PERMIT CHANGE TRACKING FORM

☐ Significant Permit Revision
☐ Permit Amendment
☐ Incidental Boundary Change

DATE RECEIVED August 5th	By: JL (Initial)	PERMIT NUMBER	PRO/007/038
Title of Proposal: Willow Creek Division Order 4		PERMIT CHANGE #	96 [redacted]
Description:		PERMITTEE	CYPRUS PLATEAU MINING CORPORATION
		MINE NAME	WILLOW CREEK MINE / BLACKHAWK

	DATE DUE	DATE DONE	RESULT	
☐ 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION	August 19th		☐ ACCEPTED	☐ REJECTED
☐ Notice of Review Status of proposed permit change sent to the Permittee.			COMMENTS	
☐ Responses Received.				
☐ Notice of Affidavit of Publication. (If change is a Significant Revision.)				

REVIEW TRACKING	INITIAL REVIEW		MODIFIED REVIEW		FINAL REVIEW AND FINDINGS	
DOGM REVIEWER	DUE	DONE	DUE	DONE	DUE	DONE
☐ Lead JL						
☐ TA (See Attached) ___						
☐ Reviewers ___						
☐ Administrative (AVS) NA						
☐ Biology NA						
☐ Engineering NA						
☐ Geology NA						
☐ Soils BOB DAVIDSON ___	8/19	Contacted by phone 8/20 for additional info.				
☐ Hydrology NA						

COORDINATED REVIEWS	SENT	DUE	RECEIVED	SENT	DUE	DONE
☐ OSMRE						
☐ US Forest Service						
☐ Bureau of Land Management						
☐ US Fish and Wildlife Service NOT IN NEW AREA		NA				
☐ US National Parks Service						
☐ UT Environmental Quality						
☐ UT Water Resources						
☐ UT Water Rights						
☐ UT Wildlife Resources						
☐ UT State History (SHPO) NOT IN NEW AREA		NA				
☐ State Trust Lands						

☐ Public Notice / Comment / Hearing Complete. (If the permit change is a Significant Revision)	NA	☐ Permit Change Approval Form signed and approved effective as of this date. ☐ Permit Change Denied.	
☐ Copies of permit change marked and ready for MRP.		☐ Notice of ☐ Approval ☐ Denial to Permittee.	
☐ Special Conditions/Stipulations written for approval.		☐ Copy of Approved Permit Change to File.	
☐ TA and CHIA modified as required.		☐ Copy of Approved Permit Change to Permittee.	
☐ Permit Change Approval Form ready for approval.		☐ Copies to Other Agencies and Price Field Office.	

Bob has one copy for review JL 8/8/96

Form DOGM - C1 (Last Revised 6/93)

File Folder # 3

APPLICATION FOR PERMIT CHANGE

Title of Change:	Permit Number: ACT/007/038
	Mine: Williow Creek/Blackhawk
	Permittee: Cyrpus Plateau Mining Corp.

Description, include reason for change and timing required to implement:

☐ Yes	☐ No	1. Change in the size of the Permit Area? _____ acres ☐ increase ☐ decrease.
☐ Yes	☐ No	2. Change in the size of the Disturbed Area? _____ acres ☐ increase ☐ decrease.
☐ Yes	☐ No	3. Will permit change include operations outside the Cumulative Hydrologic Impact Area?
☐ Yes	☐ No	4. Will permit change include operations in hydrologic basins other than currently approved?
☐ Yes	☐ No	5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☐ No	6. Does the permit change require or include public notice publication?
☐ Yes	☐ No	7. Does the permit change require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☐ No	8. Permit change as a result of a Violation? Violation #
☐ Yes	☐ No	9. Permit change as a result of Division Order? D.O. #
☐ Yes	☐ No	10. Permit change as a result of other laws or regulations or policies? Explain:
☐ Yes	☐ No	11. Does the permit change affect the surface landowner or change the post mining land use?
☐ Yes	☐ No	12. Does permit change require or include collection and reporting of any baseline information?
☐ Yes	☐ No	13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	☐ No	14. Does permit change require or include soil removal, storage or placement?
☐ Yes	☐ No	15. Does permit change require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	☐ No	16. Does permit change require or include construction, modification, or removal of surface facilities?
☐ Yes	☐ No	17. Does permit change require or include water monitoring, sediment or drainage control measures?
☐ Yes	☐ No	18. Does permit change require or include certified designs, maps, or calculations?
☐ Yes	☐ No	19. Does permit change require or include underground design or mine sequence and timing?
☐ Yes	☐ No	20. Does permit change require or include subsidence control or monitoring?
☐ Yes	☐ No	21. Have reclamation costs for bonding been provided for any change in the reclamation plan?
☐ Yes	☐ No	22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling?
☐ Yes	☐ No	23. Is this coal exploration activity?

☐ **Attach 12 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.**

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.

_____
Signed - Name - Position - Date

Subscribed and sworn to before me this ____ day of _____, 19____.

_____
Notary Public

My Commission Expires: _____, 19____

Attest: STATE OF _____ }
COUNTY OF _____ } ss:

Received by Oil, Gas & Mining

RECEIVED
AUG 05 1996
DIV. OF OIL, GAS & MINING

ASSIGNED PERMIT CHANGE NUMBER

properties outlined in the UDOGM Topsoil Guidelines. The location of these soils sample locations, three of which were located in undisturbed soils and 10 in disturbed soils are identified on the Facilities Area Soils Map, (Map 4), as 1995 Soil Sample Locations.

3.1.1.6 Prime Farmland Investigation

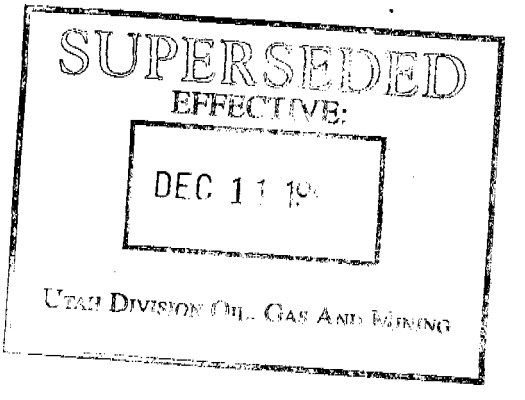
Several previous investigations have been conducted for the permit area to determine whether any prime farmlands exist in the area. Each of these investigations involved formal consultation with the USDA-SCS. The initial determination, included in PRCC's Mining and Reclamation Permit application, was provided by Mr. George D. McMillan, USDA-SCS State Conservationist in a letter dated July 16, 1979. This letter concluded that, based upon the absence of any irrigation, and excessive slopes, no prime farmlands existed in the area corresponding to Townships 12 & 13 South, Ranges 8, 9 and 10 East. A second negative determination for prime farmlands in the permit area was issued in connection with the permitting efforts for the CGCC Permit submitted to UDOGM in February 1991. The CGCC permit application contains a letter dated May 21, 1991 from Mr. Ferris P. Allgood, USDA-SCS State Soil Scientist, stating that due to the excessive amount of rock fragments, high erodibility and lack of a reliable source of irrigation waters for lands within the CGCC Mine Permit area, the soils within this area are excluded from consideration as important farmlands. Confirmation of these negative determinations was included in the findings documents issued by UDOGM for both permit applications and documentation is provided in Exhibit 5, Soils Information.

Since the limitations which exclude these soils for consideration as prime farmlands still exist, and all surface disturbance associated with the mining and reclamation activities will occur on either previously disturbed areas or on slopes greater than ten percent, UDOGM is requested to reaffirm the negative determination regarding the presence of prime farmland soils in the permit area.

3.1.2 Site-Specific Soils Information

Two soils maps have been prepared for those areas potentially affected by the mining and reclamation activities, reflecting different levels of detail.

The Regional Soils Map, (Map 3) shows the soils mapping units as identified and mapped by the USDA-SCS Soils Survey for the entire mine permit area. This regional map reflects an Order III soils survey with soils mapping at a scale of 1 inch equals 2,000 feet. The legend on this map identifies all soil mapping units found within the proposed permit area, with the individual mapping units consisting of both soil associations and soil complexes. To the extent possible individual soil associations are identified, however, where individual soil series are so intermingled that it was not practical to map them separately, the corresponding mapping units may reflect a complex of similar associated soil types.



Summary - Undisturbed Soils

According to Table 4.2-1, Soil Recovery and Storage Plans, included in Section 4.2.1.2, General Soil Availability and Handling Requirements, a total of 6.7 acres of new disturbance will result from the proposed mining and related activities. When the proposed disturbance area is superimposed on the soils map, it can be calculated that 4.7 acres or 70.2 percent of the ne disturbance will occur on Soil Mapping Unit 107, the Shupert - Winetti Complex; 1.5 acres or 22.4 percent will be on Soil Type 121, the Travessilla - Rock Outcrop - Gerst Complex; and 0.5 acres or 7.4 percent will be on Soil Type 72, Pathead - Curecanti Family Association. The originally projected impacts to Soils Mapping Unit 63 in the vicinity of the proposed mine water tank area will not occur because subsequent mapping of this site in 1996 indicated that all of the proposed disturbance in this area will involve previously disturbed areas.

Examination of the 1979 Soils Report in the PRCC Permit resulted in the conclusion that Backhoe Pit No. 4 was dug in a partially disturbed cut-slope associated with Soils Mapping Unit 107. Based upon this conclusion, it appears that these soils corresponding to the Winetti Soils Type. Based on evaluation of the 1996 soils pits, where four different pits (WC96-1, WC96-3, WC96-6, and WC96-12) were established in this same area, it can be concluded with certainty that this previous determination was correct. Soils Mapping Unit 107 contains two taxonomic soil series, the Shupert and Winetti soils. According to the 1988 SCS Soil Survey the greatest difference between these two soils is in their rock fragment content. Shupert soils contain 0 to 15 percent rock fragments while Winetti soils contain between 35 and 60 percent rock fragments. Since all of the four soil profiles contain greater than 15 percent rock fragments, these soils clearly correspond to the Winetti soil phase of this Soils Mapping Unit.

According to the USDA-SCS Soil Survey, the Winetti soils correspond to the Loamy Bottom ecological or range site. Forage production of this soil is reported to be 1,000, 1,500, and 2,000 pounds of air dry forage per acre for unfavorable, average, and favorable precipitation years, respectively. A comparison of the site conditions for the Willow Creek Mine area indicate that soils in Mapping Unit 121 correspond with the Travessilla series with major inclusions of Rock Outcrop. Vegetation in the Travessilla Soil Type corresponds to the Upland Very Steep Shallow Loam (Pinyon-Utah Juniper) woodland site. Potential production of wood products for this soil type are reported to be 1 to 2 cords of wood per acre with a forage production potential of 300, 500 and 700 pounds of air dry forage per acre for unfavorable, average, and favorable precipitation years, respectively. The soils in Mapping Unit 72 correspond to the Pathead - Curecanti Family Association. These soils occupy the undisturbed valley bottom areas along Willow Creek. According to the USDA-SCS Soils Survey descriptions, these soils belong to the Pathead soil phase of this Mapping Unit. Pathead soils correspond to the Mountain Valley Steep Loam (Salina Wildrye) range site. The potential forage production of this range site is reported as 1,000, 1,200, and 1,400 pounds of air dry forage per acre in unfavorable, average, and favorable precipitation years, respectively.

Other Relevant Soils Information and Evaluation Approach

In addition to collection and evaluation of field data and analysis results, the PRCC, BBC and CGCC permit documents were reviewed for any relevant soils information. All of these documents contain the results numerous soils testing efforts in the mine surface facilities area. Review of the OSM Technical Environmental

Soil Pit WC96-10. This soil pit is located in on a disturbed soil in the Office Trailer Area and corresponds to an AML reclamation site. This location is in the same vicinity as soil pit 95WCT10.

Soil Profile - Disturbed - 0 to 17 inches - very pale brown (10YR 7/3) gravelly sandy loam, brown to dark brown (10YR 4/3) moist; massive structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine pores; common fine roots; 8 percent fine gravels, 7 percent medium gravels, 8 percent coarse gravels, 5 percent pebbles, 3 percent stones; abrupt smooth boundary.

Disturbed, coal processing waste - 17 to 65 inches + - very dark gray (10YR 3/1) gravelly sand, black (10YR 2/1) moist; single grain; loose, loose, non sticky, non plastic; few very fine pores; 12 percent fine gravels, 6 percent medium gravels.

Soil Pit WC96-11. This soils pit corresponds to the undisturbed Soil Mapping Unit 107 in the Rock Outcrop Area. This soil pit is adjacent to the site sampled with soil pit 95WCT13.

Soil Profile - A1 - 0 to 3 inches - light gray (10YR 7/2) gravelly sandy clay loam, brown (10YR 5/3) moist; weak subangular blocky structure; slightly hard, friable, sticky, plastic; few fine pores; few fine roots; common distinct clay films; common distinct clay films; 8 percent fine gravels, 12 percent medium gravels, 14 percent coarse gravels, 2 percent pebbles; clear smooth boundary.

C1 - 3 to 12 inches - pale brown (10YR 6/3) very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; very weak subangular blocky structure; slightly hard, friable, sticky, plastic; few fine pores; few fine roots; faint very few clay films; 11 percent fine gravels, 9 percent medium gravels, 26 percent coarse gravels, 5 percent pebbles; abrupt smooth boundary.

C2 - 12 to 19 inches - pale brown (10YR 6/3) shall clay, brown to dark brown (10YR 4/3) moist; massive structure; very hard, extremely hard, sticky, plastic; few fine pores; few fine roots; 9 percent fine shale, 5 percent medium shale, 5 percent coarse shale.

R - 19 inches + - shale

Soil Pit WC96-12. This soils pit is located in the undisturbed soils found in Soils Mapping Unit 107 in the proposed Ventilation Fan area. This soil pit is in close proximity to soil pit 95WCT12.

Soil Profile - O - 1 inches - dead Juniper leaves.

A1 - 0 to 8 inches - light gray (10YR 7/1) bouldery sandy loam, reddish brown (2.5YR 5/3) moist; moderate medium subangular blocky structure; soft, friable, non sticky, non plastic; common fine pores; many fine roots; faint very fine clay films; 8 percent fine gravels, 6 percent medium gravels, 4 percent coarse gravels, 3 percent pebbles, 18 percent stones, 47 percent boulders; abrupt smooth boundary.

C1 - 8 to 34 inches - light brownish gray (10YR 6/2) extremely gravelly sandy loam, reddish brown (2.5YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very firm, non sticky, non plastic; few fine pores; few fine roots; 27 percent fine gravels, 31 percent medium gravels, 24 percent coarse gravels, 8 percent pebbles, 2 percent stones, 2 percent boulders; clear smooth boundary.

C2 - 34 to 50 inches - light gray (10YR 7/2) extremely gravelly sandy loam, reddish brown (2.5YR 5/4) moist; weak granular structure; hard, very firm, non sticky, non plastic; few fine pores; few fine roots; 14 percent fine gravels, 22 percent medium gravels, 27 percent coarse gravels, 11 percent pebbles, 5 percent stones, 6 percent boulders; gradual smooth boundary.

C3 - 50 to 68 inches + - white (10YR 8/2) bouldery sandy loam, pale brown (10YR 6/3) moist; very weak granular structure; hard, very firm, non sticky, non plastic; few fine pores; few fine roots; 8 percent fine gravels, 10 percent medium gravels, 10 percent coarse gravels, 12 percent pebbles; 18 percent stones, 18 percent boulders.

Where disturbed soils or other surficial materials are to be recovered and utilized as recovery depths will range from a minimum of 12 inches to a maximum of approximately 18 inches dependent on the topographic configuration of the recovery area and site specific material conditions. Generally, maximum recovery depths will be achieved on relatively flat or gently sloping areas where rock content, presence of coally materials, or natural obstacles are not limiting factors relative to full recovery. To the extent operationally feasible, zones or areas with any significant coal or coal refuse content will be avoided during soil material recovery operations and any coally significant deposits or accumulation will be excavated and the coally materials disposed of in the Schoolhouse Canyon Refuse Pile.

Soil material recovery areas and volumes for proposed mining and related surface disturbance are summarized by Table 4.2-1, Soil Recovery and Storage Plans and supporting documentation is provided by Table 4.2-1A, Justification for Soil Salvage Assumptions. This summary includes soil material volumes for both proposed future recovery operations and the existing material stockpiles which currently exist in the Crandall Canyon, Gravel Canyon, and Schoolhouse Canyon areas. The soil removal thicknesses and volumes summarized in Table 4.2-1 are estimates based on extensive field sampling of both disturbed and undisturbed soils in the proposed surface disturbance area. Actual recovery depths, and therefore volumes, may vary dependent on site-specific conditions and practical operating limitations. In order to assure that all operationally recoverable soil material is removed and stockpiled for later reclamation use, soil recovery operations will be supervised and monitored by a qualified and experienced reclamation specialist/soil scientist. Actual soil recovery depths and volumes will be documented and any site-specific limitations on soil recovery will be noted and described. Following completion of soil removal operations, a narrative description of soil recovery operations along with appropriate supporting documentation will be prepared and incorporated into the next Annual Reclamation Monitoring Report for submittal to UDOGM. Any variations between actual and projected soil recovery depths and volumes (as outlined by Table 4.2-1) will be identified and explained.

4.2.2.2 Soil Suitability and Testing

Given the lack of available natural soils and CPMC's resultant plans to recover disturbed soils for use as soil material, CPMC is relying primarily on the baseline soil sampling information presented in Section 3.1.2.4, Soil Availability and Suitability, to establish the relative suitability of disturbed soils as the best material available in the proposed disturbance area to support revegetation efforts. Based on the available soils sampling and testing information, which included undisturbed and disturbed soil and coal refuse materials, the following summarizes the overall suitability of disturbed soils as soil material based on the UDOGM Topsoil/Overburden Guidelines:

Parameter	Undisturbed Soils	Disturbed Soils
pH	Good to fair	Good
EC	Good to fair	Good to fair
SP	Good	Good
Texture	Good to unacceptable	Good to unacceptable
SAR	Good to fair	Good to fair
Selenium	Good	Good
Boron	Good	Good
AB Pot.	Good	Good
AWC	Good to fair	Good to fair

As documented by this summary of all existing available soil sampling data, the disturbed soil materials are an equivalent or better vegetative growth media than natural undisturbed soils in this area based on the UDOGM suitability criteria. The only parameter of concern relative to suitability of the disturbed soils as soil material is texture. The designation of both disturbed and undisturbed soils as unacceptable relative to texture is a due to a high gravel or rock fragment content which is a direct reflection of natural geomorphic and soil development characteristics in this area. The rugged terrain and extensive rock outcrops result in significant mass wasting and colluvial deposition with the accompanying characteristic occurrence of a large percentage of boulders, rocks, and large rock fragments in essentially all surficial deposits. While this may be considered a limiting factor under the UDOGM Guidelines and may in fact limit maximum vegetation potentials, it does not appear to have had a significant adverse impact on natural vegetation communities in the area nor on the natural reinvasion of previously disturbed areas which have not been intentionally revegetated.

TABLE 4.2-1
SOIL RECOVERY AND STORAGE PLANS

Disturbance Area	Acreage	Soil/ Substitute Type	Average Thickness (in.)	Volume (cy)	Stockpile
Existing Gravel Canyon Stockpile (for reclamation of Schoolhouse Canyon Refuse Pile)	--	Soil	--	97,000	Gravel Canyon
Existing Crandall Canyon Stockpiles (for reclamation of lower Crandall Canyon facilities)	--	Soil	--	18,000	Crandall Canyon
Water Tank Area	1.0	Disturbed	NRS	--	--
Ventilation Fan Area	2.7 1.3	Disturbed Undisturbed	14 8	5,100 5,243	Mine Facilities Mine Facilities
Bridge and Entrance Road	1.2 0.1	Disturbed Riparian	12 --	1,900 --	Mine Facilities --
Upper Facilities Bench (Refuse Pile Area)	9.7	Reclaimed	16	21,200*	Mine Facilities
ROM Stockpile Area and Lower Facilities Areas	19.9 2.2	Disturbed Undisturbed	12 8	32,105 2,366	Mine Facilities Mine Facilities
Stream Realignment 1	0.5	Riparian	24	1,600	Direct Placement
Stream Realignment 2	1.0	Riparian	24	3,500	Direct Placement
Office Trailer and Rock Outcrop Area	2.9 6.8 2.5	Disturbed Reclaimed Undisturbed	12 14 12	4,679 12,799 4,033	-- Mine Facilities Mine Facilities
Tunnel Portal Areas	3.3 0.7	Disturbed Undisturbed	NRS NRS	-- --	-- --
Subtotals	31.0 6.7 1.6 16.5	Disturbed Undisturbed Riparian Reclaimed	12 12-30 24 14	43,784 11,642 5,100 33,999	Mine Facilities Mine Facilities Direct Placement Mine Facilities
Totals	55.8	--	--	94,525	Mine Facilities

Notes: NRS No recoverable soil or area will be disturbed

Total Stockpile Volumes: Gravel Canyon (97,000 cy)
Crandall Canyon (18,000 cy)
Willow Creek Mine Facilities (21,200* cy)

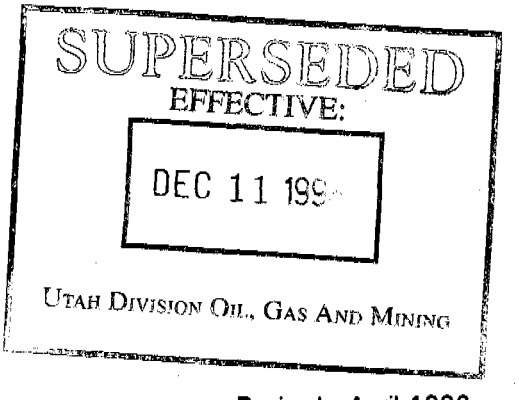
Proposed Additional Topsoil Removal: Willow Creek Mine Facilities (94,525 cy-21,200 cy = 73,325 cy)
For justification of recovery depths see Table 4.2-1A

TABLE 4.2-1A
JUSTIFICATION FOR SOIL SALVAGE ASSUMPTIONS

Disturbance Area	Area	Volume (cy)	Justification for Soil Salvage Thickness and Volume
Existing Gravel Canyon Stockpile (for reclamation of Schoolhouse Canyon Refuse Pile)	--	97,000	The topsoil plan for the Gravel Canyon area was originally discussed in detail on pages 8-30 to 8-44 of the 1984 PRCC Permit. Approval from the Division was granted when this permit was approved.
Existing Crandall Canyon Stockpiles (for reclamation of lower Crandall Canyon facilities)	--	18,000	The topsoil plan for the Crandall Canyon Area was originally discussed in detail on pages 8-30 to 8-44 of the 1984 PRCC Permit. Approval from the Division was granted when this permit was approved.
Water Tank Area	1.0	NRS	As depicted on Map 4, all of the soil materials in this area have been disturbed by previous mining activities. Since only minimal disturbance is planned for this area which will not further reduce soil viability no soil salvage is proposed for this area.
Ventilation Fan Area	2.7 1.3	5,100 5,243	An estimated 14" of salvageable soil material exists on disturbed areas and 30" on undisturbed areas on this site. These thicknesses were obtained from Soils Pit 96WCT12 and the soil profile on the bank of Willow Creek suggests that approximately 30" of soil can be recovered. Recover in separate lifts would not be operatinally feasible.
Bridge and Entrance Road	1.2 0.1	1,900 --	An estimated 12" of salvageable disturbed soil exists at this site. Removal of the riparian soils which will be disturbed by the construction of the bridge abutments would be extremely difficult since they occur at the bottom of a drainage approximately 35 feet deep and no reasonable means exists to remove these soils without adversely impacting Willow Creek. The soils along the east and west streambank have significant amounts of waste coal material mixed into the soils limiting the value of these soil materials.
Upper Facilities Bench	9.7	21,200	Soil materials in this area were removed in the fall of 1995. This volume represents the actual volume of material removed and placed into the mine facilities stockpile. Soils pits 94-12-2R; 95WCT01; 95WCT02 and 94-12-1R were completed in this area.

TABLE 4.2-1A
JUSTIFICATION FOR SOIL SALVAGE ASSUMPTIONS

Disturbance Area	Area	Volume (cy)	Justification for Soil Salvage Thickness and Volume
ROM Stockpile and Lower Facilities Area	19.9 2.2	32,105 2,366	12 inches of soil material will be removed from the disturbed area and 8 inches from undisturbed areas. Soil Pits 4 HC; 95WCT11; 5 HC; ACZ-1989-2; ACZ-1989-3; 95WCT04, ACZ-1989-4A, 4B, 4C; ACZ-1989-3A, 3B, SD1, SD2, 95WCT05; ACZ-1989-1A, 1B, 2, 3, 2A, 2B; 95WCT06; 95WCT07; and ACZ-1989-1 were completed in this area.
Stream Realignment #1	0.5	1,600	24" of soil material will be salvaged in this area. Justification for this thickness is from Soils Pits WC-5; WC-6; WC-7 and WC-10 which were completed in this area.
Stream Realignment #2	1.0	3,500	24" of soil material will be salvaged in this area. Justification for these thicknesses is from Soils Pits WC-1; WC-3; WC-4; WC-5; WC-6; and WC-7 taken in this area.
Office Trailer and Rock Outcrop Area	2.9 6.8 2.5	4,679 12,799 4,033	12" of soil material will re removed from the disturbed and undisturbed areas and 14" from the AML reclamation area. Justification for these removal depths are based upon Soils Pits 95WCT13; 95WCT09 and 95WCT10 as well as observations made during the mapping and sampling of the vegetation on this site. The thickness of soil covering on the reclaimed sites was measured at 15" for 95WCT09 and 11" for 95WCT09.
Tunnel Portal Area	3.3 0.7	NRS NRS	Both the east and west portal areas are located in vertical rock ledges and contain no measurable topsoil. Recovery of these materials is not operationally feasible.



LIST OF TABLES

LIST OF TABLES
(Continued)

1996 Schoolhouse Canyon Refuse Pile Area and Castle Gate Conveyor Area Soils Sampling Program

The 1996 Schoolhouse Canyon Refuse Pile Area and Castle Gate Conveyor Area sampling program was initiated to address concerns raised by the UDOGM in an "Order & Findings of Permit Deficiency" regarding soil salvage operations in these areas. In order to address these concerns, 10 additional soils pits were excavated in the proposed refuse pile expansion area to determine whether or not suitable material exists relative to potential soil salvage operations and proposed disturbance areas associated with Conveyors SC-6 and SC-7 were evaluated. The methodologies used in this evaluation were identical to those used and approved by the Division in the April, 1996 soils sampling program for the Willow Creek Mine. Samples were collected from 6 of the 10 soils pits and submitted to a qualified analytical laboratory for analysis. Table 3.1-1A, Summary of 1996 Soil Sampling, provides a comparison of analysis results with the suitability parameters presented in the UDOGM Soils Guidelines. Nine of the ten soils pits examined were in undisturbed soils and one was located in an area of disturbed soils. The locations of the 10 soils pits are shown on the revised Facilities Area Soils Map, (Map 4).

Soil Pit SHRP-1 - Located on an area which according to the existing Order 1 Soils Survey completed for the Castle Gate Permit corresponds to Soils Mapping Unit 47, the Guben-Rock Outcrop Complex. The vegetation on this site is dominated by Douglas Fir in the overstory, Utah Serviceberry as the dominant shrub and Salina Wildrye as the dominant herbaceous plant.

Soil Profile - A1 - 0 to 5 inches - grayish brown (10YR 5/2) bouldery loam, dark brown (10YR 3/3) when moist; granular structure; soft, very friable, non-sticky, non-plastic; common fine, medium and coarse roots; medium coarse pores; very few clay films; 16 percent fine gravels, 17 percent medium and coarse gravels, 7 percent cobbles, 12 percent stones, 20 percent boulders; clear wavy boundary.

B1 - 5 to 15 inches - pale brown (10YR 6/3) stoney loam, brown (10YR 4/3), moist; weak granular subangular blocky structure; soft, friable, slightly sticky, slightly plastic; common fine and medium pores; common medium and coarse roots; few common clay films; 8 percent fine gravels, 13 percent medium and coarse gravels, 24 percent cobbles, 26 percent stones, 9 percent boulders; abrupt smooth boundary.

C1 - 15 to 18 inches - light reddish brown (2.5 R 6/4) stoney loam, reddish yellow (7.5YR 6/6) moist; structureless; soft, firm, slightly sticky, slightly plastic; few very fine pores; common clay films; few fine roots; 18 percent fine gravels, 42 percent medium and coarse gravels, 8 percent stones; clear smooth boundary.

R - 18+ inches - burned scoria or red dog.

Soil Pit SHRP -2 - This soils pit is also in an area mapped as belonging to Soils Mapping Unit 47, the Guben-Rock Outcrop complex. This site is dominated by a stand of almost pure Salina Wildrye.

Soil Profile - A1 - 0 to 4 inches - light yellowish brown (10YR6/4) gravelly fine sandy loam, dusky red (10R 3/4) moist; moderately weak granular structure; soft, friable, slightly sticky, slightly plastic; common medium pores; common fine roots; common distinct clay films; 16 percent fine gravels, 5 percent medium and coarse gravels, 4 percent cobbles, 9 percent boulders; clear smooth boundary.

C1 - 4 to 8 inches - light reddish brown (2.5YR 4/8) extremely gravelly sandy loam, dark yellowish brown (10YR 3/6) moist; massive structure; hard, firm, slightly sticky, slightly plastic; few faint pores; few common coarse roots; very few faint clay films; 34 percent fine gravels, 42 percent medium and coarse gravels, 15 percent stones; abrupt smooth boundary.

R - 8+ inches - burned sandstone or red dog.

Soil Pit SHRP-3 - This soils profile was taken from the undisturbed Soils Mapping Unit 47 and corresponds to soils mapped as Guben series soils. The site is dominated by a monoculture of Salina Wildrye.

were dug in Crandall Canyon, Willow Creek and in the coal preparation plant area. The eight pH values for undisturbed soils in Crandall Canyon range from 7.5 to 8.5 with a mean value of 7.67. The PRCC Permit on pages 8-49 to 8-55 contains the results of 23 samples which are primarily from the Crandall Canyon Area which were analyzed for soil reaction. These values ranged from 7.7 to 8.3 with a mean value of 7.97. Soil reaction values for the Winetti portion of soils Mapping Unit 107 are reported to range from 7.9 to 8.4 with a midpoint value of 8.15. The soil reaction values for the Travessilla soils portion of soils Mapping Unit 121 are reported to range from 7.4 to 8.4 with a midpoint value of 7.9. The soil reaction values for the Podo soils portion of soils Mapping Unit 63 and the Pathead portion of soils Mapping Unit 72 are reported to range from 7.9 to 8.4 with a midpoint value of 8.15. Undisturbed topsoil pH values for samples collected by White at the PRCC site ranged from 8.38 to 8.99 with a mean value of 8.69

The three disturbed 1979 soils samples obtained from the Willow Creek area had pH values ranging from 7.5 to 7.6 with a mean value of 7.57.The soil reaction for the disturbed soils for the nine BCC Willow Creek samples collected in 1988 and 1989 was found to range from 7.2 to 7.5 with a mean value of 7.38. Data collection in June 1990 from the CGCC Preparation Plant Area resulted in 12 disturbed soils samples being tested for pH. Resulting analysis values for pH ranged from 7.5 to 8.2 with an average value of 7.93.

In the 1995 soils sampling effort a total of 20 additional samples were analyzed for soil reaction. Fifteen of the samples represented disturbed soils in the proposed Willow Creek Mine Facilities Area and 5 samples were collected from undisturbed soil units in areas which will potentially be affected by the proposed mining related disturbance. The results obtained from this evaluation effort are presented in Table 3.1-1, Summary of 1995 Soils Sampling, while the locations of the corresponding soils pits are shown on the Facilities Area Soils Map, (Map 4). Soil reaction values for the 15 disturbed soils samples were found to range from 7.3 to 7.8 with a mean value of 7.63 while pH values for the undisturbed soils samples ranged from 7.8 to 8.0 with a mean value of 7.92. All of the soil samples evaluated in conjunction with the 1995 sampling effort were found to possess a "good" suitability with respect to pH.

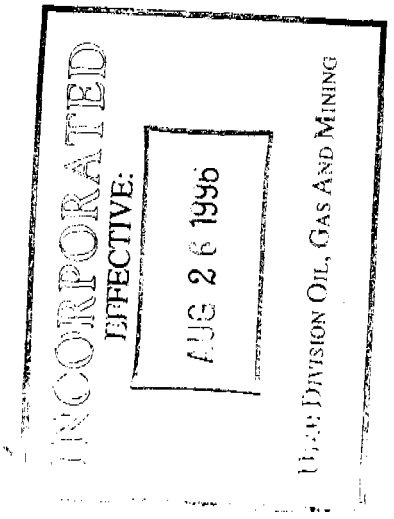
The mean value for soil reaction for the 1996 samples was 7.6 with a range of 7.3 to 8.2. As summarized in Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples, all of the 1996 samples evaluated for soil reaction rank as "good" with respect to this suitability parameter.

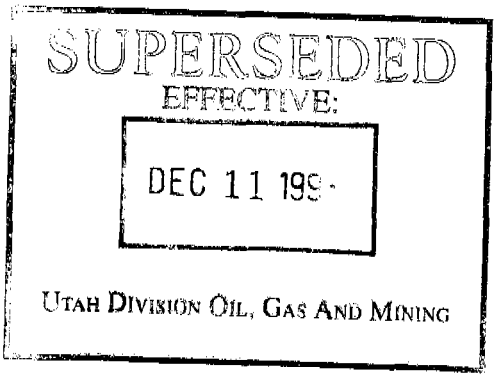
Coal refuse data from the PRCC Permit documents that the two coal refuse materials corresponding to the D Seam, which will be mined in the Willow Creek Mine, had pH values ranging from a low of 7.7 to 8.45. White et. al. (1984) reported a range in pH values of 5.77 to 9.43 for PRCC refuse, with refuse 30 years old having an average pH value of 6.24. Statistically significant reductions in pH values have been correlated by White et. al. (1982) and by Crofts and Grimes (1988) to correspond with increasing age of mine soil materials. White reports that the average pH value of new refuse material is 8.47 while that of old refuse was 7.56. Crofts and Grimes reported that the average pH value of undisturbed topsoil was 7.82 and that the refuse value of 7.11. These new refuse samples were taken directly from coal preparation plant material and had little chance to oxidize. These fresh unweathered samples represent conditions more typical of a reduced rather than an oxidized environment such as are associated with materials which have been exposed to nature. A detailed refuse sampling program conducted in June of 1990 by CGCC involving a total of 41 samples from the Schoolhouse Canyon refuse pile resulted in pH values ranging from a low of 6.9 to a high of 7.9 with an average of 7.51. Analysis of two weathered refuse samples from the UDOGM Willow Creek AMR site resulted in measured pH values of 7.4 and 7.5.

Roof and floor samples analyzed in the PRCC 1984 Permit from the D Seam in Number 5 Mine had pH values ranging from 6.4 to 8.7 with a mean of 7.95. The soil reaction values for the 40 overburden roof and floor samples obtained from the 1994 drilling effort ranged from 5.2 to 9.3 with a mean value of 7.92. The four samples obtained from the fan geotechnical drill hole yielded soil reaction values ranging from 6.8 to 8.4 with a mean value of 7.95. Three samples of Aberdeen or Castle Gate A Seam, roof, floor and parting material were analyzed in the Andalex Resources Centennial Mine Permit, this seam will be mined at the Willow Creek Mine. These soil reaction values ranged from 7.0 to 7.5 with a mean value of 7.23.

Waste rock material, being that overburden material between the coal seams to be mined was analyzed in the original PRCC Permit and presented again on page 5-72 of the BCC Permit. This testing program evaluated a total of 17 samples of the same strata overlying the coal seams in the Willow Creek Mine area. The soil reaction of these potential waste rock materials ranged from 7.0 to 9.2 with a mean value of 8.35.

The disturbed Willow Creek soil (mean pH 7.38) and refuse samples (mean pH 7.45) when compared to the refuse samples obtained from the Schoolhouse Canyon refuse pile (mean pH of 7.51) have slightly lower





although not statistically significant, soil reaction levels than do the samples from the 1994 drilling program (mean pH 7.92) and from the CGCC Preparation Plant (mean pH 7.93). This variance appears to reflect the presence of waste coal associated with the disturbed materials which has oxidized over time resulting in lower overall pH for the disturbed soils.

A summary of the suitability of all of the samples analyzed in connection with this evaluation is presented in Table 3.1-3, Summary of Reclamation Suitability. This brief comparison suggests that chemical values obtained from fresh unoxidized samples yields suitabilities different from those of weathered refuse and waste rock materials and that potential reclamation limitations of these materials should be taken with some caution.

Based on the suitability comparison for pH, using the available sampling data, it appears that the disturbed soils, and refuse materials in the proposed mine surface facilities disturbance and other nearby areas might have a slightly higher overall suitability or at least be as good as either the undisturbed soils in the Willow Creek Permit area as the undisturbed soils which probably existed in this area prior to disturbance with respect to soil reaction. Nutrient availability curves developed by the USDA-Forest Service (USDA-FS, 1979) which correlate nutrient availability of essential plant nutrients to soil chemical parameters indicate that the mean pH values of 8.10 to 8.69 for undisturbed native soils of this area, are also often associated with deficiencies in phosphorus, iron, manganese, boron, copper and zinc. Since all available evidence suggests that oxidization lowers the pH values, this comparison suggests that with respect to soil reaction the disturbed soils are of higher quality as plant growth medium than the undisturbed native soils found on this site. While lower suitability rankings are associated with the potential roof and floor waste rock materials, oxidization of these materials and mixing will render these materials more suitable as a potential plant growth medium than is indicated by this comparison. According to the data and regression line given by White and others (1982) the alkaline pH values of new refuse can be expected to moderate with weathering to fall within the "good" suitability range within five years.

Electrical Conductivity (EC) - For the undisturbed soils sampled in the PRCC 1984 Permit, soil salinity levels, as measured by EC, for the 1988 Willow Creek soils samples ranged from 0.2 to 3.2 mmhos/cm with a mean of 0.43 mmhos/cm. White and others (1982) reported for two samples collected in the Schoolhouse Refuse Pile area that EC values ranged from 0.11 to 0.14 mmhos/cm with a mean value of 0.125 mmhos/cm. According to the USDA-SCS Soil Survey all of the soils which will potentially be disturbed as a result of the proposed mining and related activities have EC values less than 2 mmhos/cm.

EC values for undisturbed soil samples collected as part of the 1995 soils sampling effort ranged from 0.29 to 0.60 mmhos/cm with an average value of 0.44 mmhos/cm. Nearly all of the values when correlated with the Suitability Guidelines indicate "good" reclamation potential with respect to soil salinity.

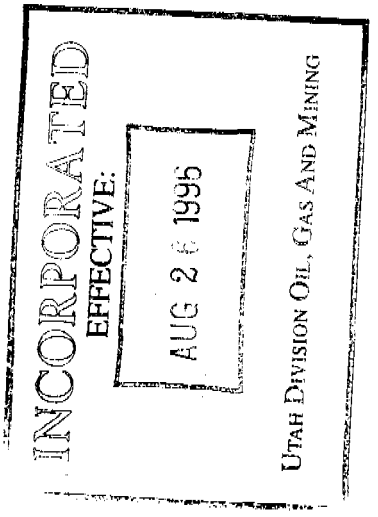
Disturbed soils sampled in the proposed Willow Creek Mine in 1988 yielded an EC range of 0.60 to 3.66 mmhos/cm with a mean of 1.65 mmhos/cm. Conductivity values for the three 1989 ACZ soils samples ranged from 0.71 mmhos/cm to 5.89 mmhos/cm, with an average value of 3.25 mmhos/cm. The twelve disturbed soils samples from the CGCC Preparation Plant area had EC values ranging from 0.55 to 4.77 mmhos/cm with an average of 1.67 mmhos/cm. Sampling and analysis of disturbed soils in the vicinity of the proposed Willow Creek Mine in 1995 yielded EC values ranging from 0.46 to 5.95 mmhos/cm with an average value of 2.14 mmhos/cm. These values for soil salinity correspond to the "good" and "fair" reclamation suitability classes based on the UDOGM Suitability Guidelines.

Evaluation of suitability relative to EC as summarized in Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples, resulted in 20 samples (67 percent) corresponding to the "good" reclamation suitability class while 10 samples (33 percent) were found to correspond to the "fair" reclamation suitability class. The mean value for EC for the 1996 samples was 1.683 with a range of 0.300 to 6.930 mmhos/cm. Of the three samples having reclamation suitabilities ranked as "fair", one sample was from an undisturbed soil, one from a disturbed soil, and one from a coal processing waste sample. Analysis results suggest that there is little or no difference in suitability relative to EC values for different soil material types.

Coal refuse samples analyzed in the 1984 PRCC Permit were reported to have EC values ranging from 0.64 to 1.40 with a mean value of 0.95 mmhos/cm. White reports EC values ranging from 0.73 to 1.76 mmhos/cm for the seven PRCC refuse samples analyzed. The EC values for the Schoolhouse Canyon refuse material were found

to range from 0.70 to 5.15 mmhos/cm with an average of 3.01 mmhos/cm. Willow Creek refuse samples obtained from geotechnical drilling conducted in the fall of 1994 yielded EC values of 2.32 and 2.74 mmhos/cm.

Roof and floor materials sampled in the connection with the 1984 PRCC Permit were found to have EC values ranging from 0.64 to 4.08 mmhos/cm with a mean value of 1.69 mmhos/cm from materials obtained from the Number 5 Mine or D Seam. Sampling conducted with the 1994 exploration program yielded EC values ranging from 0.2 to 6.89 mmhos/cm with a mean value of 1.3 mmhos/cm. The roof and floor samples obtained from the 1994 geotechnical sampling program at the proposed portal area resulted in EC values ranging from 0.46 to 1.07 mmhos/cm with a mean value of 0.71 mmhos/cm. EC values for the three samples of Castle Gate A



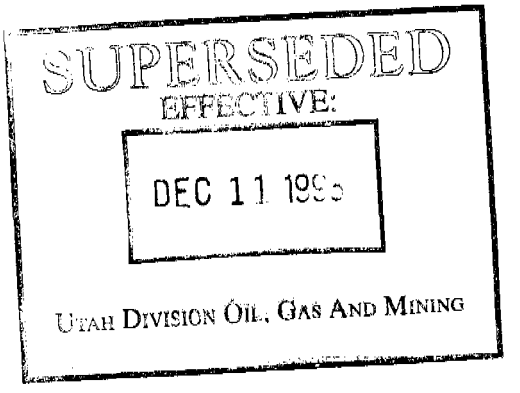
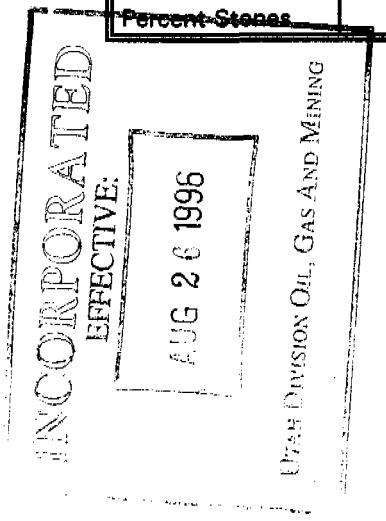
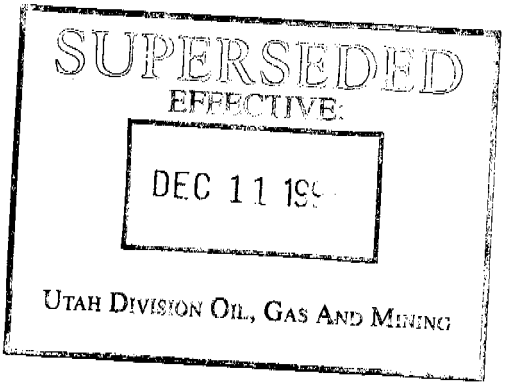


TABLE 3.1-4
SUMMARY OF RECLAMATION SUITABILITY - 1996 SOILS SAMPLES.
(NUMBER OF SAMPLES AND PERCENTAGE)

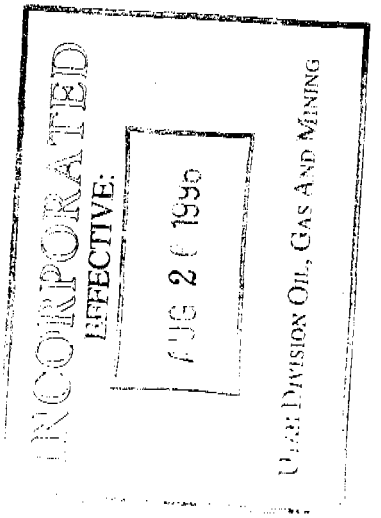
PARAMETER	NUMBER SAMPLES COLLECTED	RECLAMATION SUITABILITY CLASS			
		GOOD	FAIR	POOR	UNSUITABLE
pH	30	30(100)	-	-	-
Conductivity	30	20(67)	10(33)	-	-
Saturation %	30	30(100)	-	-	-
Texture	29	25(83)	4(13)	1(4)	-
Selenium	30	28(93)	-	-	2(6)
Boron	30	25(83)	-	-	5(17)
Acid Base Potential	30	30(100)	-	-	-
Available Water Capacity	30	1 (3)	17(57)	12(40)	-
Percent Pebbles	30	6 (20)	3(10)	6(20)	15(50)
Percent Cobbles	36	29(81)	4(11)	-	3(8)
Percent Stones	36	15(42)	4(11)	2(6)	15(42)

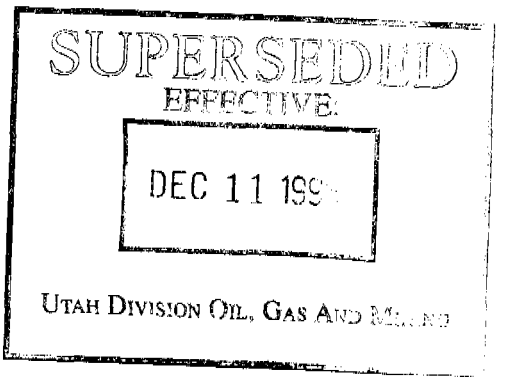




According to the UDOGM Topsoil/Overburden Guidelines, which are the basis for the suitability evaluation presented in Table 3.1-3, Summary of Reclamation Suitability it can be observed that there is no difference in suitability between the different materials evaluated at this site with respect to SP.

Texture - The sampling of soil texture involves the determination of the soil size fraction smaller than 2 mm in size and is important in predicting water holding capacity and potential erosivity of the soil. The 1979 soils investigation resulted in three soils backhoe pits being dug in the Crandall Canyon PRCC Permit Area for which detailed soil descriptions for undisturbed soils were developed. From these three backhoe pits, 19 different soil profiles were described. Textures were relatively uniform with most soils having a loamy texture. Additional





soils sampling in the Crandall Canyon area by PRCC in 1981 resulted in 23 additional soils samples being collected, all of which were analyzed for texture. These samples were also universally of a loamy texture. White et. al. (1982) collected two undisturbed soil samples in the vicinity of the Schoolhouse Canyon coal refuse pile. These two samples were found to possess loam and clay loam textures.

Soil textures for the -2 mm size fraction of 5 undisturbed and 15 disturbed soils samples obtained from the 1995 soils sampling effort ranged from loam to sandy loam. Based on the UDOGM Suitability Criteria, both the undisturbed and disturbed soils sampled in 1995 can be classified as "good" relative to reclamation suitability. When textural modifiers associated with coarse fragment content is considered, essentially all of the disturbed soils and 80 percent of the undisturbed soils have unacceptable modifiers.

Soils textures for the 1996 soil samples were dominated by coarser materials. Of the 30 samples evaluated, 25 samples (83 percent) were found to correspond to the "good" reclamation suitability class relative to soil texture, while 4 samples (13 percent) corresponded to the "fair" reclamation suitability class and 1 sample (4 percent) fell within the "poor" reclamation suitability class as summarized by Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples.

When the soil materials are compared by type, 13 of 14 undisturbed soil samples (93 percent), 10 of 11 disturbed soil samples (91 percent) and 2 of 5 coal processing waste samples (40 percent) possess a "good" reclamation suitability with respect to soil texture. A "fair" reclamation potential with respect to soil texture was associated with 1 undisturbed and 1 disturbed soil sample (7 percent each) and 2 coal processing waste samples (40 percent). The only sample found to possess a "poor" reclamation suitability potential was a coal processing waste sample (10 percent). This comparison of suitability by material type suggests that for soil texture there is little measurable difference between the undisturbed and disturbed soils samples while coal processing waste materials possess a slightly lower reclamation potential.

Of the undisturbed soils which have been sampled in this area, the SCS reports that the USDA textural class for soil Mapping Unit 107 is gravelly loam, loam and clay loam. Textural classes for soil Mapping Unit 121 are reported to be extremely boulderly loam, loam, and very fine sandy loam. Soil Mapping Unit 63 is reported to have soil textures of cobbly loam, gravelly sandy loam, sandy loam, loam, and gravelly loam. Soil textures for soils Mapping Unit 72 are reported to be extremely stony loam, extremely cobbly loam, very cobbly loam and very stony fine sandy loam.

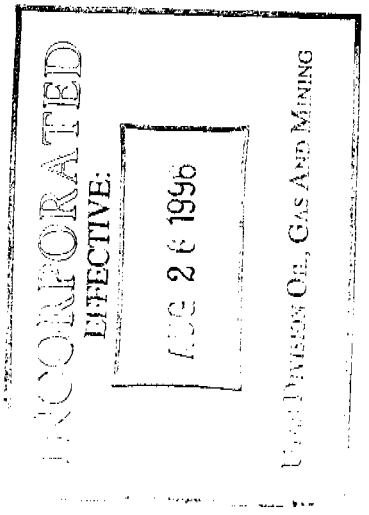
Disturbed soil textures have been widely sampled in this area. In the 1979 PRCC Soils Investigation, seven backhoe pits were dug in the Willow Creek and preparation plant area. From these pits a total of 15 different soil horizons were described which included soil textures. In-situ soil profile descriptions revealed that in the Willow Creek area textures for disturbed soils were mostly of a sandy loam textural class. In the preparation plant area soil textures were described as being predominately sandy loams. The six samples obtained in the 1988 sampling were found to have soil textures of sandy loams and loams.

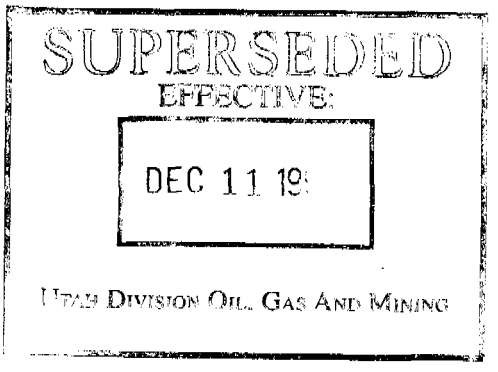
White et. al. (1982) evaluated seven samples of coal refuse materials for soil texture which were found to possess a sandy clay loam to sandy loam texture. Analysis of 41 samples of coal refuse by CGCC in 1990 revealed that all textures were in the sandy loam, loamy sand, and sand textural classes.

Roof and floor materials sampling for textural class was completed for all of the 44 samples obtained from the 1994 exploration and geotechnical drilling programs. This evaluation documented that sandy loam was the most dominant soil textural class, with loams and loamy sands also occurring frequently. Textural class for the geotechnical samples was found to be mostly sandy loams with one sample having a texture of loamy sand. Sampling of roof and floor samples from the Castle Gate A Seam at the Centennial Mine revealed that soil texture classes were a mixture of sandy loam, sand, and loamy sands. No textural analysis was completed for the potential waste rock materials.

Soil textures of the various materials evaluated in this analysis are presented in Table 3.1-3, Summary of Reclamation Suitability. This comparison suggests that there is little difference in suitability between disturbed and undisturbed soils, while the coal refuse materials possess a coarser texture with a slightly lower suitability. Without considering the textural modifiers or the influence of carbon and its propensity to skew laboratory textural results towards the sandy side, soil texture by itself has relatively limited value in determining the reclamation

suitability of any mine soil material. Eleven of the 16 disturbed samples examined for coarse fragment content had gravel contents greater than 30 percent. Documentation for Soil Pit No. 5 dug in 1979 notes that the depth of 0-33 inches contained 50 to 60 percent gravel and stones. Given this information, it is reasonable to assume that this sample would also rank as "unacceptable" with respect to texture due to the rock fragment modifier. According to the USDA-SCS Soils Survey, the Winetti soil series would also be largely "unacceptable." Three of the horizons have rock fragment contents greater than 35 percent. Only the C1 horizon at a depth of 6-11 inches would rank as "suitable". This horizon accounts for only 8.3 percent of the profile and, due to limited thickness, it could not practically be segregated during removal. Therefore, for all practical purposes, any undisturbed soils in areas adjacent to the mine facilities surface disturbance area would be ranked as "unacceptable" using the UDOGM suitability criteria. This interpretation is confirmed by the taxonomic designation for the Winetti soil series, i.e., loamy-skeletal, mixed (calcareous), frigid typic ustifluvents. Taxonomically this classification means that this soil contains more than 35 percent rock fragments to a depth corresponding to the lithic or paralithic contact (USDA-SCS, 1975).





Sodium Adsorption Ratio (SAR) - Undisturbed soil sampling to determine potential sodicity for these soils has been completed for many soils in the proposed Willow Creek Mine Permit Area. White et. al. (1982) sampled undisturbed soils in the Schoolhouse Canyon Area. This sampling reveals that the single soil sample tested had an SAR value of 0.47. The SCS Soil Survey contains no data on SAR values for the soils which occur in this area. Analysis of soil sodicity in conjunction with the 1995 soils sampling effort resulted in SAR values ranging from 0.09 to 0.54 for the undisturbed soils with a mean value of 0.242. For disturbed soils SAR values ranged from 0.18 to 1.19 with a mean value of 0.469. According to the UDOGM Suitability Guidelines, all of the 1995 soil samples would be characterized as "good" relative to reclamation suitability with respect to sodicity.

Disturbed soil samples obtained in connection with the 1988 BCC Willow Creek Mine area were found to have SAR values ranging from 0.3-1.1 with a mean of 0.62. The three 1989 ACZ samples had SAR values ranging from 0.17 to 0.95 with a mean of 0.45. The 12 disturbed soils samples obtained from the CGCC Preparation Plant Area were found to have SAR's ranging from 1.22 to 6.06 with an average value of 3.47.

Sodicity analysis for the 1996 soil samples yielded SAR values ranging from 0.10 to 1.25 with a mean value of 0.48. Based on the UDOGM Topsoil/Overburden Guidelines, SAR values for the 1996 samples rank in the "good" reclamation suitability class. This evaluation suggests that with respect to SAR and concerns over potential sodicity there is no difference between the various material types sampled relative to the reclamation suitability parameter of SAR.

The three coal refuse materials sampled by PRCC were found to have SAR's ranging from 0.24 to 3.85 with a mean value of 1.47. White et. al. (1982) reported SAR values which ranged from 0.22 to 3.62 for refuse materials in the PRCC permit area. The 43 refuse samples evaluated from this area in 1990 and 1994 possessed SAR values ranging from 0.42 to 10.2 with an average of 2.77.

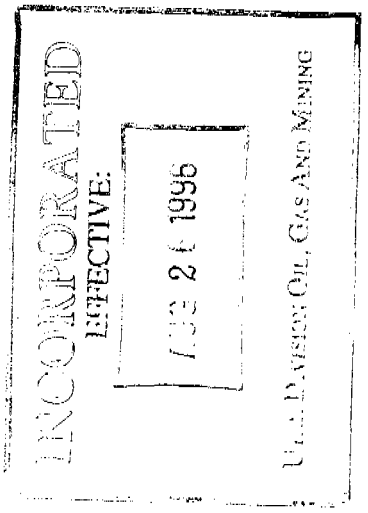
Six roof and floor material samples obtained from the D Seam were characterized in the PRCC Permit as having SAR values ranging from 0.96 to 11.2 with a mean value of 6.03. Andalex Resources reported that SAR values for the Castle Gate A Seam ranged from 1.24 to 3.37 with a mean value of 2.24. The samples obtained from the 1994 exploration drilling program resulted in SAR values which ranged from 0.4 to 89 with a mean value of 14.48. The four SAR values obtained from the geotechnical drilling yielded SAR values which ranged from 5.68 to 13.7 with a mean value of 10.80.

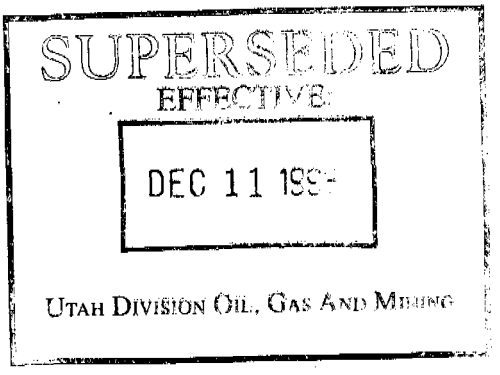
The 17 waste rock samples tested and reported in the PRCC Permit yielded SAR values ranging from 2.1 to 16.1 with a mean value of 7.47.

With respect to reclamation suitability, available evidence suggests that all of the Willow Creek Mine area undisturbed soils would rank "good" with respect to sodicity while the other materials possess a lower suitability as indicated by Table 3.1-3, Summary of Reclamation Suitability. Based strictly on raw sample analysis results, the roof/floor and waste rock samples obtained from the overburden drilling appear to be potentially toxic with additional sampling indicated. It is, however, important to remember that analyses of roof/floor and overburden/interburden materials is specifically intended to provide a reasonable indication of potential toxicity and reclamation suitability for coal refuse and mine waste materials which may be placed in surface disposal sites. For this site, numerous analyses for both actual refuse and waste samples corresponding to the same coal seams and overburden/interburden units to be mined are available from historic and recent sampling efforts. By way of comparison 79.6 percent of the existing coal refuse obtained from the same seams to be mined in the Willow Creek Mine, is ranked "good" for reclamation suitability with respect to sodicity while only 35.9 percent of the roof and floor samples fit this standard. If the two analysis sets represent the same material, this significant variance must reflect other factors.

Since the object of the geochemical sampling program is to characterize the potential refuse and waste materials which this mine will generate, the SAR characteristics of available analyses for in-mine and refuse material samples must be evaluated to determine if sample values are similar to the drillhole core materials which were used to evaluate these same materials and which form the basis for estimating the potential sodicity of these materials. When all of the drillhole data are combined they yield an average SAR value of 14.48. A corresponding average value for all of the in-mine materials sampled to date yields an SAR of 4.76. A *t*-test comparison of these values reveal that the mean SAR value of the drillhole data is significantly higher than that of the in-mine samples (probability $\leq$ 0.10) obtained from the same materials. The same comparison between coal refuse materials,

which have and average SAR value of 2.69, and the in-mine roof and floor samples which have an average SAR value of 4.76 reveals that the unweathered in-mine samples possess significantly higher sodicity values (probability $\leq$ 0.05) than do the weathered samples. A comparison of the SAR values from the 44 drillhole samples with those of the 46 refuse material samples reveals that the SAR values of the drillhole data, with a mean equal to 14.14, is significantly higher than those of the refuse materials, which have a mean of 2.69 (probability $\leq$ 0.001).





In-seam comparisons between the drillhole data and in-mine or refuse materials for specific coal seams result in some important conclusions. The drillhole SAR values for the D-Seam roof and floor materials were compared to lithologically identical roof and floor D-Seam materials obtained from in-mine sampling. The mean D-Seam SAR values for the drillhole data are 10.74 while those of the in-mine samples are 6.02. These mean values are statistically different at the 10 percent level. When the identical comparison is made using the A-Seam roof and floor materials, the mean SAR value from the drillhole data is 11.70, while that of the in-mine samples is 2.24. Due to the smaller sample size these values are not significantly different. When the roof and floor materials from the K-Seam are compared, an average SAR value of 28.91 is obtained from the drillhole samples while a mean SAR value of K-Seam refuse materials obtained from the AMR site is 1.25.

Another important comparison is that of SAR values between different drillholes. Drillhole 94-33-1 yields an average SAR value of 25.02, drillhole 94-31-1 has an average SAR value of 10.79, drillhole 94-12-1 has an average SAR value of 10.52 and drillhole 94-5-1 has an average SAR value of only 3.03. Since these holes essentially intercepted the same geologic strata they should have similar SAR values. A statistical analysis of these values reveal that drillhole 94-33-1 has significantly higher SAR values than every other drillhole with the exception of drillhole 94-31-1. These comparisons suggest a possible contamination during drilling. Discussions with the CPMC geologist who supervised this drilling effort and a careful examination of the Daily Drilling Reports maintained by the drillers confirms that bentonitic mud, soap, polymer and calcium chloride was used in drilling drillhole 94-33-1. Drilling contamination provides a reasonable explanation for the excessively high SAR values associated with this hole and help to explain why the in-mine samples of the identical strata yielded significantly lower SAR values.

The conclusions based on these comparisons are that due to contamination of the drillhole samples or their reduced state, the SAR values obtained from drillhole samples are completely dissimilar to analysis results for corresponding materials from the same lithological units obtained from in-mine sampling or from refuse materials. This comparison suggests that the potentially suspect SAR values obtained from the geochemical testing program are completely inconsistent with other sampling efforts and that the actual potential for elevated SAR values in the refuse materials which will be generated from these materials is much lower than would be suggested by the analysis results. A careful examination of all of the available data suggests there is actually very little potential for sodicity in the coal refuse or waste materials.

Selenium (Se) - Water soluble Se content of undisturbed soils in the Willow Creek Mine Facilities Area ranged from < 0.005 to a maximum value of 0.010 mg/kg with a mean value of 0.0076 mg/kg. For the disturbed soils sampled in the 1995 sampling effort the water soluble Se content ranged from < 0.005 to 0.016 mg/kg with a mean value of 0.0084 mg/kg. Based on the UDOGM Suitability Guidelines, all of the undisturbed and disturbed soils sampled would possess a "good" suitability with respect to water soluble Se. Given the close correlation of elevated Se levels with salinity, it is safe to assume that the undisturbed soils possess Se values below the UDOGM suspect value of 0.1 mg/kg. The USDA-SCS Soils Survey does not report Se concentrations for area soils.

Disturbed soils sampled in 1988 for the BCC were found to have Se values ranging from -0.01 to 0.03 mg/kg with a mean of 0.017 mg/kg water soluble selenium. The 1989 BCC sediment samples were found to have Se values ranging from -0.01 to 0.20mg/kg with a mean value of 0.07 mg/kg. The selenium content for samples from the 1990 sampling of disturbed soils in the vicinity of the CGCC Preparation Plant area was reported to be to less than 0.01 ppm.

The water soluble Se values for the 1996 soil samples ranged from < 0.005 to 0.63 mg/kg with an average value of 0.038 mg/kg. According to the UDOGM's Topsoil/Overburden Suitability Guidelines, 28 of the 30 samples (93.3 percent) tested correspond to the "good" reclamation suitability class with respect to Se while 2 samples (6.7 percent) correspond to the "unsuitable" reclamation suitability class. One of the samples designated as unsuitable corresponds to an disturbed soil sample and the other corresponds to a coal processing waste sample. This evaluation suggests that based upon the 1996 samples approximately 9 percent of the disturbed soil materials and 20 percent of the coal processing waste materials can be characterized as "unsuitable" relative to Se.

A single sample of D-Seam refuse material sampled in the PRCC Permit was reported to have an Se value of 0.002 mg/l. Analysis of the two K-Seam refuse samples from the Willow Creek AMR site resulted in selenium values of 0.03 and 0.02 mg/kg respectively. Se content of 41 refuse samples from the Schoolhouse Canyon refuse

pile sampled in 1990 resulted in measured Se concentrations ranging from a low of less than 0.01 to a high of 0.14 ppm with an average of 0.0334 ppm. Analysis of the two K-Seam refuse samples obtained from the AMR site on Willow Creek resulted in Se values ranging from 0.02 to 0.03 mg/kg with an average value of 0.025 mg/kg.

Two roof and floor material samples reported in the PRCC Permit for the D-Seam had Se values of 0.003 ppm. Three A-Seam samples of roof and floor materials from the Centennial Mine were found to have Se values ranging from < 0.02 to 0.03 mg/kg with a mean value of 0.022 mg/kg. Se values obtained from the 1994

CPMC exploration drilling program resulted in Se values ranging from 0.01 to 0.17 mg/kg with a mean of 0.04 mg/kg being reported. The geotechnical drilling at the proposed portal area resulted in Se values ranging from 0.01 to 0.07 mg/kg with a mean value of 0.035 mg/kg being obtained. No Se sampling has been conducted on potential interburden materials at this site.

A comparison of the reclamation suitability of these materials with the Se criteria found in the UDOGM Topsoil/Overburden Guidelines suggests that there is little difference between the four materials evaluated as shown on Table 3.1-3, Summary of Reclamation Suitability. This evaluation suggests that with mixing of disturbed soils and refuse materials which will occur during regrading operations as part of site reclamation, the resulting potential growth media would possess a "good" reclamation rating with respect to water soluble Se. Se concentrations are often reported as being elevated in carbonaceous materials, especially coal refuse materials. Since selenium levels for 98 percent of the actual coal refuse samples analyzed for this area are well below the suspect level, it is reasonable to assume that selenium will not be a significant revegetation concern.

Boron (B) - Water soluble B content for the undisturbed soils in the proposed Willow Creek Mine Facilities Area ranged from 0.08 to 0.27 mg/kg with an average of 0.168 mg/kg. For the disturbed soils, water soluble B content for the 1995 samples ranged from 0.14 to 2.53 mg/kg with a mean value of 1.201. According to the UDOGM Suitability Guidelines, all rooting zone materials possessing water soluble B values of less than 5.0 mg/kg possess a "good" suitability with respect to B. This comparison suggests that all of the 1995 undisturbed and disturbed soils samples would be satisfactory with respect to water souble B. Given the close correlation of elevated B levels with salinity it would be safe to assume that nearly all of the undisturbed soils possess B values below the UDOGM suspect value of 5 mg/kg. The USDA-SCS Soils Survey does not report Se concentrations for these soils. White et. al. (1982) reported that a single undisturbed topsoil sample in the Schoolhouse Canyon area had a total B concentration of 58 ppm.

Sampling of the disturbed soils in this area has resulted in several samples being analyzed for water soluble B. The six 1988 BCC samples were found to have hot water soluble B values ranging from 0.9 to 2.2 mg/kg with a mean value of 1.72 mg/kg. The three 1989 BCC samples had B values ranging from 1.2 to 1.9 mg/kg with a mean value of 1.57 mg/kg. Disturbed soil samples from the CGCC preparation plant area indicate boron concentrations ranging from 0.27 to 4.00 ppm with a mean value of 1.14 ppm.

The average water soluble B value for the 1996 soil samples was 2.67 mg/kg with a range of values from 0.39 to 10.50 mg/kg. Application of the UDOGM Topsoil/Overburden Suitability Guidelines reveals that 25 samples (83.3 percent) correspond to the "good" reclamation suitability class and 5 samples (16.7 percent) correspond to the "unsuitable" reclamation suitability class as summarized by Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples. Of the samples possessing potentially "unsuitable" B levels, two samples are disturbed soils and three samples are coal processing waste materials. This evaluation suggests that based upon the 1996 sampling data, approximately 18 percent of the disturbed soil materials and 60 percent of the coal processing waste materials possess potentially "unsuitable" Boron concentrations.

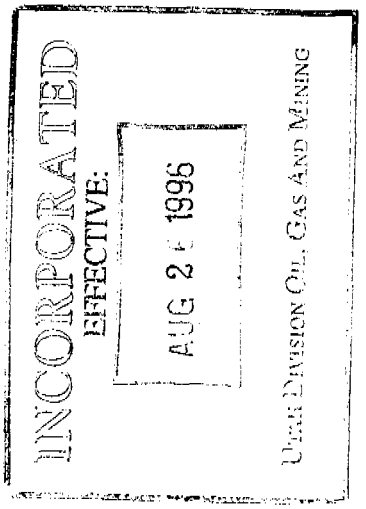
No water soluble B values are available for the refuse analyses included in the 1984 PRCC Permit application however, one sample identified as refuse from the Number 5 mine, (D-Seam) is reported to contain a total B concentration of 200 ppm. Coal refuse samples collected from the Schoolhouse Canyon refuse pile in 1990 resulted in boron values ranging from 0.25 to 1.67 ppm with a mean value of 0.76. Boron concentrations for two samples of K-Seam refuse materials from the Willow Creek AML site were 4.5 and 7.2, respectively.

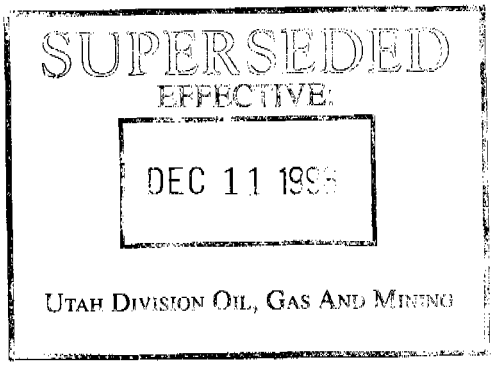
Roof and floor materials sampled in connection with in-mine sampling from the PRCC Permit resulted in four samples being tested with a B range from 0.8 to 1.9 ppm with a mean value of 1.30 ppm. The 40 samples of roof and floor materials sampled in the 1994 exploration program yielded values ranging from 0.1 to 5.7 mg/kg with a mean value of 1.29 mg/kg. Corresponding materials sampled in the geotechnical drilling program yielded values ranging from 0.41 to 1.40 mg/kg with a mean value of 0.94 mg/kg.

Of the 17 samples of interburden waste rock material analyzed in the PRCC Permit, water soluble B values were found to range from 0.5 to 1.7 ppm with a mean value of 0.92 ppm.

With respect to potential reclamation suitability, the materials evaluated would qualify as "good" for reclamation with respect to water soluble B once the materials have been mixed during the coal benefication process.

Acid Base Potential (ABP) - The ABP method has been developed as a means of predicting potential acidification of unweathered overburden materials that have been removed from a reduced and placed in an oxidizing environment. Changes in the UDOGM's ABP analysis methodologies and suitability criteria over the years have resulted in ABP data for this area reflecting two significantly different accounting methods. Prior to the April 1988 revision of the UDOGM Topsoil/Overburden Guidelines, which resulted in ABP being calculated based upon "total non-sulfate sulfur", ABP analyses calculations were based on "total sulfur". Dependent on the sulfur forms present, the two methodologies can yield significantly different results with the earlier analyses based on total sulfur potentially exaggerating the potential for acid formation. The majority of





the ABP data collected for this site are historical data calculated on the basis of "total sulfur". These ABP calculations were not reevaluated unless the ABP values were determined to be less than five tons $CaCO_3$ per 1,000 tons of material.

Analysis of ABP for undisturbed soils was conducted in conjunction with the 1995 soils sampling effort. ABP values were found to range from 56 tons to 184 tons/thousand tons (KT) with a mean value of 103.2 tons/KT. For the 1995 disturbed soil samples, the ABP values were found to range from 70 to 130 tons/KT with an average value of 98.53 tons/KT. These relatively high values indicate that both the undisturbed and disturbed soils have more than adequate buffering capacity to preclude potential acidification of these materials when used as cover soil materials. Analysis of ABP, however, for disturbed soils include a number of soil samples. All six 1988 BCC disturbed area soils samples were found to have very low total sulfur and very high calcium carbonate levels which together resulted in very high ABP values ranging from an excess of 79 to 98 tons of $CaCO_3$ per 1,000 tons of material with a mean of 86.7 tons CaCO3 per 1,000 tons material. It is important to note that this analysis was done under the old UDOGM criteria, under which acid potential was based on total sulfur, so the acid potential is somewhat exaggerated. The three 1989 BCC disturbed soils samples yielded ABP values ranging from 71 to 90 tons CaCO3 per 1,000 tons of material, with an average of 78.67 tons CaCO3 per 1,000 tons of material. Analysis of disturbed soil samples from the CGCC preparation plant area resulted in ABP values ranging from 124 to 213 tons CaCO3 per 1,000 tons of material with an average value of 150.6 tons CaCO3 per 1,000 tons of material.

The 1996 soil samples analyzed for ABP were found to have values ranging from 20 tons CaCO3 per 1,000 tons of material to 165 tons CaCO3 per 1,000 tons of material. The average Acid Base Potential value was calculated to equal 92.7 tons CaCO3 per 1,000 tons of material as summarized by Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples. Application of the UDOGM's Topsoil/Overburden Suitability Guidelines indicate that all of the materials sampled possess a "good" reclamation potential with respect to ABP and none of these materials have the potential to generate acidic drainage.

Examination of the coal refuse data from the CGCC preparation plant indicates that ABP was evaluated for three samples as reported in the PRCC Permit. These ABP values ranged from an excess of 14 to 35 tons CaCO3 of $CaCO_3$ per 1,000 tons of material. Analysis of refuse material samples from the Schoolhouse Canyon refuse pile resulted in ABP values ranging from 54.8 to 256 tons CaCO3 per 1,000 tons of material with an average of 112.3 tons CaCO3 per 1,000 tons of material for the 41 samples tested. The two AMR K-Seam refuse samples yielded ABP values of 66 and 39 tons CaCO3 per 1,000 tons of material, respectively.

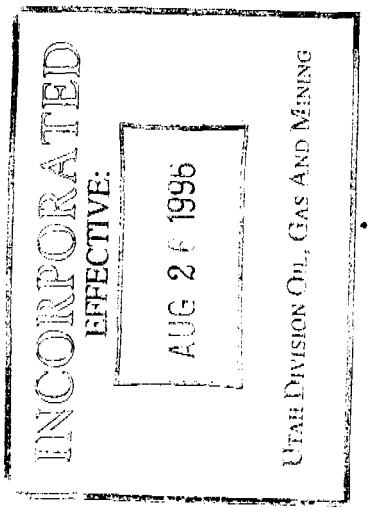
Roof and floor materials sampled in the original PRCC Permit yielded ABP values for D-Seam materials ranging from 0 to 30 tons CaCO3 per 1,000 tons material with an average of 14.25 tons CaCO3 per 1,000 tons. These analyses were conducted on the basis of total sulfur. The 40 samples analyzed from the 1994 exploration program yielded ABP values ranging from -51.6 to 318.6 tons CaCO3 tons material with a mean value of 45.91 tons CaCO3 per 1,000 tons material. The 4 samples from the portal geotechnical drilling effort yielded ABP values ranging from 2.6 to 199 tons CaCO3 per 1,000 tons material with a mean value of 64.4 tons CaCO3 per 1,000 tons material. Waste rock material evaluation of 17 samples as described in the PRCC permit yielded ABP values ranging from 0 to 90 tons CaCO3 per 1,000 tons material with a mean value of 37.8 tons CaCO3 per 1,000 tons of material.

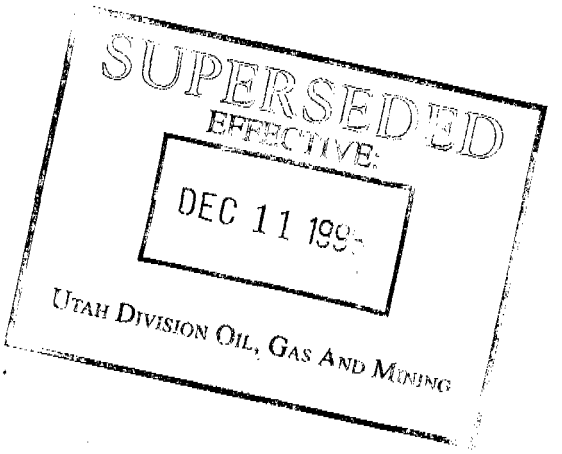
Based on the UDOGM Topsoil/Overburden Guidelines for ABP, all of the undisturbed and disturbed soils, coal refuse materials, and waste rock tested would be rated as having a "good" reclamation suitability with respect to potentially acidity as summarized by Table 3.1-3, Summary of Reclamation Suitability.

All of the soil samples collected from the disturbed Willow Creek Mine area contain varying amounts of visible waste coal. In fact, sampling Site AEP #3 was purposely placed in a area that contained a very high percentage of waste coal and could reasonably be classified as refuse material. Since coal waste materials are frequently associated with increased potential for acid generation, the elevated coal content of these materials suggests that oxidization of these materials could be a potential concern. Examination of pH values for this area indicates that some measurable acidification has occurred, with significantly lower pH values for disturbed soils and refuse samples than for undisturbed soils from adjacent areas. It is important to note, however, that pH values for undisturbed soils in this area are naturally high (alkaline soils) and that disturbed soil and refuse materials, some

of which have undergone significant weathering and oxidation, still fall within the "good" suitability category as described in the previous evaluation for pH.

Examination of the available information for coal refuse and disturbed soils containing waste coal in this area suggests that the potential for acidification of these materials over time to the point where they would become unsuitable for use in the vegetative rooting zone is extremely remote. Sulfur content and the associated acidification potential are low and calcium carbonate, with its associated capability to neutralize acid is high. According to the coal quality information presented on pages 6-8 and 6-9 of the BCC Permit, the maximum





sulfur value for all of the coals analyzed is 0.89 percent total sulfur. The CGCC Mine Permit application reports that the highest "total sulfur" value encountered in the coal refuse materials is 0.50 percent. By comparison, the lowest percent $CaCO_3$ value obtained from the 84 disturbed soils and refuse samples analyzed is 6.45 percent and most values are significantly higher. For the data obtained from the 1994 exploration program, the highest "total sulfur" value obtained is 0.79 percent and the lowest CaCO3 value reported, both from the C-Seam materials is 0.4 percent.

Using the highest possible "total sulfur" values reported for this area (0.89 percent total S), assuming that all of the sulfur would oxidize (this would never occur since organic sulfur is the dominant component and does not readily oxidize), and using the lowest $CaCO_3$ value (7.1% $CaCO_3$) for potential substitute materials obtained by recovery of the disturbed soils present on this site, the amount of soil needed to neutralize any acid potentially generated can be calculated. Using this approach, a thickness of only 2.55 inches of material containing 7.1 percent $CaCO_3$ would be necessary to totally neutralize any acid produced. This calculation also clearly demonstrates that it is almost impossible for the Willow Creek soils materials to become acidic over time and suggests that under the very worst set of conditions that a potential reclamation medium of 2.6 parts coal to 1.0 part soil would not turn acidic over time. Based on the available information, there is almost no theoretical potential for any of the materials exclusive of the C-Seam to become acidic over time. The potential of the C-Seam materials becoming acidic is very limited and mixing or covering these materials with a minimum thickness of soil or substitute soil material would readily neutralize any potential acidity which might occur.

Available Water Capacity (AWC) - The range of measured AWC for the undisturbed soils which occur in this area is given in the USDA-SCS Soil Survey. Soil Mapping Unit 107 is reported to have an AWC ranging from 0.0.06 to 0.17 inches of water per inch of soil (in/in) with a weighted average AWC of 0.081 in/in. The AWC for soils Mapping Unit 121 is reported to range from 0.06 to 0.16 in/in with a weighted average of 0.128 in/in. The AWC for soils Mapping Unit 63 is reported to range from 0.11 to 0.14 in/in with a weighted average of 0.125 in/in. The AWC for soils Mapping Unit 72 ranges from 0.04 to 0.08 in/in with a weighted average of 0.063 in/in. The weighted average AWC for all undisturbed soils is 0.087 in/in. All of the soils samples resulting from the 1995 soils sampling effort were analyzed by the Soils Testing Laboratory of Colorado State University (CSU) for AWC. When the data were examined, however, it was evident that the values reported pertain only to the -2 mm size fraction and were not adjusted for coarse fragment content as is commonly done in soils survey work and as outlined in the UDOGM Suitability Guidelines. In order, therefore to standardize the data, all of the AWC contents reported by CSU were adjusted for coarse fragment content so the values could be compared directly to the UDOGM Suitability Guidelines.

Of the 5 undisturbed soils sampled for AWC in the Willow Creek Mine area, AWC values were found to range from 0.058 to 0.084 inches of potential water per inch of soil with an average value of 0.0698 in/in. For the 15 disturbed soil samples evaluated for AWC, the potential water storage capacity was found to range from 0.056 to 0.090 in/in with an average value of 0.0703 in/in. When compared with the UDOGM Suitability Guidelines, all of the undisturbed and disturbed soils sampled in 1995 were found to possess a "fair" reclamation suitability with respect to AWC.

The disturbed soils AWC for six 1988 BCC samples was found to range from 0.06 to 0.08 in/in with a mean of 0.072 in/in of AWC. The three 1989 BCC sediment pond samples ranged from 0.10 to 0.16 in/in with an average of 0.127 in/in of AWC. The nine 1989 BCC geotechnical soil samples ranged from 0.06 to 0.13 in/in with an average of 0.098 in/in of AWC. The eleven samples from the CGCC Preparation Plant area ranged in AWC from 0.05 to 0.06 in/in with an average of 0.058 in/in.

For the 1996 soils samples, AWC was found to range from 0.0200 to 0.2066 in/in with an average value of 0.0588 in/in. Based upon the summary found in Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples, 1 sample (3.3 percent) was found to correspond to the "good" reclamation suitability class, 17 samples (56.7 percent) to the "fair" reclamation suitability class and 12 samples (40 percent) to the "poor" reclamation suitability class. These values are similar to the results of previous testing for this site and show that restricted AWC of the soils materials at this site is one of the major reclamation limitations of these soil materials.

In comparing soil types, the sample possessing a "good" reclamation suitability with respect to AWC was a disturbed soil sample (WC96-2, 58"- 82"). This sample, however, also exhibited the highest EC and Se values encountered. Those materials found to possess a "fair" reclamation suitability with respect to AWC included 7

of 14 (50 percent) undisturbed soils samples, 7 of 11 (64 percent) disturbed soils samples, and 3 of 5 (60 percent) coal possessing waste material samples. For materials ranked as having a "poor" reclamation suitability with respect to AWC, 7 of 14 (50 percent) undisturbed soil samples, 3 of 11 (27 percent) disturbed soil samples, and 2 of 5 (40 percent) coal processing waste material samples fall within this suitability class. This comparison suggests that with respect to AWC, the disturbed soils and coal processing waste materials possess slightly higher reclamation suitability than do the undisturbed soils found on this site.

The 41 refuse samples collected from the Schoolhouse Canyon refuse pile yielded AWC values ranging from 0.02 to 0.08 in/in with an average of 0.043 in/in of AWC. Coarse fragment content for the AMR refuse samples, the 1994 roof and floor samples, and the PRCC interburden samples was not determined so AWC could not be calculated on these samples.

Based on the UDOGM Topsoil/Overburden Guidelines, undisturbed soil types 121 and 63 would rate as having a "good" reclamation suitability with respect to AWC while soil types 107 and 72 would posses a "fair" AWC as indicated by reclamation suitability. The overall suitability for AWC for the undisturbed soils would be "fair" Table 3.1-2, Summary of Reclamation Suitability. This comparison suggests that disturbed soils and coal refuse materials have slightly lower suitability rankings than do the undisturbed soils at this site.

Pebbles (> 2mm & < 3 inch) - The rock fragment content of pebble sized materials for the undisturbed soils which occur in this area is given in the USDA-SCS Soil Survey. For the Winetti Series component of soil Mapping Unit 107 it is reported that pebbles range from 0 to 40 percent of the volume of the solum with a weighted average of 29.99 percent. The pebble content for the Travessilla Series component of soils Mapping Unit 121 is reported to range from 0 to 15 percent with a weighted average of 12 percent. The AWC for the Podo Series component of soils Mapping Unit 63 is reported to range from 10 to 25 percent with a weighted average of 15.9 percent. The pebble content for the Pathead component of soils Mapping Unit 72 ranges from 5 to 20 percent with a weighted average of 18.3 percent. The weighted average pebble content for these soils is 21.0 percent. Three backhoe pits from the 1979 PRCC Soil Survey were dug in the undisturbed soils in the Crandall Canyon Area. Pit 1 was reported to have pebble content ranging from 0 to 20 percent with a weighted mean value of 2.8 percent pebbles to a 58 inch depth. Pit 2 was reported to have a pebble content ranging from 0 to 60 percent with a weighted mean value of 6.1 percent pebbles. Pit 3 was reported to have a pebble content ranging from 0 to 5 percent with a weighted mean value of 0.4 percent. The weighted average pebble content of these Crandall Canyon soils is 3.1 percent. For all undisturbed soils the weighted average pebble content is 9.8 percent.

Pebble content of soils sampled in 1995 indicates that for undisturbed soils the size fraction greater than 2 mm and less than 3 inches in diameter ranges from 26.5 to 66.3 percent with an average value of 48.3 percent. For the disturbed soils, pebble content was found to range from 33.5 to 58.1 percent with an average value of 47.63 percent. According to the UDOGM Suitability Guidelines, 80 percent of the undisturbed soils and 100 percent of the disturbed soils possess an "unacceptable" ranking with respect to pebble contents.

Pebble content for the 1996 soil samples ranged from 2.0 percent to 72.5 percent with an average value of 30.6 percent. Based on the UDOGM's Topsoil/Overburden Suitability Guidelines, 6 samples (20 percent) correspond to the "good" reclamation suitability class, 3 samples (10 percent) correspond to the "fair" reclamation suitability class, 6 samples (20 percent) correspond to the "poor" reclamation suitability class, and 15 samples (50 percent) were found to correspond to the "unsuitable" reclamation suitability class. When all samples are averaged, the sampled materials were found to be "unsuitable" relative to pebble content as a reclamation rooting zone medium as summarized by Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples.

The only undisturbed soil sample which ranked "acceptable" relative to pebble content corresponds to the surface layer for Sample 95-13-0, from 0 to 5 inches in depth. This layer overlies a layer having a coarse fragment content of 49.4 percent. According to the soils sample log provided in Exhibit 5, Soils Information, these soils occur on a very steep slope and it would be operationally infeasible to salvage these soils layers separately. Based on the 1995 sampling and the related soil profile information, all of the undisturbed and disturbed soil materials which could realistically be salvaged from the proposed mine surface facilities area possess an "unacceptable" ranking relative to reclamation suitability with respect to pebble content.

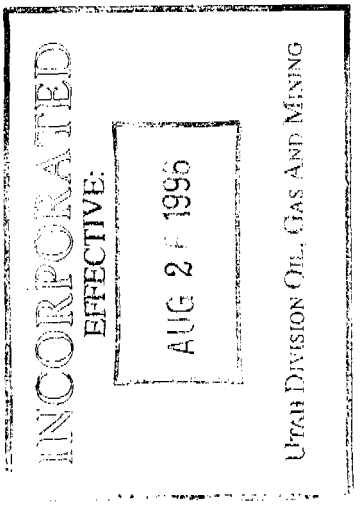
In disturbed soils the pebble content was evaluated from six backhoe pits dug at Willow Creek and in the Castle Gate preparation plant area. The pebble content these sites ranged from 0 to 50 percent with a weighted average of 2.3 percent. Gravel content for the 1988 BCC Willow Creek disturbed soil samples ranged from 26 to 74 percent with a weighted mean of 60 percent. The pebble content of the 1989 BCC sediment pond samples ranged from 4.7 to 29.4 percent with a mean value of 15.6 percent while the pebble content of the nine 1994 geotechnical holes ranged from 25.8 to 53.5 percent with a mean value of 41.3 percent. The 10 soil samples in the CGCC coal preparation plant area were reported to have pebble contents ranging from 22.6 to 53.0 percent with a mean value of 36.5 percent.

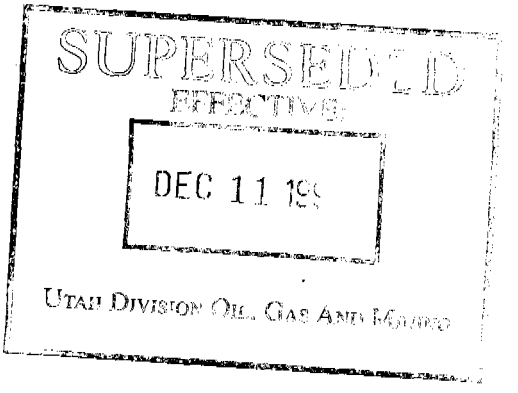
Coal refuse materials were sampled at various locations at this site. The pebble content of materials at the Schoolhouse Canyon refuse site based upon 38 samples ranged from 24.0 to 74.9 percent with an average value of 54.9 percent. The two refuse samples from the AMR site were found to have pebble contents of 40.5 and 43.7 percent.

Based on the UDOGM Topsoil/Overburden Guidelines, undisturbed soils at the proposed Willow Creek Facilities Area in Mapping Units 121, 72 and 63 possess "fair" suitability rankings with respect to pebble content while the soils in Mapping Unit 107 possess a "poor" reclamation suitability with respect to pebble content. The undisturbed soils sampled in the Crandall Canyon area all possess a "good" reclamation suitability with respect to pebble content. The overall suitability of these materials is "good" and a breakdown of the number of observations falling into each suitability class is given in Table 3.1-3, Summary of Reclamation Suitability. This comparison suggests

that using these criteria, the pebble content of the disturbed soils and coal refuse materials is slightly lower than that of the undisturbed soils. No data on pebble content was collected for the roof and floor samples or interburden for this location due to the nature of these samples.

Percent Cobbles (3-10 inch) - The cobble content for the undisturbed soils which occur in the Willow Creek mine facilities area is given in the USDA-SCS Soil Survey. For the Winetti Series component of soil Mapping Unit 107 it is reported that the cobble content ranges from 0 to 45 percent of the volume of the solum with a





weighted average of 28.9 percent. The cobble content for the Travessilla Series component of soils Mapping Unit 121 ranges from 0 to 65 percent with a weighted mean value of 14.0 percent. The cobble content for the Podo Series of soils Mapping Unit 63 ranges from 0 to 20 percent with a weighted mean value of 6.4 percent. The Pathead component of soils Mapping Unit 72 has a cobble content ranging from 40 to 80 percent with a weighted average of 50.4 percent. Three backhoe pits from the 1979 PRCC Soil Survey were dug in the undisturbed soils in the Crandall Canyon Area and all were reported to have no cobble.

Cobble content was evaluated on six backhoe pits dug in the disturbed areas at Willow Creek and in the Castle Gate preparation plant area. The cobble content these sites ranged from 0 to 70 percent with a weighted average of 16.2 percent. The six 1988 BCC Willow Creek disturbed soil material samples ranged from 0 to 15 percent with a mean value of 3.3 percent cobbles. For the 10 soils sampled in the CGCC preparation plant area in the 1990 sampling program, cobble contents were not reported. The cobble content of coal refuse materials, roof and floor materials and waste rock were not sampled at this location.

Cobble content for the 1996 soil samples ranged from a low of 0 percent to a high of 32 percent with a mean value of 9.9 percent. When compared to the UDOGM's Topsoil/Overburden Suitability Guidelines, 29 samples (81 percent) correspond to the "good" reclamation suitability class, 4 samples (11 percent) correspond to the "fair" reclamation suitability class, and 3 samples (8 percent) fall within the "unsuitable" class relative to suitability based on cobble content as summarized by Table 3.1-4, Summary of Reclamation Suitability - 1996 Soil Samples.

Based on the UDOGM Topsoil/Overburden Guidelines, undisturbed soils the Willow Creek facilities area in Mapping Units 121 and 63 possess "good" suitability rankings with respect to cobble content, soils in Mapping Unit 107 possess a "poor" reclamation suitability, and soil Mapping Unit 72 possess an "unacceptable" reclamation suitability with respect to pebble content. The undisturbed soils sampled in the Crandall Canyon Mine area all possess a "good" reclamation suitability with respect to pebble content. The overall suitability of the undisturbed soils at this site is given in Table 3.1-3, Summary of Reclamation Suitability. This comparison suggests that the cobble content suitability of the disturbed soils and coal refuse materials is slightly lower than that of the undisturbed soils at this site. No data on cobble content was collected for the coal refuse, roof and floor samples or interburden for this location.

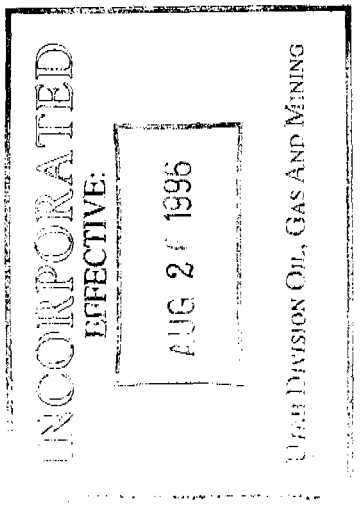
Percent Stones and Boulders (greater than 10 inch) - The stone (10 to 24 inches) and boulder content of the undisturbed soils found at the Willow Creek Mine are given in the USDA-SCS Soil Survey. For soils Mapping Unit 107 the stone and boulder content ranges from 0 to 25 percent with a weighted mean value of 14.3 percent. For soils Mapping Unit 72 the stone and boulder content ranges from 5 to 45 percent with a mean value of 9.6 percent. Soils in Mapping Units 107 and 63 do not possess measurable stone and boulder content. The stone and boulder content of undisturbed soils sampled in Crandall Canyon ranged from 0 to 30 percent with a mean value of 7.3 percent stones and boulders.

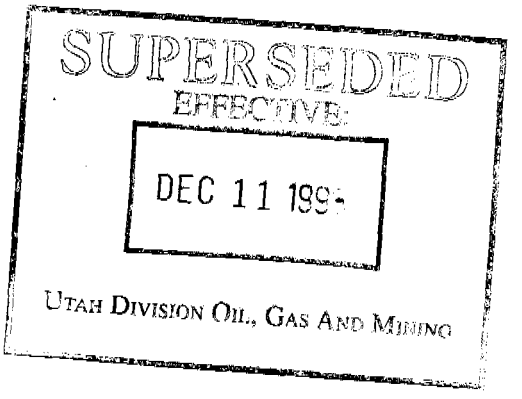
Disturbed soils sampled by PRCC at Willow Creek and in the vicinity of the CGCC preparation plant resulted in a total of 17 observations being taken to describe the stone and boulder content of these materials and yielded stone and boulder contents ranging from 0 to 60 percent with a weighted mean value of 22.7 percent. No sampling of stone and boulder content of coal refuse, roof and floor materials or interburden waste rock occurred due to the nature of these samples.

The combined stone and boulder content of the 36 soil horizons sampled in 1996 ranged from 0 to 23 percent stones with an average value of 5.7 percent. Boulder content was found to range from 0 to 42 percent with an average value of 8.8 percent. Comparing these values with the UDOGM's Topsoil/Overburden Suitability Guidelines, 15 samples (42 percent) correspond to potentially "good" reclamation rooting zone medium, 4 samples (11 percent) as "fair" rooting medium, 2 samples (6 percent) possess a "poor" reclamation rooting zone suitability, and 15 samples (42 percent) were found to correspond to the "unsuitable" reclamation rooting zone suitability class. When all of the samples were averaged, the mean combined stone and boulder content equals 14.5 percent which corresponds to the "unsuitable" reclamation suitability class.

Application of the UDOGM suitability criteria to the stone and boulder content data reveal that the stone and boulder content of disturbed soils is slightly lower, resulting in a slightly higher reclamation suitability, compared to the undisturbed soils, and that these materials are of equal or higher reclamation suitability with respect to their stone and boulder content than the undisturbed soils in this area. The smaller percentage of larger rocks in the disturbed soils reflects the fact that these soils have broken down with successive placement and handling.

Comparison of the ten parameters in the UDOGM Topsoil and Overburden Guidelines to the data available from this site indicates that the disturbed Willow Creek soils samples possess suitability characteristics similar to those associated with the undisturbed soils which have been evaluated for this site. Evaluation of the available sampling data reveals only three parameters which are significantly different when comparing the existing disturbed Willow Creek soils with the undisturbed native Winetti soil type. The pH values are significantly different at the 0.01 percent level, the stone and boulder content is significantly different at the 0.05 level, and the gravel content is significantly different at the 0.10 level. Differences in pH values and their implications relative to revegetation potential have previously been addressed in the evaluation of suitability for pH. For this site, the slight acidification due to oxidation of coally material and accompanying reduction in pH values for the disturbed soils has had the beneficial effect of buffering naturally alkaline soils to produce a soil material which offers enhanced suitability as a potential revegetation medium. Numerous researchers have advocated applying waste coal to calcareous western soils to lower the pH and increase nutrient availability. Site data





VOLUME 9

EXHIBIT 6 - VEGETATION, FISH, AND WILDLIFE INFORMATION

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Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

State of Utah

DEPARTMENT OF NATURAL RESOURCES
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December 11, 1996

Ben Grimes
Cyprus Plateau Mining
P.O. Drawer PMC
Price, Utah 84501

Re: Topsoil Revision, Division Order 96A, Willow Creek Mine, Cyprus Plateau Mining, ACT/007/038-96C, Folder #2, Carbon County, Utah

Dear Mr. Grimes:

The above mentioned amendment is hereby approved by the Division, effective December 11, 1996. A stamped incorporated copy is enclosed for insertion into your mining and reclamation plan.

If you have any questions please call me at 538-5290.

Sincerely,

Joseph C. Helfrich
Permit Supervisor

blb
Enclosure
cc: Ranvir Singh, OSM
Mark Bailey, BLM
Mark Page, Water Rights, Price (w/o)
Dave Ariotti, Health, Price (w/o)
Bill Bates, Wildlife, Price (w/o)
David Terry, Trust Lands (w/o)
PFO
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TERRAMATRIX inc.

ENGINEERING AND ENVIRONMENTAL SERVICES

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To: Joe Helfrich/Bob Davidson	From: Jerry Nettleton
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TOTAL NUMBER OF PAGES (Including This Cover Sheet): 11

DATE: August 1, 1996 CHARGE NUMBER: 866 CHARGED AMOUNT: ____

Comments/Notes:

Joe/Bob - As I mentioned on the phone we are having some problems with our computer system in terms of generating revised permit pages. Attached, however, are the draft transmittal letter and revisions which respond to Division Order 96A for the soils section of the Willow Creek Mine Permit. We will continue trying to finalize the corresponding revision pages and hope to be able to Fedex a complete revision package with revised text and maps tomorrow. Thanks for your patience and consideration.

IF YOU DO NOT RECEIVE LEGIBLE COPIES OF ALL PAGES,
PLEASE CALL BACK AS SOON AS POSSIBLE

Mr. Joseph C. Helfrich
Permit Supervisor
Utah Division of Oil, Gas & Mining
1594 West North Temple
Salt Lake City, UT 84114-5801
(801) 538-5340

DRAFT

29 July 1996

Re: Willow Creek Mine (Permit ACT/007/038) - Response to Division Order 96A, Regarding Soil Salvage Operations in the School House Canyon Refuse Pile Area and in the area of Conveyor Segments SC-6 and SC-7.

Dear Mr. Helfrich:

As directed by Ben Grimes of Cyprus Plateau Mining Corporation (CPMC), this response addresses soil salvage operations in the vicinity of the School House Canyon Refuse Pile and also in the vicinity of proposed Conveyor Segments SC-6 and SC-7. The information provided in this submittal was collected and response discussions prepared by Mr. Kent A. Crofts, a consultant to CPMC. Mr Crofts conducted detailed site investigations of the subject areas on July 12-13, 1996 including characterization of the soils found in these areas and collection of soil samples. Due, however to normal turn-around times for completion of laboratory soil analyses, sample analysis data are not yet available. Analysis results and an evaluation of soil suitability based on the results will be submitted to UDOGM following receipt.

This submittal responds to the following UDOGM comment as contained in Division Order 96A:

> *The Division finds the permit deficient in that the existing Mining and Reclamation Plan (MRP) does not address soil salvage in the Schoolhouse Canyon Refuse Pile area and soil salvage and reclamation in the area of conveyors SC-6 and SC-7 and associated transfer buildings being constructed for the Willow Creek Mine (R645-301-230 - Operations Plan; R645-301-240 - Reclamation Plan).*
>
> *In order to comply with these regulations, the permittee must amend the mining and reclamation plan to address pertinent requirements to remove and store topsoil resources in the identified areas and to replace topsoil during reclamation in the conveyor area.*

Pursuant to discussions between Robert Davidson of UDOGM and Ben Grimes of CPMC, it was agreed that additional soils pits would be excavated in the Schoolhouse Canyon Refuse Pile Area to characterize existing soil resources and evaluate the feasibility of soil salvage in the refuse pile area and that soil salvage potential along the proposed Conveyor would be investigated. The supplemental soils characterization work was initiated on July 12, 1996 and completed on July 13, 1996. Field work involved excavation and characterization of soil horizons in 10 soils pits in the refuse pile area and sampling of 6 of these pits for physical and chemical soils properties. Soils in the vicinity of proposed Conveyor [illegible] examined. The results of this field sampling effort are summarized by the accompanying revised permit pages (pages 3.1-6A, 4.2-). This submittal also includes a revised soils map (Map 4).

This information should be sufficient to allow UDOGM to proceed to vacate the "Order & Findings of Permit Deficiency" issued on 21 May 1996, relative to the soils section of the Willow Creek Mine Permit.

We appreciate your consideration and timely action on this matter. Please feel free to contact me at (970)879-6260 or Kent Crofts at (970)638-4462 with any comments or questions regarding this submittal.

Sincerely,

TerraMatrix, Inc, for Cyprus Plateau Mining Corporation

Jerry M. Nettleton

JMN:slb

cc: Ben Grimes - CPMC (w/attachments)
Kent Crofts - IME (w/attachments)

Revised Permit Page 3.1-6A, this text is to be added following the Section entitled, "1996 Soils Sampling Program".

- **1996 Schoolhouse Canyon Refuse Pile Area and Castle Gate Facilities Conveyor Area Soils Sampling Program.** In order to address concerns raised in an "Order & Findings of Permit Deficiency" issued by the UDOGM on May 21, 1996, a detailed soil evaluation was completed in the subject areas. The sampling program involved the excavation of 10 additional soils pits and the collection of soils samples from 6 soils pits in the Schoolhouse Canyon Refuse Pile Area as well as the examination of the soils in the vicinity of Conveyor SC-6 and SC-7 and associated transfer buildings being constructed for the Willow Creek Mine.

Revised Permit Page 3.1-13d, this text is to be inserted immediately before the heading, "Summary - Undisturbed Soils".

1996 Schoolhouse Canyon Refuse Pile Area and Castle Gate Conveyor Area Soils Sampling Program

The 1996 Schoolhouse Canyon Refuse Pile Area and Castle Gate Conveyor Area sampling program was initiated to address concerns raised by the UDOGM in an "Order & Findings of Permit Deficiency" regarding soil salvage operations in these areas. In order to address these concerns, 10 additional soils pits were excavated in the proposed refuse pile expansion area to determine whether or not suitable material exists relative to potential soil salvage operations and proposed disturbance areas associated with Conveyors SC-6 and SC-7 were evaluated. The methodologies used in this evaluation were identical to those used and approved by the Division in the April, 1996 soils sampling program for the Willow Creek Mine. Samples were collected from 6 of the 10 soils pits and submitted to a qualified analytical laboratory for analysis. Nine of the ten soils pits examined were in undisturbed soils and one was located in an area of disturbed soils. The locations of the 10 soils pits are shown on the revised Facilities Area Soils Map, (Map 4).

Soil Pit SHRP-1 - Located on an area which according to the existing Order 1 Soils Survey completed for the Castle Gate Permit corresponds to Soils Mapping Unit 47, the Guben-Rock Outcrop Complex. The vegetation on this site is dominated by Douglas Fir in the overstory, Utah Serviceberry as the dominant shrub and Salina Wildrye as the dominant herbaceous plant.

Soil Profile - A1 - 0 to 5 inches - grayish brown (10YR 5/2) bouldery loam, dark brown (10YR 3/3) when moist; granular structure; soft, very friable, non-sticky, non-plastic; common fine, medium and coarse roots; medium coarse pores; very few clay films; 16 percent fine gravels, 17 percent medium and coarse gravels, 7 percent cobbles, 12 percent stones, 20 percent boulders; clear wavy boundary.

B1 - 5 to 15 inches - pale brown (10YR 6/3) stoney loam, brown (10YR 4/3), moist; weak granular subangular blocky structure; soft, friable, slightly sticky, slightly plastic; common fine and medium pores; common medium and coarse roots; few common clay

films; 8 percent fine gravels, 13 percent medium and coarse gravels, 24 percent cobbles, 26 percent stones, 9 percent boulders; abrupt smooth boundary.

C1 - 15 to 18 inches - light reddish brown (2.5 R 6/4) stoney loam, reddish yellow (7.5YR 6/6) moist; structureless; soft, firm, slightly sticky, slightly plastic; few very fine pores; common clay films; few fine roots; 18 percent fine gravels, 42 percent medium and coarse gravels, 8 percent stones; clear smooth boundary.

R - 18+ inches - burned scoria or red dog.

Soil Pit SHRP -2 - This soils pit is also in an area mapped as belonging to Soils Mapping Unit 47, the Guben-Rock Outcrop complex. This site is dominated by a stand of almost pure Salina Wildrye.

Soil Profile - A1 - 0 to 4 inches - light yellowish brown (10YR6/4) gravelly fine sandy loam, dusky red (10R 3/4) moist; moderately weak granular structure; soft, friable, slightly sticky, slightly plastic; common medium pores; common fine roots; common distinct clay films; 16 percent fine gravels, 5 percent medium and coarse gravels, 4 percent cobbles, 9 percent boulders; clear smooth boundary.

C1 - 4 to 8 inches - light reddish brown (2.5YR 4/8) extremely gravelly sandy loam, dark yellowish brown (10YR 3/6) moist; massive structure; hard, firm, slightly sticky, slightly plastic; few faint pores; few common coarse roots; very few faint clay films; 34 percent fine gravels, 42 percent medium and coarse gravels, 15 percent stones; abrupt smooth boundary.

R - 8+ inches - burned sandstone or red dog.

Soil Pit SHRP-3 - This soils profile was taken from the undisturbed Soils Mapping Unit 47 and corresponds to soils mapped as Guben series soils. The site is dominated by a monoculture of Salina Wildrye.

Soil Profile - A1 - 0 to 6 inches - grayish brown (10YR 5/2) gravelly fine sandy loam, [illegible] slightly sticky, slightly plastic; many medium pores; common fine and medium roots; common distinct clay films; 8 percent fine gravels, 6 percent medium and coarse gravels, 7 cobbles, 8 percent boulders; gradual smooth boundary.

B1 - 6 to 13 inches - pale brown (10YR 6/3) gravelly sandy loam, brown to dark brown (10YR 4/3) moist; moderate granular structure; soft, friable, slightly sticky, slightly plastic, common medium pores; common fine and medium roots; common distinct clay films; 7 percent fine gravels, 6 percent medium and coarse gravels, 3 percent cobbles. Abrupt smooth boundary.

C1 - 13 to 21 inches - very pale brown (10YR 7/3) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic, common medium pores; few fine and medium roots; few distinct clay films; 13 percent fine gravels, 5 percent medium and coarse gravels, 5 percent stones. Gradual smooth boundary.

C2 - 21 to 29 inches - very pale brown (10YR 7/3) stoney sandy loam, brown to dark brown (10YR 3/4) moist; weak granular structure; slightly hard, firm, slightly sticky, slightly plastic; common medium pores; few fine and medium roots; common distinct clay films; 6 percent fine gravels, 12 percent medium and coarse gravels, 17 percent cobbles, 31 percent stones. Gradual smooth boundary.

C3 - 29 to 40 inches - very pale brown (10YR 7/3) stoney sandy loam, brown to dark brown (10YR 4/3) moist; moderately weak medium subangular blocky; hard, very firm, sticky, plastic, common medium pores; few fine roots; few distinct clay films; 8 percent fine gravels, 11 percent medium and coarse gravels, 11 percent cobbles, 18 percent stones; abrupt smooth boundary.

R - 40+ inches - sandstone.

Soil Pit SHRP-4 This soils pit was dug in an undisturbed soil corresponding to Soils Mapping Unit 47 and belongs to soils in the Guben series. This site is dominated by a stand of almost pure Salina Wildrye.

Soil Profile - A1 - 0 to 5 inches - pale brown (10YR 6/3) gravelly loam, brown (10 YR 5/3) moist; moderate granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium pores; common very fine and fine roots; common distinct clay films; 13 percent fine gravels, 12 percent medium and coarse gravels; clear smooth boundary.

B1 - 5 to 9 inches - light gray (10YR 7/2) gravelly loam, brown to dark brown (10YR 4/3) moist; moderately weak subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common very fine and fine pores; common very fine and fine roots; common distinct clay films; 8 percent fine gravels, 15 percent medium and coarse gravels, 6 percent cobbles; abrupt smooth boundary.

C1 - 9 to 15 inches - reddish yellow (7.5YR 6/6) gravelly loam, red (10R 4/6) moist; very weak platy structure; hard, friable, sticky, plastic; few very fine pores; common very fine and fine roots; common distinct clay films; 11 percent fine shale, 7 percent medium and coarse shaly; 3 percent shaly; abrupt smooth boundary.

R 15+ inches - weathered shale

Soil Pit SHRP-5 This undisturbed soil pit is located in the Schoolhouse Canyon Refuse Pile Area on an area mapped in the Castle Gate Permit Order 1 soil survey as belonging to Soils Mapping

Unit 47 and corresponds to soils mapped as Guben series soils. The vegetation on this site is nearly a solid stand of Salina Wildrye.

Soil Profile - A1 - 0 to 4 inches - grayish brown (10YR 5/2) gravelly loam, dark brown (10 YR 3/3) moist; moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine pores; common very fine roots; common distinct clay films; 15 percent fine gravels, 8 percent medium and coarse gravels, 3 percent cobbles; clear smooth boundary.

B1 - 4 to 10 inches - pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; moderately fine granular structure; slightly hard, friable, sticky, plastic; common fine and medium pores; common very fine roots; common distinct clay films; 11 percent fine gravels, 13 percent medium and coarse gravels, 4 percent cobbles; gradual smooth boundary.

C1 - 10 to 16 inches - pale brown (10YR 6/3) gravelly silty clay loam, yellowish brown (10R 5/4) moist; moderately fine platy structure; slightly hard, friable, slightly sticky, slightly plastic; common medium pores; common very fine and fine roots; common distinct clay films; 8 percent fine shale, 6 percent medium and coarse shaly gravels; clear smooth boundary.

C2 - 16 to 23 inches - yellow (10YR 7/6) extremely shaly silty clay loam, yellowish brown (10R 5/6) moist; moderate medium platy structure; soft, very friable, slightly sticky, slightly plastic; common very fine and fine pores; common very fine and fine roots; few faint clay films; 65 percent fine shaly, 8 percent medium and coarse shaly, 5 percent shaly cobbles; gradual wavy boundary.

R 23+ inches - weathered shale

Soil Pit SHRP-6 This undisturbed soils pit corresponds to soils associated with Soils Mapping Unit 47 and the Guben series soil of that mapping unit. The vegetation on this site is Salina Wildrye.

Soil Profile - A1 - 0 to 5 inches - light brownish grayish (10YR 6/2) gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common medium pores; common very fine and fine roots; common distinct clay films; 18 percent fine gravels, 12 percent medium and coarse gravels, 6 percent cobbles, 13 percent boulders; clear smooth boundary.

C1 - 5 to 12 inches - pale brown (10YR 6/3) gravelly fine sandy loam, brown to dark brown (10YR 4/3) moist; fine medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common medium pores; common very fine and fine roots; common distinct clay films; 11 percent fine gravels, 8 percent medium and coarse gravels, 6 percent cobbles; gradual smooth boundary.

C2 - 12 to 19 inches - very pale brown (10YR 7/3) gravelly sandy loam, brown to dark brown (10YR 4/3) moist; moderately fine granular structure; hard, friable, slightly sticky, slightly plastic; common fine pores; common very fine and fine roots; few faint clay films; 13 percent fine gravels, 8 percent medium and coarse gravels; abrupt smooth boundary.

R 19+ inches - weathered

Soil Pit SHRP-7 This soil pit is located in an undisturbed location near the upper end of the refuse pile in a soil mapped in the Order I Soil Survey of the Castle Gate Permit Area as belong to Soils Mapping Unit 47. This soil corresponds to the Guben soils series component of that mapping unit. Vegetation on this site is dominated by Utah Juniper, Basin Big Sagebrush and Salina Wildrye.

Soil Profile - A1 - 0 to 3 inches - dark grayish brown (10YR 4/2) bouldery sandy loam, very dark gray (10YR 3/1) moist; very fine subangular blocky structure; soft, very friable, non sticky, non plastic; common fine pores; common very fine and fine roots; few distinct clay films; 3 percent fine gravels, 8 percent medium and coarse gravels, 7 percent cobbles, 9 percent stones, 18 percent boulders; clear smooth boundary.

C1 - 3 to 7 inches - brown (10YR 5/3) bouldery fine sandy loam, very dark grayish brown (10YR 3/2) moist; very weak fine subangular blocky structure; slightly hard, friable, non sticky, non plastic; common fine to medium pores; common very fine and fine roots; few faint clay films; 5 percent fine gravels, 12 percent medium and coarse gravels, 9 percent cobbles, 4 percent stones; gradual smooth boundary.

C2 - 7 to 19 inches - very pale brown (10YR 7/3) bouldery fine sandy loam, brown to dark brown (10YR 4/3) moist; very weak subangular blocky structure; hard, firm, non sticky, non plastic; few very fine pores; few very fine and fine roots; few very faint clay films; 12 percent fine gravels, 15 percent medium and coarse gravels, 8 percent cobbles, 5 percent stones; gradual smooth boundary.

C3 - 19 to 25 inches - very pale brown (10YR 7/3) bouldery fine sandy loam, brown (10YR 5/3) moist; very weak subangular blocky structure; slightly hard, very firm, non sticky, non plastic; few very fine pores; few very fine and fine roots; very few faint clay films; 11 percent fine gravels, 8 percent medium and coarse gravels, 6 percent cobbles, 5 percent stones; broken clear boundary.

R - 25+ inches - fractured sandstone.

Soil Pit SHRP-8 This soil pit is located in a disturbed soil which corresponds to the area below the clean water diversion ditch which was constructed to divert the undisturbed runoff from upgradient areas around the refuse pile. According to the Order I soils map in the Castle Gate Permit, the soils on this site belong to the Strych and Colluvium Soils Mapping Unit. This designation is in error as all of these soils are disturbed and consist of material which was blasted away from a sandstone ledge when the clean water diversion was constructed. These materials are

at the angle of repose. Due to the steep slope associated with these materials, they support only limited vegetative growth which is dominated by annual weeds and a few planted grasses.

Soil Profile - Disturbed - 0 to 78 inches + - very pale brown (10YR 7/3) extremely cobbly sand, dark yellowish brown (10YR 4/4) moist; structureless; extremely hard, extremely firm, slightly sticky, slightly plastic; no pores; no roots; no clay films; 18 percent fine gravels, 16 percent medium and coarse gravels, 32 percent pebbles, 16 percent stones, 7 percent boulders.

Soil Pit SHRP-9 This soil pit is located on the west side of the refuse pile in a location designed on the Order I soil survey of the Castle Gate Permit as being an area of rock outcrop. Those areas containing developed soils belong to the Strych soils series.

Soil Profile - A1 - 0 to 1 inch - light brownish gray (10YR 6/2) extremely gravelly sandy loam, brown (10YR 5/3) moist; very weak granular structure; hard, very firm, non sticky, non plastic; few very fine pores; common very fine roots; very few faint clay films; 18 percent fine gravels, 21 percent medium and coarse gravels, 10 percent cobbles, 16 percent stones, 13 percent boulders; clear smooth boundary.

C1 - 1 to 7 inches - light brownish gray (10YR 6/2) extremely gravelly sandy loam, brown to dark brown (10YR 4/3) moist; very fine granular structure; hard, very firm, non sticky, non plastic; few very fine faint pores; common very fine roots; no clay films; 32 percent fine gravels, 21 percent medium and coarse gravels, 6 percent cobbles; clear smooth boundary.

C2 - 7 to 17 inches - very dark grayish brown (10YR 3/2) sandy loam, black (10YR 2/1) moist; moderately fine platy structure; hard, very firm, non sticky, non plastic; no pores; few very fine and fine roots; few very faint clay films; gradual smooth boundary.

R - 17+ inches - weathered coal.

Soil Pit SHRP-10 This soil pit is located in the same area as Soil Pit SHRP-9.

Soil Profile - A1 - 0 to 2 inches - pale brown (10YR 6/3) extremely gravelly sandy loam, brown to dark brown (10YR 4/3) moist; weak very fine granular structure; slightly hard, firm, slightly sticky, slightly plastic; few fine pores; few fine roots; few faint clay films; 31 percent fine gravels, 15 percent medium and coarse gravels, 7 percent cobbles; diffuse wavy smooth boundary.

C1 - 2 to 8 inches - pale brown (10YR 6/3) extremely gravelly sandy loam, brown to dark brown (10YR 4/3) moist; moderate very fine granular structure; hard, firm, slightly sticky, slightly plastic; few very fine pores; common very fine and fine roots; very few faint clay films; 42 percent fine gravels, 26 percent medium and coarse gravels; gradual smooth boundary.

C2 - 8 to 16 inches - very pale brown(10YR 8/3) extremely gravelly sandy loam, yellowish brown (10YR 5/6) moist; structureless; very hard, very firm, non sticky, non plastic; few very fine pores; common very fine and fine roots; few very faint clay films; 51 percent fine gravels, 32 percent medium and coarse gravels; gradual smooth boundary.

C3 - 16 to 22 inches - very pale brown (10YR 7/3) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; structureless; soft, friable, slightly sticky, slightly plastic; few very fine pores; few very fine roots; no clay films; 38 percent fine gravels, 51 percent medium and coarse gravels; clear smooth boundary.

R - 22+ inches - weathered sandstone.

The soils in the vicinity of proposed Conveyors SC-6 and SC-7 have been mapped to an Order I soils survey level as indicated on the Castle Gate Area Preparation Plant Facilities Soil Survey Map found in the Castle Gate Permit. According to this map, all of the soils in the vicinity of these conveyor sections correspond to the classifications of either "Made Land" or "Areas Disturbed by Mining Prior to 1977 and not re-affected by Castle Gate Coal Company". On the Willow Creek Facilities Area - Soils Map, (Map 4), all of these areas are designated as "Pre-1977 Disturbance". Based on available information and field inspection, all of the soils in the vicinity of Conveyors SC-6 and SC-7 have been previously disturbed and no undisturbed soil material remains which could be recovered from these sites. CPMC has, however, identified and recovered minor quantities of suitable disturbed soils from the conveyor areas. This additional soil material has been placed in the Willow Creek topsoil stockpile. (amount ?)

Revised Page 4.2-3, this section of text is to be inserted immediately before the current text associated with Permit Section 4.2.2.2, Soil Suitability and Testing.

Based on proposed expansion of the Schoolhouse Canyon Refuse Pile, placement of the maximum volume in the refuse pile and extension of the pile to it's maximum elevation would result in an additional 12.08 acres of disturbance at this location. Not all of the proposed disturbance area, however, contains salvagable soil materials. The area of the current clean water diversion ditch amounts to 2.38 acres and no soil material is available for salvaged in this area. Also, the area immediately downslope of the diversion ditch contains fill which cannot be removed without undermining the diversion ditch, resulting in a ditch failure. Therefore, any soil material in the 2.35 acres corresponding to this downslope area is not available for salvage for potential reclamation use. Given these limitations, proposed expansion areas potentially available for soil salvage total only 7.35 acres.

In order to determine the volume of potentially salvageable soil material from the 7.35 acre refuse pile expansion area (excluding the clean water diversion and downslope area), a total of nine soils pits were excavated in this area, the thickness of potentially salvageable soil material was measured, and any limitations on potential soil salvage were noted. Areas where site conditions would preclude soil salvage included rock outcrop areas and areas where large boulders occurred. In order to quantify the portion of the potential soil recovery area associated with rock ledges, at each sample site a 100 foot tape was extended upslope from the current top of the refuse pile and

the length of rock ledge exposed along the tape line was measured. In a similar manner, all boulders, defined as rocks having a diameter greater than 2 feet across, were also measured. Based on the field measurements, soil volumes for each soil sample site and the corresponding area of influence were calculated and then adjusted to reflect the percentage of each area where soil could not be salvaged due to rock ledges and boulders. Since the salvagable soil material would have to be pulled downslope onto the top of the refuse pile using a tracked backhoe due to the steep slopes and limited access, some mixing of this material with refuse and consequent loss is inevitable. Based on previous soil salvage experience, it is estimated that this loss will account for approximately three percent of the total volume of potentially salvageable soil material.

Based upon field measurements and the factors noted above, a calculated volume of approximately 15,500 cubic yards of additional soil material can be salvaged from the proposed expansion area associated with the School Canyon Refuse Pile Expansion. The additional soil material will be placed in either the Willow Creek topsoil stockpile or the existing Gravel Canyon stockpile. When the current permit commitment to place two feet of soil cover on the refuse pile is adjusted to reflect this additional soil salvage volume, the overall soil replacement depth is increased to approximately 2.34 feet. Table 4.2-1, Soil Recovery and Storage Plans, has been revised and updated to reflect the additional topsoil recovery from the refuse pile expansion area.

With respect to salvage of additional soil materials in the vicinity of Conveyors SC-6 and SC-7, minor quantities of additional plant growth media consisting of disturbed soils were identified by field inspection and have been salvaged from these areas. A total of approximately 600 cubic yards of additional disturbed soil material were removed from these areas and placed in the Willow Creek topsoil stockpile. Given that soils in the subject areas have been previously disturbed and that all reasonably available suitable soils have now been recovered and stockpiled for use in future reclamation, no additional soil salvage in this area is necessary or justified.

Form DOGM - C1 (Last Revised 6/93) File Folder # 3

APPLICATION FOR PERMIT CHANGE

Title of Change: REVISED SOILS INFORMATION - RESPONSE TO DIVISION ORDER ACT/007/038 - DO96A

Permit Number: ACT/007/038

Mine: Willow Creek/Blackhawk

Permittee: Cyrpus Plateau Mining Corp.

Description, include reason for change and timing required to implement: REVISED TEXT AND MAP 4 TO RESPOND TO DIVISION ORDER ACT/007/038 - DO96A

☐ Yes	☒ No	1. Change in the size of the Permit Area? ____ acres ☐ increase ☐ decrease
☐ Yes	☒ No	2. Change in the size of the Disturbed Area? ____ acres ☐ increase ☐ decrease
☐ Yes	☒ No	3. Will permit change include operations outside the Cumulative Hydrologic Impact Area?
☐ Yes	☒ No	4. Will permit change include operations in hydrologic basins other than currently approved?
☐ Yes	☒ No	5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☒ No	6. Does the permit change require or include public notice publication?
☐ Yes	☒ No	7. Does the permit change require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☒ No	8. Permit change as a result of a Violation? Violation #
☒ Yes	☐ No	9. Permit change as a result of Division Order? D.O. # ACT/007/038- DO96A
☐ Yes	☒ No	10. Permit change as a result of other laws or regulations or policies? Explain:
☐ Yes	☒ No	11. Does the permit change affect the surface landowner or change the post mining land use?
☒ Yes	☐ No	12. Does permit change require or include collection and reporting of any baseline information?
☐ Yes	☒ No	13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area?
☒ Yes	☐ No	14. Does permit change require or include soil removal, storage or placement?
☒ Yes	☐ No	15. Does permit change require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	☒ No	16. Does permit change require or include construction, modification, or removal of surface facilities?
☐ Yes	☒ No	17. Does permit change require or include water monitoring, sediment or drainage control measures?
☐ Yes	☒ No	18. Does permit change require or include certified designs, maps, or calculations?
☐ Yes	☒ No	19. Does permit change require or include underground design or mine sequence and timing?
☐ Yes	☒ No	20. Does permit change require or include subsidence control or monitoring?
☐ Yes	☒ No	21. Have reclamation costs for bonding been provided for any change in the reclamation plan?
☐ Yes	☒ No	22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling?
☐ Yes	☒ No	23. Is this coal exploration activity?

☒ Attach 5 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.

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.

Signed - Name - Position - Date

Subscribed and sworn to before me this 12 day of AUGUST, 19 96

Notary Public

My Commission Expires: 1/3-7, 19 98

Attest: STATE OF UTAH
COUNTY OF CARBON

JOHN C. PAPPAS
NOTARY PUBLIC • STATE of UTAH
1646 EAST CASTLE CIRCLE
PRICE, UTAH 84501
COMM. EXP. 3-7-98

Received by Oil, Gas & Mining

RECEIVED
AUG 12 1996
DIV. OF OIL, GAS & MINING

ASSIGNED PERMIT CHANGE NUMBER

File Folder # 3

Form DOGM - C2 (Last Revised 6/93)

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change: Revised SOILS INFORMATION - RESPONSE TO DIVISION ORDER ACT/007/038 - DO96A

Permit Number: ACT/007/038

Mine: WILLOW CREEK

Permittee: CYPRUS PLATEAU MINING

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. 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 exiting 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	PAGES 3.1-6a, 3.1-13e, 4.2-3, 4.2-3a, 4.2-4, 4.2-4b
☒ ADD	☐ REPLACE	☐ REMOVE	PAGES 3.1-13f THROUGH 3.1-13j
☐ ADD	☒ REPLACE	☐ REMOVE	MAP 4
☐ ADD	☐ REPLACE	☐ REMOVE	
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☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	

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

RECEIVED
AUG 12 1996
DIV. OF OIL, GAS & MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
(801) 538-5289
801-359-3940 (Fax)
801-538-5319 (TDD)

August 5, 1996

John Borla
Cyprus Plateau Mining
P.O. Drawer PMC
Price Utah 84501

WC

Re: Willow Creek Mine Permit ACT/007/038-DO 96A, Cyprus Plateau Mining Corporation, Folder #2, Carbon County, Utah

Dear Mr. Borla:

The Division is in receipt of a submittal for the referenced Division Order from TerraMatrix Dated July 31, 1996. The Division anticipates reviewing this information by August 19, 1996. A copy of this submittal will be retained at the Divisions Salt Lake office for review by other entities.

On a procedural note in the future please allow your company enough time to obtain information from consulting firms and transmit such through your resident agent or company. Enclosed you will find an application for permit change to be filled out and returned to the division at your convenience. If you have any questions please call.

Sincerely,

Joseph C. Helfrich
Permit Supervisor

Enclosure
cc: Mark Page, Water Rights-Price (w/o enclosure)
Dave Ariotti, Health-Price (w/o enclosure)
Bill Bates, Wildlife-Price (w/o enclosure)
David Terry, Trust Lands (w/o enclosure)
PFO

TerraMatrix

July 31, 1996

Mr. Joseph C. Helfrich
Permit Supervisor
Utah Division of Oil, Gas & Mining
1594 West North Temple
Salt Lake City, UT 84114-5801
(801) 538-5340

Re: Willow Creek Mine (Permit ACT/007/038) - Response to Division Order 96A, Regarding Soil Salvage Operations in the School House Canyon Refuse Pile Area and in the area of Conveyor Segments SC-6 and SC-7.

Dear Mr. Helfrich:

As directed by Ben Grimes of Cyprus Plateau Mining Corporation (CPMC), this response addresses soil salvage operations in the vicinity of the School House Canyon Refuse Pile and also in the vicinity of proposed Conveyor Segments SC-6 and SC-7. The information provided in this submittal was collected and response discussions prepared by Mr. Kent A. Crofts, a consultant to CPMC. Mr Crofts conducted detailed site investigations of the subject areas on July 12-13, 1996 including characterization of the soils found in these areas and collection of soil samples. Due, however to normal turn-around times for completion of laboratory soil analyses, sample analysis data are not yet available. Analysis results and an evaluation of soil suitability based on the results will be submitted to UDOGM following receipt.

This submittal responds to the following UDOGM comment as contained in Division Order 96A:

> *The Division finds the permit deficient in that the existing Mining and Reclamation Plan (MRP) does not address soil salvage in the Schoolhouse Canyon Refuse Pile area and soil salvage and reclamation in the area of conveyors SC-6 and SC-7 and associated transfer buildings being constructed for the Willow Creek Mine (R645-301-230 - Operations Plan; R645-301-240 - Reclamation Plan).*
>
> *In order to comply with these regulations, the permittee must amend the mining and reclamation plan to address pertinent requirements to remove and store topsoil resources in the identified areas and to replace topsoil during reclamation in the conveyor area.*

Pursuant to discussions between Robert Davidson of UDOGM and Ben Grimes of CPMC, it was agreed that additional soils pits would be excavated in the Schoolhouse Canyon Refuse Pile Area to characterize existing soil resources and evaluate the feasibility of soil salvage in the refuse pile

Engineering & Environmental Services
P.O. Box 774018
1475 Pine Grove Road
Steamboat Springs, Colorado 80477
Phone 970.879.6260 Fax 970.879.9048

Steamboat Springs **Denver** **Fort Collins** **Seattle** **Santiago**

area and that soil salvage potential along the proposed Conveyor would be investigated. The supplemental soils characterization work was initiated on July 12, 1996 and completed on July 13, 1996. Field work involved excavation and characterization of soil horizons in 10 soils pits in the refuse pile area and sampling of 6 of these pits for physical and chemical soils properties. Soils in the vicinity of proposed Conveyors SC-6 and SC-7 and associated transfer towers were also examined. The results of this field sampling effort are summarized by the accompanying revised permit pages (pages 3.1-6a, 3.1-13d through 3.1-13j, 4.2-3 and 3a, 4.2-4 and 4.2-4b). This submittal also includes a revised soils map (Map 4). This information should be sufficient to allow UDOGM to proceed to vacate the "Order & Findings of Permit Deficiency" issued on 21 May 1996, relative to the soils section of the Willow Creek Mine Permit.

We appreciate your consideration and timely action on this matter. Please feel free to contact me at (970)879-6260 or Kent Crofts at (970)638-4462 with any comments or questions regarding this submittal.

Sincerely,

TerraMatrix, Inc. for Cyprus Plateau Mining Corporation

Jerry M. Nettleton

JMN:ypl

cc: Ben Grimes - CPMC (w/attachments)
Kent Crofts - IME (w/attachments)

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

January 16, 1997

TO: File

THRU: Joe Helfrich, Permit Supervisor

FROM: Robert Davidson, Soils Reclamation Specialist RAD

RE: Technical Analysis of MRP Topsoil Revision, Willow Creek Mine, Cyprus Plateau Mining Company, ACT/007/038-96C, Folder #2, Carbon County, Utah

SYNOPSIS

Cyprus Plateau Mining Company (CPMC) submitted a topsoil revision that addresses the Division's Order 96A, "Order & Findings of Permit Deficiency" issued on May 21, 1996. The revision provides a detailed soil evaluation and operation plan for soils salvaged from Schoolhouse Canyon, Conveyors SC-6 and SC-7 vicinity, and affiliated transfer buildings. This Technical Review summarizes the revisions associated with the environmental resource, operational plan, and reclamation plan of the MRP.

ENVIRONMENTAL RESOURCE INFORMATION
SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-220, -301-411.

Analysis:

The Division issued a Division Order 96A on May 21, 1996, that found the permit deficient in that the MRP did not address soil salvage in the Schoolhouse Canyon Refuse Pile area or soil salvage and reclamation in the area of conveyors SC-6 and SC-7 and their associated transfer buildings that were under construction for the Willow Creek Mine. In response to the Division Order, Cyprus Plateau Mining Corporation (CPMC) extensively sampled soils in the Schoolhouse Canyon refuse pile area and examined soils in the conveyor and transfer building area. The Schoolhouse Canyon sampling program involved 10 additional soil pits and thoroughly collecting samples from 6 of the excavated pits.

The soil resource information collected for the 1996 Schoolhouse Canyon Refuse Pile area and Castle Gate conveyor area soils sampling was added to the Soil Resource section of the MRP. The methodologies used for soil evaluation were identical to those used for the 1996 soils sampling program for the Willow Creek Mine. For the Schoolhouse Canyon Refuse Pile area, samples were collected from 6 of the 10 excavated soils pits. The samples were analyzed for the soil parameters as set forth in the Division's Guidelines for topsoil.[1]

Sixteen samples from six pits (pits 1, 2, 4, 7, 8, & 9) were analyzed for pH, EC, SP, Texture, SAR, soluble Se, ABP, AWC, and pebbles. The majority of samples tested were rated "good" to "fair." Two samples, SHRP-1-A1 and SHRP-9-C2 were rated "poor" for saturation percent. Since the majority of samples analyzed for SP correspond to "good," it is reasonable to assume that operational mixing will result in a blended product with acceptable SP criteria. One sample had "unacceptable" ratings for acid base potential (ABP=16) and pH (pH=3.6); both results reinforce that this material is indeed acid producing. This sample corresponds to a zone of weathered coal encountered within the survey pit. CPMC commits that any evident occurrences of weathered coal encountered during salvaging operations will be avoided. Furthermore, any minor amounts of weathered coal inadvertently introduced during salvage will be diluted during operational mixing.

Schoolhouse Canyon soil pit locations are located on the Facilities Area Soils Map (Map #4) while soil profile descriptions are provided for all 10 pits in the Soil Resource section of the MRP. Nine of the 10 pits in Schoolhouse Canyon were in undisturbed soils while the tenth pit was located in the disturbed soils beneath the diversion ditch. According to the Order I soils map in the Castle Gate Permit, these disturbed soils on this site below the diversion ditch belong to the Strych and Colluvium Soils Mapping Unit. This description is in error since these soils are disturbed and consist of material which was blasted away from a sandstone ledge when the diversion ditch was constructed. These materials are at the angle of repose. The undisturbed soils correspond to the SCS Carbon County soil survey series #47, Guben-Rock Outcrop Complex.

Soils in the conveyor and transfer building area have already been mapped to an Order I soils survey level which is found in the Castle Gate Permit. These soils correspond to either "Made Land" or "Areas Disturbed by Mining Prior to 1977 and not re-affected by Castle Gate Coal Company." The revision states that no undisturbed soils remain in this area which could be salvaged. However, CPMC identified and recovered minor quantities of suitable disturbed soil material from the conveyor area during construction. This salvaged material was placed

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[1]Leatherwood, J., and Duce, D., 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah Department of Natural Resources, Division of Oil, Gas and Mining.

on the Willow Creek topsoil stockpile.

Findings:

This portion of the revised permit meets the regulatory requirements.

OPERATION PLAN TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Future expansion of the Schoolhouse Canyon Refuse Pile will disturb an additional 12.08 acres. Not all of the future disturbance contains salvageable soil. The disturbance area associated with the diversion ditch accounts for 4.73 acres and includes the fill immediately down slope of the diversion ditch which cannot be removed without undermining the ditch. Therefore, the proposed expansion areas potentially available for soil salvage totals 7.35 acres.

Areas within the 7.35 acres that would preclude soil salvage included rock outcrops, rock ledges, and boulders. Boulders were defined as rocks with a diameter greater than two feet. These areas were quantified to reduce that portion of non-salvageable soil. Salvageable soil would have to be pulled down slope onto the surface of the refuse pile using a tracked backhoe and, therefore, some mixing of the soil with the surface refuse and consequent soil loss in inevitable. CPMC estimates soil loss at three percent of the total volume of salvageable soil.

Calculated volume of the resulting potentially salvageable soil in the Schoolhouse Canyon Refuse Pile expansion area is approximately 15,500 cubic yards. The average thickness removal depth for the 7.35 acres is 16 inches of undisturbed soils. The soil will be stockpiled in either the Willow Creek topsoil pile or the Gravel Canyon stockpile. Table 4.2-1, Soil Recovery and Storage Plans, has been revised and updated to reflect the additional topsoil recovery from the refuse pile expansion area.

In the vicinity of Conveyors SC-6 and SC-7, approximately 600 cubic yards of additional disturbed soil material was salvaged and placed in the Willow Creek topsoil stockpile. CPMC states that no additional soil salvage in this area is planned since all reasonably available soils were identified and recovered. No specifics are given for actual basis for salvaging soils, details for depths and actual areas of salvage, or personnel and their

credentials making the decisions for salvage. Therefore the Division is unable to assess if the correct quality or quantity of soil was salvaged. Salvageable 'reasonable available soils' to CPMC may or may not be reasonable to a non-biased party. As demonstrated in past construction activities, disturbed or undisturbed soils are often looked at as construction fill. The cost and inconvenience of salvaging soil materials are frequently used as excuses for not salvaging what could be appropriate growth media. These points of argument are particularly valid since the Castle Gate MRP shows a deficit of soil available for reclamation in these pre-disturbed areas.

Findings:

This portion of the revised permit meets the regulatory requirements.

RECLAMATION PLAN TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

The current Castle Gate MRP commitment is to place 24 inches of soil cover on the Schoolhouse Canyon refuse pile. This soil primarily comes from the Gravel Canyon stockpile which currently contains 97,000 cubic yards of soils. This resulting acreage for the 24 inch commitment equates to 30 acres. With the additional 15,500 cubic yards of soil salvage from the Schoolhouse Canyon Refuse pile expansion area, the total volume of soil available for reclaiming the refuse pile is increased to 112,500 cubic yards. Based on the 30 acres of total disturbance for the refuse pile, the projected overall soil replacement depth will be increased to 2.34 feet.

Findings:

This portion of the revised permit meets the regulatory requirements.

BLB
cc: Daron Haddock
Paul Baker
Pete Hess
O:\007038.WIL\DRAFT\WC_STA#4.RAD

TerraMatrix

January 8, 1997

Mr. Robert Davidson
Utah Division of Oil, Gas and Mining
1594 West North Temple
Salt Lake City, Utah 84114-5801
(801) 538-5340

Re: Cyprus Plateau Mining Company - Willow Creek Mine, Supplemental Soils Information

Dear Mr. Davidson:

As noted in our 7/31/96 letter to Joe Helfrich of UDOGM, evaluation of soil sample analysis results for samples collected during the 1996 sampling program for the Schoolhouse Canyon Refuse Pile Expansion Area and Castle Gate Conveyor Modification Areas was pending completion of lab analyses at the time of submittal of the required supplemental soils information (refer to Division Order 96A). We received the laboratory analysis results in mid-December, have completed evaluation of those results, and are pleased to submit with this transmittal the outstanding supplemental soils information.

Accompanying this transmittal are five copies of the revised permit text pages, tables, and exhibit materials incorporating the supplemental soils information from the 1996 sampling program for the Schoolhouse Canyon Refuse Pile Expansion Area and Castle Gate Conveyor Modification Areas. The accompanying Summary of Revisions/Additions identifies the revised permit materials and provides instructions for their placement in the Willow Creek Permit Document.

Following your review of the accompanying permit information please feel free to contact me with any further questions or comments.

Sincerely,

TerraMatrix, Inc. For Cyprus Plateau Mining Company

Jerry M. Nettleton

JMN:yl

cc: B. Grimes/CPMC (w/2 copies of attachments)

Engineering & Environmental Services
P.O. Box 774018
1475 Pine Grove Road
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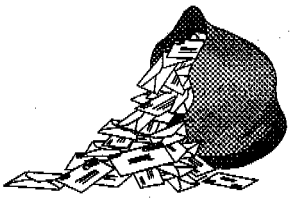
Phone 970.879.6260 Fax 970.879.9048

Steamboat Springs **Denver** **Fort Collins** **Seattle** **Santiago**

SUPPLEMENTAL SOILS INFORMATION SUMMARY OF REVISIONS/ADDITIONS JANUARY 1997		
Item/Reference	**Description**	**Placement Instructions**
List of Tables	Updated to include Tables 3.1-1a and 3.1-5	Replaces List of Figures in Vols. 1-3
Permit Text		
Pages 3.1-13e	Revised	Replaces page 3.1-13e in Vol. 2
3.1-14a	New Table 3.1-1A	Insert after page 3.1-14 in Vol. 2
3.1-18, 18a, 19, 19a	Revised	Replace pages 3.1-18 and 3.1-19 in Vol. 2
3.1-21a	Revised	Replaces page 3.1-21a in Vol. 2
3.1-21b	New Table 3.1-5	Insert after page 3.1-21a in Vol. 2
3.1-22a, 23, 23a, 24, 24a, 25, 25a, 26, 26a, 27, 27a, 28, 28a, 29, 29a, 30, 30a	Revised	Replace pages 3.1-22a through 30a in Vol. 2
Exhibit 5 - Soils Information		
Table of Contents	Revised	Replaces Exhibit 5 Table of Contents in Vol. 9
Soils Information	Schoolhouse Canyon Refuse Pile and Castle Gate Conveyor - 1996 Soils Analyses	Insert after Willow Creek 1996 Soils Analyses in Exhibit 5, Vol. 9

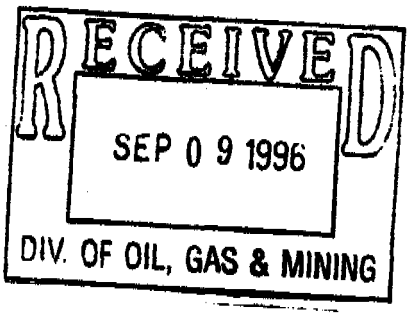
TRANSMITTAL LETTER



TERRAMATRIX
Engineering and Environmental Services

September 3, 1996 **Project No. 866**

To: Robert Davidson
Utah Division of Oil, Gas & Mining
1594 West North Temple
Salt Lake City, Utah 84114-5801
(801) 538-5340



Sent by: Jerry Nettleton

Delivered by: **Other:**

- ☑ Mail ☐ _____
- ☐ Air Freight ☐ _____
- ☐ Hand Carried ☐ _____

QUANTITY	ITEM DESCRIPTION
3	Copies of revised soils information (Table 4.2-1, Table 4.2-1A (sheet 1 of 2), and Map 4)

REMARKS: Bob - Enclosed are copies of the revised soils information for the Willow Creek Mine Permit incorporating the corrections we discussed on the phone. I believe the revisions should address your remaining concerns. Please feel free to contact me with any further questions regarding this transmittal -

cc: B. Grimes/CPMC (2 copies of attachments)
K. Crofts/IME (1 copy of attachments)

Jerry

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

December 11, 1996

TO: File

THRU: Joe Helfrich, Permit Supervisor

FROM: Robert Davidson, Soils Reclamation Specialist

RE: Technical Analysis of MRP Topsoil Revision, Willow Creek Mine, Cyprus Plateau Mining Company, ACT/007/038-96C, Folder #2, Carbon County, Utah

SYNOPSIS

Cyprus Plateau Mining Company (CPMC) submitted a topsoil revision that addresses the Division's Order 96A, "Order & Findings of Permit Deficiency" issued on May 21, 1996. The revision provides a detail soil evaluation and operation plan for soils salvaged from Schoolhouse Canyon, Conveyors SC-6 and SC-7 vicinity, and affiliated transfer buildings. This Technical Review summarizes the revisions associated with the environmental resource, operational plan, and reclamation plan of the MRP.

ENVIRONMENTAL RESOURCE INFORMATION
SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-220, -301-411.

Analysis:

The Division issued a Division Order 96A on May 21, 1996, that found the permit deficient in that the MRP did not address soil salvage in the Schoolhouse Canyon Refuse Pile area or soil salvage and reclamation in the area of conveyors SC-6 and SC-7 and their associated transfer buildings that were under construction for the Willow Creek Mine. In response to the Division Order, Cyprus Plateau Mining Corporation (CPMC) extensively sampled soils in the Schoolhouse Canyon refuse pile area and examined soils in the conveyor and transfer building area. The Schoolhouse Canyon sampling program involved 10

additional soil pits and thoroughly collecting samples from 6 of the excavated pits.

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Findings:

This portion of the revised permit meets the regulatory requirements.

---

[1]Leatherwood, J., and Duce, D., 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah Department of Natural Resources, Division of Oil, Gas and Mining.

OPERATION PLAN TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Future expansion of the Schoolhouse Canyon Refuse Pile will disturb an additional 12.08 acres. Not all of the future disturbance contains salvageable soil. The disturbance area associated with the diversion ditch accounts for 4.73 acres and includes the fill immediately down slope of the diversion ditch which cannot be removed without undermining the ditch. Therefore, the proposed expansion areas potentially available for soil salvage totals 7.35 acres.

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in these pre-disturbed areas.

Findings:

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RECLAMATION PLAN TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

The current Castle Gate MRP commitment is to place 24 inches of soil cover on the Schoolhouse Canyon refuse pile. This soil primarily comes from the Gravel Canyon stockpile which currently contains 97,000 cubic yards of soils. This resulting acreage for the 24 inch commitment equates to 30 acres. With the additional 15,500 cubic yards of soil salvage from the Schoolhouse Canyon Refuse pile expansion area, the total volume of soil available for reclaiming the refuse pile is increased to 112,500 cubic yards. Based on the 30 acres of total disturbance for the refuse pile, the projected overall soil replacement depth will be increased to 2.34 feet.

Findings:

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