felt that they did not have to be included in the MRP. If this interpretation is incorrect, please identify and they will be included.

The submittal is provided in both the redline/strike-out and clean copy version for the Division's review and ultimate inclusion into the MRP, if the Divisions finds the permit modification adequate and complete. To assist the Division with incorporating the permit modification into the Willow Creek MRP, the C2 forms provide instructions on inserting the non-redline/strikeout text, exhibits, and other pertinent information.

CPMC greatly appreciates the Division's patience by allowing us ample time to address the deficiencies and incorporate CPMC's new proposed facilities in Barn Canyon. Additionally, the Division should be commended on their timely review of the initial submittal and identification of germane permit deficiencies.

If the Division has any questions or needs additional information, please do not hesitate to contact me at (435) 472-4741. Additionally, I provided the Price Field Office with one of the five copies for their records, therefore, the Salt Lake Office will have four of the five copies in their possession.

Sincerely,

Johnny Pappas
Sr. Environmental Engineer

Enclosures

cc: Pete Hess - DOGM w/enclosures

File: WCENV 2.5.2.12.5.6
Chrono: JP980702.LTR

RECEIVED
JUL 14 1998
DIVISION OF OIL
GAS & MINING PRICE UTAH

Form DOGM - C1 (Last Revised June 26, 1998) File Folder # 3

APPLICATION FOR PERMIT PROCESSING

Permit Change ☒	New Permit ☐	Renewal ☐	Transfer ☐	Exploration ☐	Bond Release ☐	Permit Number: ACT/007/038

Title of Proposal:

Addition of Barn Canyon Ventilation Shaft Facility

Mine: WILLOW CREEK

Permittee: CYPRUS PLATEAU

Description, include reason for application and timing required to implement: Changing underground conditions have necessitated the addition of a ventilation shaft in Barn Canyon.

Instructions: *If you answer yes to any of the first 8 questions (gray), submit the application to the Salt Lake Office. Otherwise, you may submit it to an inspector.*

☐ Yes	☒ No	1. Change in the size of the Permit Area? 0 acres Disturbed Area? 0.46 acres ☒ increase ☐ decrease.
☐ Yes	☒ No	2. Is the application submitted as a result of a Division Order? DO #
☐ Yes	☒ No	3. Does application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes	☒ No	4. Does application include operations in hydrologic basins other than as currently approved?
☐ Yes	☒ No	5. Does application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☒ No	6. Does the application require or include public notice/publication?
☐ Yes	☒ No	7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☒ No	8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes	☒ No	9. Is the application submitted as a result of a Violation? NOV #
☐ Yes	☒ No	10. Is the application submitted as a result of other laws or regulations or policies? Explain:
☐ Yes	☒ No	11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes	☒ No	12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2?)
☒ Yes	☐ No	13. Does the application require or include collection and reporting of any baseline information?
☒ Yes	☐ No	14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☒ Yes	☐ No	15. Does application require or include soil removal, storage or placement?
☒ Yes	☐ No	16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☒ Yes	☐ No	17. Does the application require or include construction, modification, or removal of surface facilities?
☒ Yes	☐ No	18. Does the application require or include water monitoring, sediment or drainage control measures?
☒ Yes	☐ No	19. Does the application require or include certified designs, maps, or calculations?
☐ Yes	☒ No	20. Does the application require or include subsidence control or monitoring?
☒ Yes	☐ No	21. Have reclamation costs for bonding been provided for?
☐ Yes	☒ No	22. Does application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes	☒ No	23. Does the application affect permits issued by other agencies or permits issued to other entities?

☒ **Attach 5 complete copies of the application.**

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein. (R645-301-123)

Johnny Rigby - Johnny Rigby - Sr. Env. Engineer 7/13/98
Signed - Name - Position - Date

Subscribed and sworn to before me this 13 day of July 19 98.

Jackie D. Boggin
Notary Public

My Commission Expires: 3-15 2001
Attest: STATE OF UT
COUNTY OF CARBON

Notary Public
JACKIE D. BOGGIN
104 Helper Drive
Helper, Utah 84526
My Commission Expires
March 15, 2001
State of Utah

Received by Oil, Gas & Mining

ASSIGNED TRACKING NUMBER

Application for Permit Processing
Detailed Schedule of Changes to the MRP

Title of Application:	Permit Number: ACT/007/038
Addition of Barn Canyon Ventilation Shaft Facility	Mine: WILLOW CREEK
	Permittee: CYPRUS PLATEAU

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. **Include page, section and drawing numbers as part of the description.**

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Table of Contents paes TOC-ii & TOC-v, in Volumes 1, 2 & 3
☐ ADD	☒ REPLACE	☐ REMOVE	List of Tables page LOT-i in Volumes 1, 2 & 3
☐ ADD	☒ REPLACE	☐ REMOVE	List of Figures page LOF-i in Volumes 1, 2 & 3
☐ ADD	☒ REPLACE	☐ REMOVE	List if Maps page LOM-ii, in Volumes 1, 2 & 3
☐ ADD	☒ REPLACE	☐ REMOVE	List of Exhibits page LOE-i in Volumes 1, 2 & 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 1.0-4 & 1.0-5 in Section 1.0, Volume 1
☐ ADD	☒ REPLACE	☐ REMOVE	Page 3.1-6a in Section 3.1, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Page 3.1-6b to Section 3.1, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Figure 3.1-1 after page 3.1-6b in Section 3.1, Volume 2
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 3.1-17 & 3.1-17a in Section 3.1, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Page 3.1-17b to Section 3.1, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Table 3.1-6 (2 pages) after page 3.1-17b in Section 3.1, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Pages 3.1-17e & 3.1-17f after Table 3.1-6 in Section 3.1, Volume 2
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 3.2-4 & 3.2-7 in Section 3.2, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Page 3.2-7a after page 3.2-7 in Section 3.2, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Figure 3.2-1 after page 3.2-7a in Section 3.2, Volume 2
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 3.2-19a & 3.2-27b in Section 3.2, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Page 3.2-27b1 after page 3.2-27b in Section 3.2, Volume 2
☐ ADD	☒ REPLACE	☐ REMOVE	Page 3.3-23 in Section 3.3, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Page 3.3-23a to Section 3.3, Volume 2
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 3.4-3, 3.4-5a & 3.4-12 in Section 3.4, Volume2
☐ ADD	☒ REPLACE	☐ REMOVE	Page 3.7-97 in Section 3.7, Volume 2
☒ ADD	☐ REPLACE	☐ REMOVE	Page 3.7-97a to Section 3.7, in Volume 2

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

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			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Page 3.7-98 in Section 3.7, Volume 2
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 4.2-1, 4.2-3, 4.2-3a, 4.2-3b, 4.2-4, 4.2-4b & 4.2-5 in Section 4.2, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 4.3-1, 4.3-4 in Section 4.3, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.3-4a to Section 4.3, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.3-13a to Section 4.3, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 4.3-15 in Section 4.3, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.3-15a to Section 4.3, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 4.5-3, 4.5-4, & 4.5-6 in Section 4.5, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.5-6a in Section 4.5, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 4.5-7, 4.5-9 & 4.5-10 in Section 4.5, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.5-10a to Section 4.5, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 4.5-27, 4.5-27a, 4.5-28, 4.5-29 and 4.5-31 in Section 4.5, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.5-31a to Section 4.5, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 4.5-37, 4.5-47, 4.5-47a, 4.5-48, 4.5-48a, 4.5-49, 4.5-49a, 4.5-53, 4.5-54, 4.5-55, and 4.5-55a in Section 4.5, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 4.7-10 in Section 4.7, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.7-10a to Section 4.7, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 4.7-20 in Section 4.7, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 4.7-20a to Section 4.7, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 4.7-22 & 4.7-29 in Section 4.7, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 5.2-2 in Section 5.2, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 5.3-4 in Section 5.3, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 5.4-2 in Section 5.4, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 5.4-2a to Section 5.4, Volume 3

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☐ ADD	☒ REPLACE	☐ REMOVE	Pages 5.4-3, 5.4-7,& 5.4-8 in Section 5.4, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 5.4-8a to Section 5.4, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Pages 5.4-10 & 5.4-11 in Section 5.4, Volume 3
☒ ADD	☐ REPLACE	☐ REMOVE	Page 5.4-11a to Section 5.4, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 5.4-12 to Section 5.4, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page 5.5-1 in Section 5.5, Volume 3
☒ADD	☐ REPLACE	☐ REMOVE	Page 5.5-1a to Section 5.5, Volume 3
☐ ADD	☒ REPLACE	☐ REMOVE	Add cover page for Exhibit 1 in Volume 8
☒ ADD	☐ REPLACE	☐ REMOVE	Add cover page titled "Letter to BLM Requesting Input on Leaving Barn Canyon Shaft Access Road for Post Mine Land Use, and letter to BLM to the end of Exhibit 1, Volume 8
☒ ADD	☐ REPLACE	☐ REMOVE	Add page titled "Notice" (located at beginning of Exhibit 13 revisions) behind the first blue divider sheet of Exhibit 13 dated October 1997, Volume 1 of 3
☐ ADD	☒ REPLACE	☐ REMOVE	Page EX 13-iii in Volume 1 of 3 of the October 1997 revision
☐ ADD	☒ REPLACE	☐ REMOVE	Page EX-13-6, EX 13-9, EX 13-29, EX 13-34, EX 13-37, EX 13-51, EX 13-64 & EX 13-65 in Volume 1 of 3 of the October 1997 revision
☒ ADD	☐ REPLACE	☐ REMOVE	Appendix H-5, Barn Canyon Shaft Hydrology Calculations to the end of Volume 3 of 3 of the October 1997 revision to Exhibit 13
☒ ADD	☐ REPLACE	☐ REMOVE	Exhibit 18-1, Reclamation Information to the end of Volume 12 – Contains Barn Canyon Shaft Plug Information & Barn Canyon Shaft Facility Cut and Fill Volume Calculations
☐ ADD	☒ REPLACE	☐ REMOVE	Pages Exh 17-1, Exh 17-2 & Exh 17-3 in Exhibit 17, Volume 12
☐ ADD	☐ REPLACE	☒ REMOVE	Page Exh 17-4 – Text shifted to page Exh 17-3
☐ ADD	☒ REPLACE	☐ REMOVE	Replace everything after new page Exh 17-3 (old page Exh 17-4 has been removed), in Exhibit 17 with the contents starting at the page with the title "Willow Creek Mine, Bond Reclamation Cost Estimate, Cost Estimate Summary Sheet"
☐ ADD	☒ REPLACE	☐ REMOVE	The first page in Volume 15 with the revised Table of Contents page

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

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			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☒ ADD	☐ REPLACE	☐ REMOVE	The Barn Canyon Shaft Facility Cultural/Historical Survey Review - Correspondence With SHPO to the end of Volume 15
☐ ADD	☒ REPLACE	☐ REMOVE	Map 18A, Mine Surface Facilities (Premining Configuration and Facilities)
☐ ADD	☒ REPLACE	☐ REMOVE	Map 18B, Mine Surface Facilities (Proposed Configuration and Facilities)
☐ ADD	☒ REPLACE	☐ REMOVE	Map 19A, Mine Plan, D Seam
☐ ADD	☒ REPLACE	☐ REMOVE	Map 21B, Mine Surface Facilities Area - Interim Drainage Control
☒ ADD	☐ REPLACE	☐ REMOVE	Map 31, Barn Canyon Shaft Facility, Site Plan and Sections
☒ ADD	☐ REPLACE	☐ REMOVE	Map 32, Barn Canyon Shaft Facility, Post Mining Topography
☒ ADD	☐ REPLACE	☐ REMOVE	Map 33, Barn Canyon Shaft , Access Road
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
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Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

BARN CANYON SHAFT PERMIT APPLICATION
KEY TO RESPONSES TO DOGM TECHNICAL ANALYSIS

DOGM 4/2/98 TECH. ANALYSIS PAGE NO	DOGM FINDING REGULATION #	#	MRP SECTION 0R MAP WHERE ADDRESSED	COMMENT
3	301-120	1		Provided with cover letter
	301-140	1	Figure 3.1-1	Elevation markers added
		2	Figure 3.1-1	Bar scale added
		3	Figure 3.1-1	The topsoil now is being taken to Gravel Canyon Topsoil pile
5	301-234	1	Section 4.2	The topsoil now is being taken to Gravel Canyon Topsoil pile
7	301-341	1	Section 5.3	Gambel oak and Big toothed maple seedlings will be planted
8	301-400	1	Sections 4.5, 4.7 & 5.4	The road is on fee land and has been classified. A variance has been requested to leave the road for post mine land use.
		2	Sections 3.1, 3.2, 4.2, 5.2, 5.3, 5.4	Revised to be consistent
		3	Sections 4.5, 4.7 & 5.4	The road is on fee land and has been classified. A variance has been requested to leave the road for post mine land use.
9	301-526	1	Sections 4.5, 4.7 & 5.4	The road is on fee land and has been classified. A variance has been requested to leave the road for post mine land use.
10	301-525	1	Map 19A, Section 4.5	The shaft site and access road are outside of the projected subsidence zone
	301-521, 527 & 534	2	Sections 4.5, 4.7 & 5.4	The road is on fee land and has been classified. A variance has been requested to leave the road for post mine land use.
11	301-524	1	Section 4.5	Blasting has been addressed. Explosives storage area proposed.
13	301-521 & 542	1	Map 31 & 32	Maps made consistent
	301-542.300	2	All maps	Maps have at least 5 foot intervals where necessary
	301-542-300	3	Maps 31 & 32	Cross sections at standard engineering spacing
	301-121.200	4	Map 31	Potential disturbed area boundary and surface disturbance area boundary clearly shown
	301-521.141	5	Map 33	The road has been included in the disturbed area
	301-521-152	6	Map 33	Shows topography and thus the slope at least 100 feet outside the boundary
	301-521-170	7	Map33	Cross sections of the road shown
	301-542-300	8	Map 32	Contours at least every 5 feet
	301-542-300	9	Map 32	Cross sections at standard engineering spacing
	301-521.141	10	Map 19A	D-Seam Mine Plan maps added showing shaft location

BARN CANYON SHAFT PERMIT APPLICATION
KEY TO RESPONSES TO DOGM TECHNICAL ANALYSIS

DOGM 4/2/98 TECH. ANALYSIS PAGE NO	DOGM FINDING REGULATION #	#	MRP SECTION 0R MAP WHERE ADDRESSED	COMMENT
14	301-542.300	1	Map 32	Contours at least at 5' intervals
	301-542-300	2	Map 32	Cross sections at standard engineering spacing
15	301-553.130	1	Section 5.4	Slopes addressed
	30 CFR 75	2	Map 32 & Section 5.4	Vent pipe addressed
	301-513	3		Certification not required by UCR or MSHA refulations
16	301-121.100	1	Sections 4.5, 4.7 & 5.4	The road is on fee land and has been classified. A variance has been requested to leave the road for post mine land use.
	Bonding	2	Exhibit 17	Bond estimates provided
17	301-731	1	Map 32	Shows shaft seal & rock protection. Ground water in wells in area below shaft site - see 1997 Annual Hydrology report - Well BN25-1
		2	Sections 3-7 & 4-7	Ground water interception addressed
		3	Section 4.7	Intercepted ground water treatment addressed
18	301-722-300	1	N/A	No berm proposed this submittal
19	301-742-400	1	Exhibit 13	Drainage plan proposed
	301-742-240	2	N/A	No berm proposed this submittal
	301-742-110	3	Exhibit 13	Alternative sediment control proposed
	301-742-240	4	Section 5.5	Reclamation sediment control addressed

BARN CANYON SHAFT FACILITY
SOIL SURVEY FIELD DATA SHEETS
January 1998

Cyprus Plateau - Willow Creek Mine

Disturbed/Drainage MAP UNIT BC1

Soil type		Date 1-14-98	Stop No.
Classification —			Area
Location see map			Elev.
N. veg. (or crop) sparse grasses			Climate
Parent material disturbed zone over streambed alluv.			
Physiography drainage bottom			
Relief	Drainage well	Salt or alkali —	
Elevation	Gr. water deep	Stoniness	
Slope 3%	Moisture sl. moist 0-12" dry below		
Aspect south facing	Root distrib. MRD 0-4 Few M,F,VF 0-4"		
Erosion disturbed site			
Permeability			
Additional notes			

near old drill hole, in disturbed drainage unit.

C was screened in field; C is compacted streambed alluvium

SCS-232A-Soil Description—Rev. 7-15-56

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary
C1	0-4	10YR 4/3	10YR 3/3	SL	WMGR (massive)	H	FI	SS/SP	ES	GW
C2	4-32	10YR 5/4	10YR 4/4	ext. grav. SL-LS	massive	VH	FI	NS/NP	ES	—

0-4 35% gravel, 10% cobbles, 2% stones-boulders

4-32 50% gravels, 15% cobbles, 1% stone-boulders

Cyprus Plateau-Willow Creek Mine

MAP UNIT C

BC 2

Soil type	"Disturbed Hillside"	Date 1-14-98	Step No.
Classification	—		Area
Location	see map		Elev.
N. veg. (or crop)	scattered grasses sagebrush		Climate
Parent material	mixed local materials		
Physiography	disturbed		
Relief		Drainage well	Salt or alkali —
Elevation		Gr. water deep	Stoniness
Slope 6%		Moisture all sl. moist	
Aspect South facing		Root distrib. Com MF, VF & few CO 0-6"	
Erosion slight		MRD 0-6" Few F, VF 6-18"	
Permeability			
Additional notes			

disturbed site - old drill site area
Rec. salvage depth = 6"
very compacted below 6"

SCS-232A-Soil Description—Rev. 7-15-56

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary
AC	0-6	10YR 4/3	10YR 4/3	SCL	WMGR	SH	FR	SS/SP	SE	GW
C	6-24	10YR 6/4	10YR 5/4	SCL	Massive	VH	FI	SS/SP	SE-EM	—

>35% cobbles, gravels, boulders

Cyprus Plateau - Willow Creek Mine

MAP UNIT B

BC3

Soil type	Pathead cobbly loam	Date 1-14-98	Stop No.
Classification	Loamy-skeletal, mixed (calcareous) Frigid Typic Ustorthent		Area
Location	see map		Elev.
N. veg. (or crops)	Mtn. maple, scattered Juniper		Climate
Parent material	mixed colluvium		
Physiography	Mtn. steep sideslope		
Relief	Drainage well	Salt or alkali –	
Elevation	Gr. water deep	Stoniness	
Slope 40%	Moisture all sl. moist (0-3" frozen)		
Aspect east facing	Root distrib. MRD 0-18"		
Erosion slight			
Permeability moderate			
Additional notes			

Rec. salvage depth 18" (too compact, too much rock below)

SCS-232A-Soil Description—Rev. 7-15-56

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary
A	0-5	10YR 3/3	10YR 3/2	Loam	MMGR	SH	FR	SS/SP	SE	CW
BC	5-18	10YR 5/4	10YR 4/4	SCL	MMSBK	SH	FR	SS/SP	SE	GW
C	18-40	10YR 6/4	10YR 5/4	SCL	Massive	H	FR	SS/SP	SE-EM	—

Coarse fragments

0-18 15% GR, CB; few stones/boulders

18-40 45% CB, GR, stones and few boulders

Cyprus Plateau - Willow Creek Mine M[redacted] UNIT A BC 4

Soil type	Perma sandy loam	Date 1-14-98	Stop No.
Classification	Loamy-skeletal, mixed Typic Haploboroll		Area
Location	Barn Canyon fan portal site (see map)		Elev.
N. veg. (or crop)	oakbrush (Gambel's), Mtn. maple		Climate
Parent material	mixed colluvium		
Physiography	lower sideslope		
Relief		Drainage well	Salt or alkali —
Elevation		Gr. water deep	Stoniness
Slope 12%		Moisture sl. moist throughout	
Aspect east facing		Root distrib. Many M, F, VF & few CO 0-6"	
Erosion none		MRD 0-24" Many CO, M, F, VF 6-24	
Permeability Mod		Com M, F, VF 24-30	
Additional notes			

rec. salvage depth 2'

soil has a buried A horizon at 13-19" in depth

SCS-232A-Soil Description—Rev. 7-15-56

Horizon	Depth	Color Dry	Color Moist	Texture	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction	Boundary
Oi	2-0	leaf litter.								
A	0-6	10YR 3/2	10YR 2/2	SL-L	MM GR	SO	VFR	SS/SP	SE	C
Bw	6-13	10YR 5/4	10YR 4/4	SL-	WM SBK	SH	FR	SS/NP	ES	C
2A	13-19	10YR 3/2	10YR 3/2	SL-L	WM SBK	SH	FR	SS/SP	EM	C
2Bw	19-35+	10YR 5/4	10YR 4/4	SL-	WM SBK	SH	FR	NS/NP	ES	—

Coarse fragments - scattered surface big boulders 35% of surface covered by boulders

0-19" GR CB } 5%

19-35" GR CB } 35%