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PRO 0071038
#3

Mr. Robert A. Davidson
Reclamation Specialist
Utah Division of Oil, Gas & Mining
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203

April 17, 1996

Re: Responses to Soils Comments contained in your Soils - Technical Analysis for the Willow Creek Mine FAX of April 12, 1996.

Dear Bob:

I have been instructed by Ben Grimes of Cyprus Plateau Mining Corporation to submit the following FAX to you which contains responses to the comments to provided to Ben on April 12, 1996. Please be advised that a paper copy of this submittal will be mailed to you via overnight mail as well.

In order to ensure that each concern raised in your comments is addressed we are providing our responses in a question and answer format. Please be advised that this submittal to you contains zerox copies of the revised map and well as the revised text we are proposing for permit application. It is our understanding that this submittal contains all of the information you requested in your FAX. Mr. Jerry Nettleton of Terra Matrix will be forwarding to you within a couple of days the actual revised maps along with the revised permit pages. However, it is hoped that with this submittal you can proceed to approve the soils section of the Willow Creek Mine Permit.

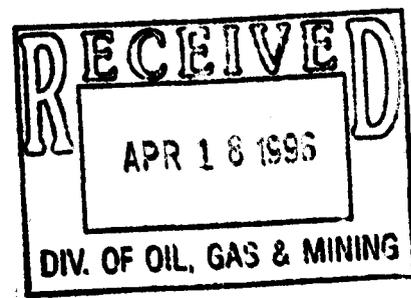
If you have any comments or questions please call me at 970-638-4462 and I will do whatever is necessary to address your concerns.

Sincerely,



Kent A. Crofts
IME
P.O. Box 270
Yampa, CO 80483

cc: Ben Grimes - Cyprus Plateau
Jerry Nettleton - Terra Matrix



Division Concern:

1. Collect Order 1, soil pit information in the following construction sites:

Ventilation Fan Area

- 2 pits - 1 pit in disturbed soils**
- 1 pit in undisturbed soils**

Upper Facilities Bench

- 2 pits - 1 pit in disturbed soils**
- 1 pit in undisturbed soils**

Lower Facilities Area

- 2 pits - 1 pit in disturbed soils (kidney shaped area between 95WCT05 and 06)**
- 1 pit in undisturbed soils (triangle area south of 95WCT06)**

Stream Realignment # 1

- 1 pit (near WC-1)**

Stream Realignment # 2

- 1 pit (east of 95WCT07)**

Office Trailer and Rock Outcrop Area

- 2 or 3 pits - 1 or 2 pits disturbed soil (near or around trailer)**
- 1 pit in undisturbed soils (below and west of rock outcrop, cliff area)**

Response:

Pursuant to the discussions held on Wednesday April 10, 1996 between Robert Davidson of the Division and Ben Grimes of CPMC and as outlined in the FAX from Mr. Davidson dated April 12, 1996 wherein it was proposed that an additional 10 to 11 soils pits be excavated in these six different areas CPMC commissioned additional soils survey work in this area.

This soils field characterization work was started on April 12, 1996 and was completed on April 13, 1996. This field work involved the excavation of 12 soils pits and the sampling of 11 of these pits for physical and chemical soils properties. The results of this sampling effort are presented in response to the following concerns raised by the Division.

2. Amend section 3.1, Soils Information section to include 96 sampling soil pit information with complete Order-I description. Descriptions will include location, site description, horizon/layer identification, depth, color, texture, structure, acid reaction, and coarse/large fragments, boulders, etc. This information will meet the standards of the

National Cooperative Soil Survey and will supply individual horizons/layers results of analyses plus morphological descriptions. Chemical analyses for each horizon/layer sampled will be supplied when completed and will amend the permit in Exhibit 5.

Response:

1996 Soils Sampling

The 1996 soils sampling effort was initiated to address concerns raised by the Division during their Technical Analysis of the Willow Creek Mine Mining and Reclamation Plan and resulted in a total of 12 additional soils pits being evaluated with additional soils samples being collected from 11 of these soils pits. Four of the soils pits examined are in undisturbed soils and eight are located in disturbed soils. The locations of these 12 soils pits are shown on revised Map 4, Willow Creek Mine Facilities Area Soils Map. These locations correspond to all of the areas specified as needing additional sampling in the Division FAX of April 12, 1996.

The 1996 soils survey efforts complies with the standards of the National Cooperative Soils Survey as found in the 1962 edition of the Soils Survey Manual which was updated by a 1983 Edition of the Soil Survey Manual. The 1983 edition of the and National Soils Handbook and the 1992 edition of the Keys to Soil Taxonomy issued by the Soil Survey Staff of the United States Department of Agriculture, Soil Conservation Service were also utilized in this investigation. Consultation was also made with the 1988 Soil Survey of Carbon Area, Utah to further refine the soils mapping unit designations.

Soils Descriptions

At each soils pit examined during this sampling effort, soils descriptions were taken and recorded onto a Soils Field Form for Pedon Description. This form is that currently used by the United States Department of Agriculture, Forest Service and is modified from forms originally issued by the Soil Conservation Service.

The FAX sent by the Division recommends that the descriptions “will include location, site description, horizon/layer identification, depth, color, texture, structure, acid reaction, and coarse/large fragment, boulders, etc.” In the following descriptions each of these parameters is addressed with the exception of acid reaction. Since the Division required that samples be submitted for laboratory analysis it was decided that since field sampling of acid reaction was not as accurate as laboratory measurements and since these measurements would be redundant, there was no reason to conduct field sampling of acid reaction. In addition, the applicant has already produced extensive data from field and laboratory samples describing the soil reaction for several dozen samples of soils in this area.

Soil Pit WC96-1 is one of two sites required by the Division to be placed in the proposed

Ventilation Fan Area. On the existing SCS soils mapping for this area these soils are designated as corresponding to soils mapping unit 107 Shupert-Winetti complex. examination of this area suggests that it is undisturbed and is covered by a tree over story of Juniper with a relatively dense under story of Basin Big Sagebrush.

Disturbed - 0 to 11 inches - light gray (10 YR 7/2) gravelly sandy clay loam, dark brown to brown (10 YR 4/3) when moist; massive to very weak granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots; many fine pores; 9 percent fine gravels; 11 percent medium gravels; 13 percent coarse gravels; abrupt smooth boundary.

Waste Coal Material - 11 to 20 inches - gray (10YR 5/1) gravelly sand, very dark gray (10 YR 3/1) moist; single grain structure; slightly hard, loose, non sticky, non plastic; common fine pores; many fine roots; 14 percent fine gravels; 17 percent medium gravels; 7 percent coarse gravels; abrupt smooth boundary.

A1b - 20 to 32 inches - very pale brown (10YR 8/3) very gravelly sandy loam, dark brown to brown (10YR 4/3) moist; moderate subangular blocky structure; slightly hard, friable, non sticky, non plastic; common fine pores; common fine roots; faint very fine clay films; 13 percent fine gravels, 16 percent medium gravels, 9 percent coarse gravels, 3 percent pebbles, 5 percent cobbles, 8 percent boulders; clear smooth boundary.

C1 - 32 to 44 inches - light gray (10YR 7/2) very cobbly sandy loam, brown (10YR 5/3) moist; moderate subangular blocky structure; hard, firm, non sticky, non plastic; few fine pores; common fine roots; 21 percent fine gravels, 8 percent medium gravels, 16 percent coarse gravels, 32 percent pebbles, 4 percent stones, 3 percent boulders; gradual smooth boundary.

C2 - 44 to 56 inches - pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; moderate subangular blocky structure; hard, very firm, non sticky, non plastic; few fine pores; common fine roots; 26 percent fine gravels, 11 percent medium gravels, 24 percent coarse gravels, 30 percent pebbles, 11 percent stones, 4 percent boulders; gradual smooth boundary.

C3 - 56 to 68 inches + - very pale brown (10YR 7/3) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak subangular blocky structure; hard, very firm, non sticky, non plastic, few fine pores; common fine roots; 30 percent fine gravels, 16 percent medium gravels, 20 percent coarse gravels, 11 percent pebbles, 14 percent stones, 6 percent boulders.

Soil Pit WC96-2. This is the second soils pit placed in a disturbed soil in the vicinity of the proposed Ventilation Fan area.

Disturbed - 0-22 inches - grayish brown (10YR 5/2) extremely gravelly sandy clay loam, dark brown (10YR 3/3) moist; massive structure; very hard, firm, non sticky, non plastic; common fine pores; common fine roots; 7 percent fine gravels, 8 percent medium gravels, 21 percent coarse

gravels, 9 percent pebbles; abrupt wavy boundary.

Disturbed - 22 to 58 inches - very pale brown (10YR 7/4) very pebbly sandy loam, yellowish brown (10YR 5/4) moist; massive structure; very hard, very firm, non sticky, non plastic; few fine pores; few fine roots; 8 percent fine gravels, 8 percent medium gravels, 12 percent coarse gravels, 17 percent pebbles, 3 percent stones; abrupt smooth boundary.

Disturbed - 58 to 83 inches + - brown (10YR 5/3) extremely gravelly sandy loam, dark brown (10YR 3/3) moist; massive structure; very hard, very firm, non sticky, non plastic; few fine pores; few fine roots; 13 percent fine gravels, 14 percent medium gravels, 34 percent coarse gravels, 10 percent pebbles.

Soil Pit WC96-3. This soils profile was taken from the undisturbed soils mapping unit 107 and corresponds to the undisturbed soils pit specified by the Division for the Upper Facilities Bench Area. The C horizon was very uniform in its characteristics and differentiation into sub horizons was not practicable.

A1 - 0 to 6 inches - very dark grayish brown (10YR 3/2) extremely bouldery sandy loam, very dark brown (10YR 2/2) moist; weak subangular blocky to weak granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine pores; common fine roots; faint very few clay films; 8 percent fine gravels, 12 percent medium gravels, 12 percent coarse gravels, 2 percent pebbles, 13 percent stones, 36 percent boulders; clear smooth boundary.

C - 6 to 60 inches + - light gray (10YR 7/2) extremely bouldery sandy loam, dark yellowish brown (10YR 4/4) moist; weak subangular blocky structure; slightly hard, firm, non sticky, non plastic, few fine pores; few fine roots; 8 percent fine gravels, 7 percent medium gravels, 7 percent coarse gravels, 8 percent pebbles, 19 percent stones, 42 percent boulders.

Soil Pit WC96-4. This soils pit was dug in the disturbed soils associated with the Upper Facilities Bench and is located very close to soil sample 95WCT03. This soils pit contains respread disturbed soil material over waste coal material.

Disturbed - 0 to 50 inches - white (10YR 8/2) very gravelly sandy loam, dark brown to brown (10YR 4/3) moist; massive structure; slightly hard, friable, slightly sticky, slightly plastic; few fine pores; common fine roots; 9 percent fine gravels, 14 percent medium gravels, 10 percent coarse gravels, 11 percent pebbles, 6 percent stones, 4 percent boulders; abrupt smooth boundary.

Waste coal material - 50 to 72 inches + - gray (10YR 5/1) cobbly sandy, very dark gray (10YR 3/1) moist; single grain structure; loose, loose, non sticky, non plastic; few very fine roots; 13 percent fine gravels, 18 percent medium gravels, 21 percent coarse gravels, 23 percent pebbles.

Soil Pit WC95-5. This is the disturbed soil pit located in the kidney shaped Lower Facilities area between soils pits 95WCT05 and 06 as specified by the Division.

Disturbed - 0 to 27 inches - light gray (10YR 7/2) very cobbly loam, yellowish brown (10YR 5/6) moist; massive structure; very hard, very firm, slightly sticky, slightly plastic; few fine pores; few very fine roots; 8 percent fine gravels, 9 percent medium gravels, 13 percent coarse gravels, 21 percent pebbles, 4 percent stones, 11 percent boulders; gradual irregular boundary.

Coal processing waste - 27 to 65 inches + - gray (2.5Y 5/1) gravelly sand, very dark gray (2.5Y 3/1) moist; single grain grading to massive structure; very hard, very firm, non sticky, non plastic; few fine pores; few fine roots; 9 percent fine gravels, 8 percent medium gravels, 15 percent coarse gravel, 14 percent pebbles, 2 percent stones, 5 percent boulders.

Soil Pit WC96-6. This undisturbed soils pit corresponds to the undisturbed soil found in the triangle shaped area in the Lower Facilities area mentioned in the Division FAX. It is located adjacent to soils sample 95WCT07. According to the SCS soils map, this soil corresponds to soils mapping unit 107, the Shupert - Winetti complex.

A1 - 0 to 6 inches - grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate to strongly medium granular structure; soft; very friable, slightly sticky, slightly plastic; common fine pores; common fine roots; distinct common clay films; 6 percent fine gravels, 9 percent medium gravels, 11 percent coarse gravels, 13 percent pebbles, 10 percent stones, 8 percent boulders; abrupt wavy boundary.

C1 - 6 to 13 inches - pale brown (10YR 6/3) gravelly loam, dark yellowish brown (10YR 4/4) moist; strongly granular structure; soft, very friable, slightly sticky, slightly plastic; common fine pores; common fine roots; distinct common clay films; 9 percent fine gravels, 13 percent medium gravels, 18 percent coarse gravels, 21 percent pebbles, 5 percent stones; clear wavy boundary.

C2 - 13 to 28 inches - pale brown (10YR 6/3) extremely gravelly loam, yellowish brown (10YR 5/6) moist; moderate subangular blocky structure; soft, very friable, non sticky, non plastic; common fine pores; common fine roots; few faint clay films; 13 percent fine gravels, 16 percent medium gravels, 24 percent coarse gravels, 31 percent pebbles, 11 percent stones, 5 percent boulders; gradual irregular boundary.

C3 - 28 to 44 inches - very pale brown (10YR 7/3) bouldery loam, light yellowish brown (10YR 6/4) moist; weak medium subangular blocky structure; soft, very friable, non sticky, non plastic; common fine pores; few very fine roots; few faint clay films; 5 percent fine gravels, 7 percent medium gravels, 8 percent coarse gravels, 5 percent pebbles, 7 percent stones, 26 percent boulders; gradual irregular boundary.

C4 - 44 to 72 inches + - very pale brown (10YR 7/3) bouldery sandy loam, yellowish brown (10YR 5/4) moist; very weak subangular blocky structure; loose, very friable, non sticky, non plastic; few fine pores; few very fine roots; faint very fine clay films; 7 percent fine gravels, 6 percent medium gravels, 8 percent coarse gravels, 11 percent stones, 35 percent boulders.

Soil Pit WC96-7. This soil pit is located in a disturbed soil and corresponds to the pit in the Division FAX pertaining to the Stream Realignment # 1 area. This site corresponds to an AML reclamation site.

Disturbed - 0 to 29 inches - light gray (10YR 7/2) gravelly sandy loam, brown to dark brown (10YR 4/3) moist; massive structure; slightly hard, friable, slightly sticky, slightly plastic; few fine pores; common fine roots; faint very few clay films; 7 percent fine gravels, 8 percent medium gravels, 8 percent coarse gravels, 5 percent pebbles; abrupt smooth boundary.

Coal Processing Waste - 29 to 70 inches + - very dark grey (10YR3/1) sand, black (10YR 2/1) moist; single grain structure; loose, loose, non sticky, non plastic; few very fine roots; 5 percent fine gravels, 6 percent medium gravels, 2 percent coarse gravels, 3 percent pebbles.

Soil Pit WC96-8. This soil pit is located in a disturbed soil which corresponds to the area mentioned in the Division as Stream Realignment Area # 2.

Disturbed - 0 to 25 inches - light gray (10YR 7/2) extremely gravelly sandy loam, very light brown (10YR 7/4) moist; massive structure; soft, loose, non sticky, non plastic; few very fine pores; many fine roots; 11 percent fine gravels, 17 percent medium gravels, 21 percent coarse gravels, 8 percent pebbles, 23 percent stones, 13 percent boulders; abrupt irregular boundary.

Disturbed - 25 to 50 inches - grayish brown (10YR 5/2) gravelly loamy sand, brown to dark brown (10YR4/3) moist; massive structure; slightly hard, firm, slightly sticky, non plastic; few very fine pores; few fine roots; faint very few clay films; 4 percent fine gravels, 9 percent medium gravels, 13 percent coarse gravels, 7 percent pebbles, 16 percent stones, 18 percent boulders; abrupt irregular boundary.

Disturbed - 50 to 82 inches + - very pale brown (10YR 8/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive structure; loose, loose, non sticky, non plastic; few medium pores; few fine roots; 21 percent fine gravels, 16 percent medium gravels, 26 percent coarse gravels, 14 percent pebbles, 5 percent stones, 21 percent boulders.

Soil Pit WC96-9. This soil pit is also located in a disturbed soil corresponding to Stream Realignment Section # 2 and is found on an AML Reclamation Area. This site is located adjacent to soil pit 95WCT09.

Disturbed - 0 to 18 inches - pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; massive structure; slightly hard, friable, slightly sticky, slightly plastic; common fine pores; common fine roots; 5 percent fine gravels, 7 percent medium gravels, 4 percent coarse gravels, 10 percent pebbles; abrupt irregular boundary.

Coal processing waste - 18 to 65 inches + - very dark gray (10YR 3/1) extremely gravelly sand, black (10YR 2/1) moist; single grain structure; loose, loose, non sticky, non plastic; few coarse

roots; 31 percent fine gravels, 6 percent medium gravels.

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.

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 area called the Rock Outcrop Area in the Division FAX. This soil pit is adjacent to the site sampled with soil pit 95WCT13.

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. The soils in this area are mapped by the SCS as belonging to soils mapping unit 107.

O - 1 to 0 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; fine few pores; few fine roots; 8 percent fine gravels, 10 percent medium gravels, 10 percent coarse gravels, 12 percent pebbles; 13 percent stones, 18 percent boulders.

3. Update Map 4, Facilities Area Soils Map, to include 96 soil sampling pit locations.

Response:

The locations of the 12 soils pits examined in the 1996 soils sampling effort are shown on the enclosed xerox pages of Map 4, Facilities Area Soils Map.

4. Revise section 4.2, Soil Salvage, Handling, and Storage, tables 4.2-1 and 4.2-1A to accurately reflect new soil resource information, justification, and corrected volume amounts.

Response: Based upon the data obtained from this field sampling effort the applicant has revised Tables 4.2-1 and 4.2-1B to reflect the proposed volumes and justification for the soil salvage information.

5. Include soil field log information for 96 sampling in Exhibit 5.

Response: Copies of the field forms used to make the soils descriptions are enclosed.

6. Still include text revision to reflect the soil recovery supervision commitment as well as a commitment to complete and provide a written narrative to UDOGM, following completion of soil removal operations, documenting actual soil recovery thickness and volumes and comparing actual recovery versus projected recovery based on 96 sampling

results.

Response: The following section will be added at the end of Permit Section 4.2.1.2 on page 4.2-3.

The applicant will remove “all available soil material will be removed to a maximum depth of 3 feet or until highly consolidated, coarse fragment content or clayey materials are encountered.” This Section also acknowledges that soil removal operations are “dependent on the topographic configuration of the recovery area and site specific conditions encountered.” Therefore, in order to ensure compliance with this permit application commitment, the applicant will commit to ensuring that all topsoil salvage operations are supervised by an experienced reclamation specialist/soil scientist who will ensure that all available soil materials are removed prior to any mining related disturbance. The results of the soil removal operations will then be reported in the Annual Reclamation Monitoring Report which will contain a written narrative documenting actual soil recovery thicknesses and volumes and comparing actual recovery versus projected recovery (as outlined by Table 4.2-1). In any areas where less soil material is recovered then the narrative will address the reasons for these soil recovery limitations and associated soil losses.

7. **Make corrections to errors and inconsistencies within Section 3.1 and Map 4 as verbally discussed with Kent Crofts in April 1 st meeting. These corrections are outlined below:**

SECTION 3.1 SOILS INFORMATION

- **pp. 3.1-5 thru pp. 3.1-6, 1979 Soil Investigations.** Reference is made to excavation of 13 pits whereas only 10 pits are given in the text. These include 3 pits in Crandall Canyon area, 2 pits in Willow Creek area and 5 pits in Castle Gate Coal Company prep plant area.

Response: The explanation for this discrepancy is found in the paragraph of narrative found in the introduction to Section 3.1.1 4 Soils Mapping Information and in Section 3.1.1.5 Soils Analysis. Included in this narrative is the clear explanation that the following discussion pertains only to those “soils within the proposed Willow Creek Mine permit area...”. Soils pits 11, 12, and 13 originally sampled in 1979 were located in the Sowbelly and Hardscrabble Canyon Areas which are outside of the permitting limits of the Willow Creek Mine Permit facilities area. Therefore, there is no reason to include them in this analysis. However, due to the confusion regarding this issue the statement on Page 3.1-5 under 1979 Soil Investigations (Price River Coal Company (PRCC) the statement regarding “thirteen backhoe soil test pits” will be corrected to read “ten backhoe pits in the proposed mine development area.”

- **pp. 3.1-6, 1979 Soil Investigations.** Symbol discrepancy and confusion which symbol is referenced in text - HC or 1HC symbol. Symbol HC is shown on Soils Map 4 in

CGCC prep area but is not included in Legend. However, symbols 1HC are also shown in prep area with symbols given in Legend.

Response: The text states that “The locations of the [1979] soils test pits are shown on the Facilities Area Soils Map, (Map 4), with test pit locations denoted by the symbol HC.” The Legend clearly identifies the HC test pits as being “Harrocks & Carrollo 1979 Samples” The example raised by the Division regarding test pit 1HC merely denotes that this is test pit number one of the 1979 sampling effort. This is the identical methodology used for the 1988, 1989, 1994 and 1995 sampling efforts which the Division accepts. The applicant believes that if the Text and Map Legend terminology for the sampling periods exclusive of 1979 are acceptable then since the 1979 terminology is identical it is also acceptable. The verbal concerns raised by the Division in the April 1, 1996 meeting wherein they mention that the text does not indicate that these sample sites are circled on the map is immaterial since only the 1979 sample sites are denoted by the symbol HC.

- **pp. 3.1-6, 1990 Sampling Program (CGCC).** Preparation Plant Sample sites 1-8 are referenced in text but can only find 6 sites on Map 4. Sites on Map 4 and Legend are given by ◊ #. The Legend simple states “Soil Sampling Site” and would be clearer if referenced as “1990 Soil Sampling sites.”

Response: We agree that the Map Legend would be more understandable if the sites labeled with a diamond ◊ # are labeled as “1990 Soil Sampling Sites” and this change will be made to Map 4

With respect to the discrepancy in the text which states that there were eight sample sites in the prep plant area and the fact that only six sites are identified on Map 4, in our April 1, 1996 meeting and the language in our text under the **1990 Sampling Program (CGCC)** which states “The locations of those sample sites which could be identified from the available documentation are shown on the Facilities Area Soils Map, (Map 4)” was pointed out to the Division. CPMC was not responsible for the accuracy of the 1990 CGCC soils map and merely used the data which the Division had previously approved and submits that no further explanation of this issue is necessary.

- **pp. 3.1-6, 1991 Soils Mapping (CGCC).** The text references Map 4 and reads at the end of paragraph as “Extent of the Castle Gate Soils Survey Area” but is actually shown on Map 4 as “Limits of Castle Gate Coal Co. Soils Survey Area.”

Response: CPMC recognizes that the terminology in these two statements might be interpreted as being slightly inconsistent. Therefore, the Legend on Map 4 will be revised to read “Extent of Castle Gate Soils Survey Area.”

- **pp. 3.1-6, 1994 Soil Sampling Program (CPMC).** Twelve soil samples are referenced but can find 1, 3, 4, 5, 6, 7, and 10 on Map 4. Can’t find sites 2, 8, 9, 11 and 12 on

Map 4, Text reads “soils pits” when in actuality they are “soil sampling sites” as shown in Exhibit 5.

Response: The Division is correct that 1994 soils sample sites 2, 8, 9, 11 and 12 can not be found on Map 4. These sample locations were originally placed on the Map but were removed in subsequent modifications. They have been added to the Map. Soils Pit WC-2 is located to the east of the existing office trailer in the AML reclaimed site near the southern end of Stream Realignment Section # 2, Soils Pits 8 and 9 are located immediately to the west of the existing culverted crossing of Willow Creek while samples WC-11 and 12 are located approximately 150 feet upstream of this culvert.

The references cited by the Division on page 3.1-6 which refers to “soils pits” and the reference cited in Exhibit 5 must be compared with the more detailed description of how these pits were dug and sampled as found on Permit Page 3.1-12. They were both “soils pits” and “soil sampling sites”. As described on page 3.1-12 a soils pit can be synonymous with a “soils sampling site” and these terms are not exclusive of each other.

- **pp. 3.1-6, 1995 Soils Sampling Program (CPMC). Text reads “13 additional soils pits were excavated” when in actuality the text shown read as “13 additional soil sampling sites were sampled by auger” (see Exhibit 5).**

Response: The explanation of how these samples were collected is found on page 3.1-6 which states that “13 additional soils pits were excavated...” and on page 3.1-13. The applicant never mentioned the use of an auger, either hand or mechanical in the collection of the 1995 soils samples. These samples were all collected by digging holes with a shovel. The suggested language change by the Division is contrary to what actually occurred.

- **pp. 3.1-10 thru pp. 3.1-11, Pit 6 thru 10. Each entry references “(Exhibit 8-4)” and would be clearer if shown as “(Castle Gate Coal Co. Permit, Exhibit 8-4)”**

Response: As was pointed out to the Division in the April 1, 1996 meeting, the text preceding that found on pages 3.1-10 to 3.1-11 on page 3.1-6 states “The following are excerpts from this study [PRCC 1979] which provide relevant information with respect to characterization of soils in the proposed surface disturbance areas.” The applicant submits that the permit points out where this information was obtained and thus the changes recommended by the Division are unnecessary.

- **pp. 3.1-12, 1994 Soils Sampling Efforts section, 2 nd paragraph, line 4. Map 4 references given as “WC-1 through WC-12” and can’t find 2, 8, 9, 11, and 12. Again, text references “pits” and “1) soils profile descriptions...” when only grab samples were taken (see Exhibit 5).**

Response: The locations of samples WC-2, 8, 9, 11 and 12 have been added to revised

Map 4. CPMC recognizes that the text referring to “1) Soils profile descriptions” is in need of clarification and this portion of the text will be deleted. This sentence will start with the phrase “1) Soils characterization in the Willow Creek Drainage Channel....”.

The text references “pits” because an 18 inch hole or pit was dug at each of the WC soils sample locations. We admit that the reference to “soils profile descriptions” in connection with the WC sample plots might be misinterpreted and this phrase has been modified.

The Division’s reference to the term “grab” sample and its corresponding implication that it is somehow less than required for this type of sampling effort is confusing. The applicant knows of no better way to describe the nature of the soils sampling conducted in 1994 in this area. All soil profile descriptions are compiled by taking “grab” samples of the respective soil horizons being evaluated where they are evaluated.

- **pp. 3.1.13, Summary - Undisturbed Soils section, line 2.** A total of 6.8 acres of new ground will be impacted and is discussed as: 4.2 acres of Soil 107, 1.3 acres as Soil 121, and 0.7 acres as Soil 63. These add up as 6.2 acres or 94 %. The text is missing 0.6 acres at approximately 8.8 %. Is the missing area Soil 72?

Response: The issue of disturbance acreages corresponding to currently undisturbed soils was addressed in consequence to the April 1, 1996 meeting held between UDOGM and CPMC. As was pointed out at that time the projected 6.8 acres of new soils disturbance was calculated and originally submitted in the original Permit application version submitted to the Division on May 2, 1995. Changes in the proposed site development plan since that date have resulted to slight changes in these figures. According to instructions received from the UDOGM during the April 1, 1996 meeting all of the acreages figures were reevaluated and submitted to the UDOGM on April 9, 1996. Based upon this evaluation it was determined that the current total disturbance to undisturbed lands amounts to 6.7 acres. The revised figures showing these acreages were submitted to the Division in Revised Permit Table 4.2-1. Based upon these figures the current narrative found in the **Summary - Undisturbed Soils** section found on Permit Page 3.1-13 should be replaced with the following:

According to revised Table 4.2-1, Soil/Recovery and Storage Area, found in Section 4.2.1.2, General Soil Availability and Handling Requirements, a total of 6.7 acres of new ground will be impacted by this proposed action. When these impacts are superimposed onto the soils map it can be calculated that 4.7 acres or 70.2 percent of these impacts will be on soil Mapping Unit 107 the Shupert - Winetti Complex; 1.5 acres of impacts 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 original estimates of 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 reveals that all of the disturbance proposed for this area will occur on previously disturbed soil.

Examination of the 1979 Soils Report in the PRCC Permit caused us to previously conclude that Backhoe Pit No. 4 was dug in a partially disturbed cut slope associated with soils mapping unit 107. Based upon this comparison it was concluded that the soils corresponding to soils mapping unit 107 in this immediate area correspond to Winetti soils. Based upon the data obtained from the 1996 soils pits wherein four different pits (WC96-1, WC96-3, WC96-6 and WC96-12) were dug in this 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 in these two soils is in their rock fragment content. Shupert soils contain 0 to 15 percent rock fragments in the control section while Winetti soils contain between 35 and 60 percent rock fragments in the control section. Since all of these four soil profiles contain greater than 15 percent rock fragments in their control sections 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 found at the Willow Creek Mine indicate that soils in mapping unit 121 correspond largely with the Travessilla series with major inclusions of Rock Outcrop. Vegetation in the Travessilla soil 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 potential forage production 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.

- **pp. 3.1-17, 3.1.2.4 Soil Availability and Suitability section, 1 st paragraph. In Section 3.1.2.4, Soil Availability and Suitability, a comparison of the existing surficial soils materials is made for evaluation of reclamation suitability. The section implies that coal refuse materials and mine development wastes will be used as substitute topsoil. The implication is given by the evaluation of the suitability of all materials which could be utilized as potential growth media, which includes the separate evaluations of coal refuse materials and mine development wastes. Handling and disposal of coal refuse materials and mine development waste is regulated by 30 CFR 817.81, Coal Mine Wastes: General Requirements, and R645-301-528, Handling and Disposal of Coal, Overburden, Excess Spoil, and Coal Mine Waste. Clarification of the text needs to be made clear that the use of coal refuse,**

coal, mine development wastes or waste rock will not be used as substitute topsoil.

Response: As the applicant stated in the Willow Creek Mine Technical Adequacy Responses in their submittal dated April 9, 1996 that "CPMC wishes to make it clear that they are not proposing nor requesting approval for the use of coal mine wastes as a topsoil substitute" and also "CPMC is not proposing the use of any topsoil substitute or supplement materials." The suitability evaluation of the coal refuse materials and mine development waste was included in the Permit because the Division's Regulations and Guidelines require that such analyses be conducted. In order to clarify this issue the following text will be added to the permit application as the last paragraph of Section 3.1.2.4 Soil Availability and Suitability.

As detailed in Table 4.2-1 development of the Willow Creek Mine will result in a total of 55.8 acres of new soil disturbance. Of this acreage all but 6.7 acres (12.01 %) have previously been disturbed by pre SMRCA mining activities which resulted in the disturbance to the soils originally present on these sites.. This means that 78.99 % of the area associated with the current mine development proposal lacks materials defined as topsoil as it is defined in R645-100 and as it is specifically addressed in R645-301-200.

On the 6.7 acres of unaffected soils which will be impacted by this action soil removal operations will be conducted as outlined in R645-301-232. However, on the 49.1 acres or 78.99 % of the site which have no diagnostic A or E horizon material removal of taxonomically defined "topsoil" material is impossible since they do not correspond to the typical diagnostic soil horizons as defined in R645-100. Since the disturbed soils occur on the surface, which according to page 185 of the Soil Survey Manual is one of the commonly accepted definitions of topsoil, these materials can be called topsoil. The applicant believes that since the Regulations at R645-314.100 specifically request that this reference be used in conducting soil surveys that this implies that this definition is acceptable. Further evidence to support the use of this interpretation are found in the previous approvals granted by the Division to salvage the disturbed soils from the AML coal refuse site and place these materials into the Willow Creek Mine Topsoil Stockpile. The applicants understanding of the Regulations and previous permitting events supports this interpretation. Accordingly, the applicant is not proposing the use of any topsoil substitute or supplement materials.

- **pp. 3.1-25, 1 st paragraph, line 2. These are not "conclusions" but "comparisons."**

Response: The applicant agrees that these are comparisons and this is the terminology used prior to and after the paragraph cited by the UDOGM. However, the applicant feels that conclusions can also be made from comparisons and this is the context in which this narrative is presented. The applicant believes that given the highly significant statistical difference between in mine samples of identical material obtained from drilling conclusions regarding potential contamination can be made.

- **pp. 3.1-25, Selenium (Se) section, 1 st paragraph, line 2.** The “0.076mg/kg” should be “0.0076 mg/kg” since the values range from <0.005 and 0.010.

Response: The applicant acknowledges that the reported Se value of “0.076 mg/kg” is incorrect and should read “0.0076 mg/kg” as pointed out by the Division. This change will be made in the text.

Justification for Revised Table 4.2-1B

**Table 4.2-1B
JUSTIFICATION FOR SOIL SALVAGE ASSUMPTIONS**

Disturbance Area	Acres	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 great detail on pages 8-30 to 8-44 in 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 great detail on pages 8-30 to 8-44 in the 1984 PRCC Permit. Approval from the Division was granted when this permit was approved.
Water Tank Area	1.0	NRS	As are 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	10,890 5,243	An estimated 30" of salvageable soil material exists on the disturbed soils and undisturbed soils at this site. These thicknesses were obtained from soils pits, WC96-1, WC96-2, WC96-12 and 95WCT12 and the soil profile on the bank of Willow Creek suggests that approximately 30" of soil can be recovered. Recovery in separate lifts will be very difficult
Bridge and Entrance Road	1.2 0.1	12 --	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 will be extremely difficult due since they occur at the bottom on the drainage bottom approximately 35 feet deep and no reasonable means exists to remove these soils. The soils along the east and west streambank have significant amounts of waste coal material mixed into these soils making soil recovery difficult.
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 taken in this area.
ROM Stockpile and Lower Facilities Area	19.9 2.2	40,132 4,457	15" inches of soil material will be removed from both the disturbed and undisturbed soils. Soils pits WC96-3, WC96-4, WC96-5, WC96-6, 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 taken in this area.

Stream Realignment # 1	0.5	1,600	24" of soil material will be salvaged in this area. Justification for these thicknesses is from soils pits WC-5; WC-6; WC-7; WC-10; WC-11 and WC-12 which were taken 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-2; WC-3; WC-4; WC-5; WC-6; WC-7; WC-8 and WC-9 which were taken in this area.
Office Trailer and Rock Outcrop Area	2.9 6.8 2.5	5,848 13,713 4,033	12" of soil material will be removed from the undisturbed and 15 " from the disturbed and AML reclamation. Justification for these removal depths are based upon soils pits WC96-8, WC96-9, WC96-19, WC96-11, 95WCT13; 95WCT09 and 95WCT10 as well as observations made during the mapping and sampling of the vegetation on this site.
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 impracticable.

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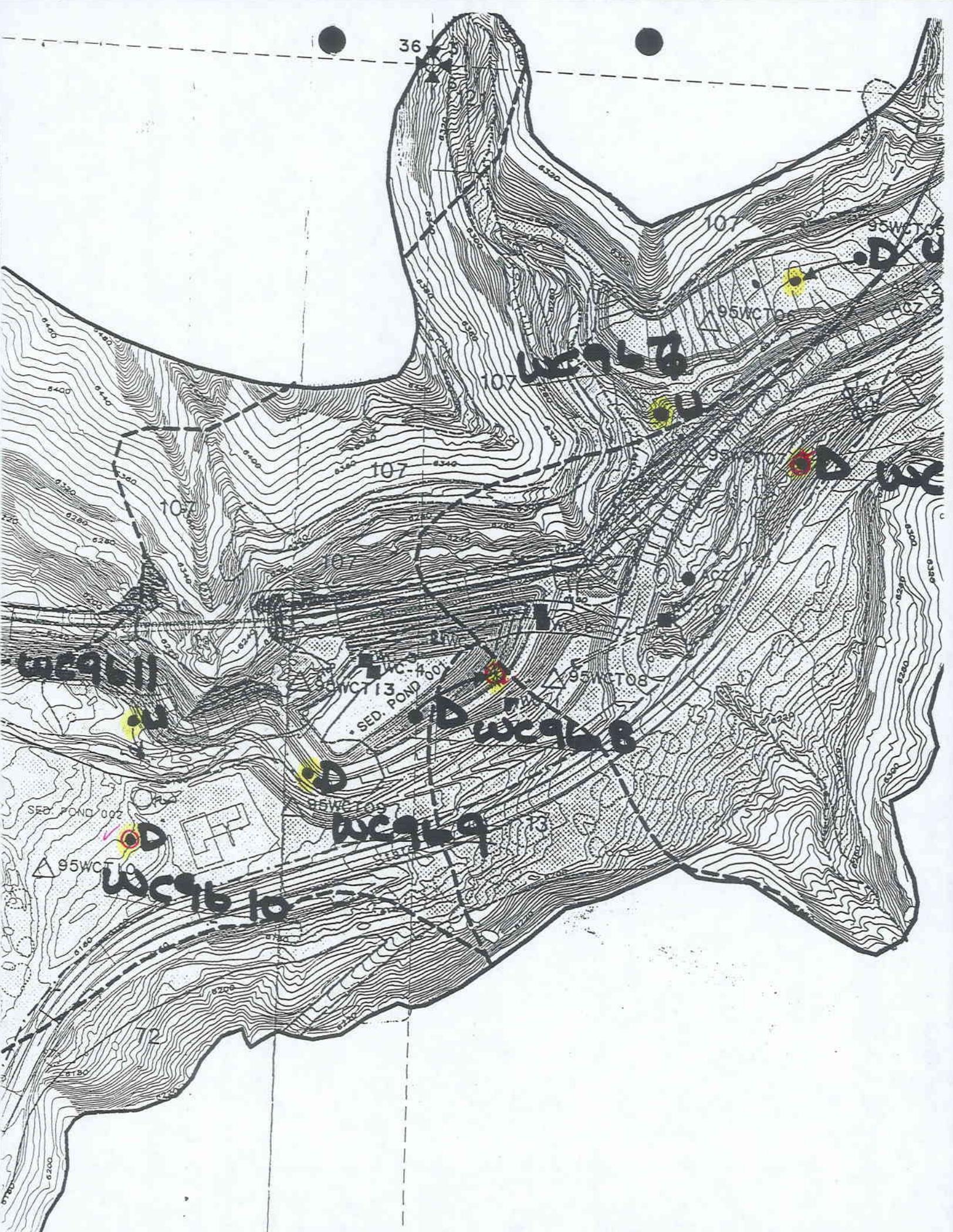
IL SAMPLE SITE
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 9 SAMPLES
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 KS & CARROLLO 1979 SAMPLES
 SITE SOIL SAMPLING
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 URBANCE SOIL TYPE BOUNDARY

PRE-DISTURBANCE SOIL TYPE:

- 13 CABBA FAMILY-GUBEN-ROCK OUTCROP COMPLEX
- 26 DONEY FAMILY, 50 TO 70 PERCENT SLOPES
- 47 GUBEN-ROCK OUTCROP COMPLEX
- 63 MIDFORD FAMILY-PODO ASSOCIATION
- 71 PATHEAD EXTREMELY BOULDERY FINE SANDY LOAM, 40-70% SLOPES
- 72 PATHEAD-CURECANTI FAMILY ASSOCIATION
- 95 ROCK OUTCROP
- 107 SUPERT-WINETTI COMPLEX
- 121 TRAVESSILLA-ROCK OUTCROP-GERST COMPLEX
- M2 MADE LAND NO. 2, PREP. PLANT, PITS 6-10
- RO ROCK OUTCROP

• 96 SOIL TEST PITS
 U = UNDISTURBED SOIL
 D = DISTURBED SOIL





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95WCT08

95WCT05

95WCT10

SED. POND 002

95WCT13

SED. POND 001

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UP&L
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CEMETERY

EXISTING
PORTAL

DWC 965

DWC 967

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95WCT05

95WCT06

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95WCT07

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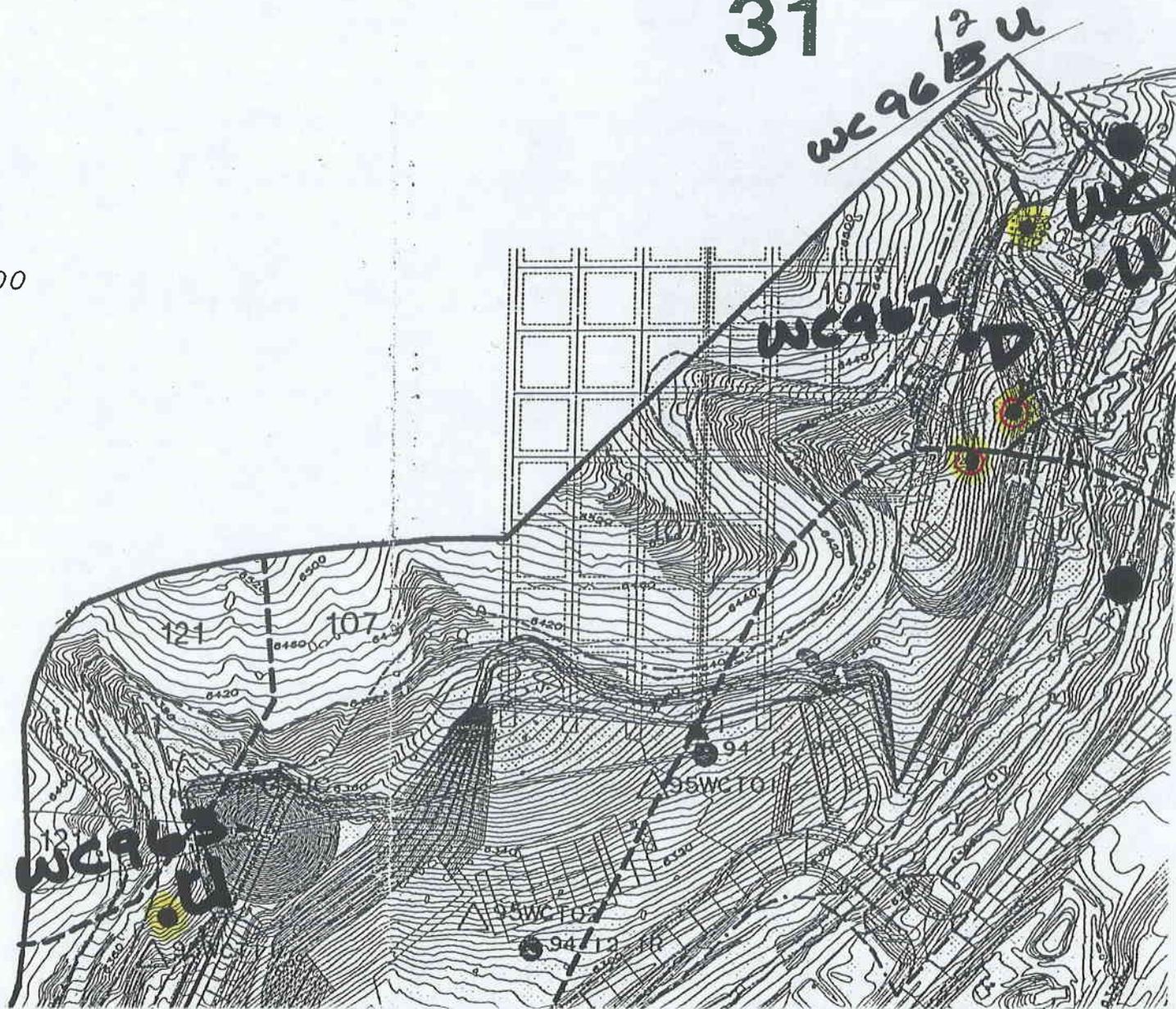
AREA BOUNDARY

LIMITS OF CASTLE GATE COAL CO.
SOILS STUDY AREA

E 2,183,000



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Plot locations of soil sample
Plots WC-2, WC-8, WC-9,
WC-11 and WC-12

SOIL FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>WC 96-1</i>	STOP NO.	AERIAL PHOTO NO.	DATE <i>13 April 96</i>	BY <i>KAC</i>			
LANDTYPE PHASE			HABITAT TYPE		LOCATION				
SOIL CLASSIFICATION				PARTICLE SIZE		Sec. T. R.			
AREA <i>Proposed Pan site</i>		FOREST		RANGER DISTRICT		COUNTY STATE			
SLOPE %		SLOPE RANGE		SLOPE CONFIGURATION		ASPECT			
MOISTURE ZONE		SOIL TEMPERATURE		INFILTRATION		PERCOLATION			
PARENT MATERIAL			WEATHERING		FRACTURING		DRAINAGE CLASS		
% ROCK CUTCROP		EROSION		% VEG & LITTER					
GRAVELS 2mm-18.75mm 1/16-3/4"		GRAVELS coarse 18.75mm-75mm 3/4-3"		COBBLES & STONES > 75mm 3"+				% BARE GROUND	

Epipedon -
Diagnostic Horizon - PROFILE DESCRIPTION *No Samples Taken Road Profile Only*

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURES	CONSISTANCE				CLAY FILMS	MG FRAGMENTS				Mn	BOUNDARY	MOISTURE D-Dry	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST				
																				80
<i>Dis</i>	<i>0-71</i>	<i>10YR 7/2</i>	<i>10YR 4/3</i>	<i>Common Fine</i>	<i>Many fine</i>	<i>SCL</i>	<i>Weak granular</i>	<i>SH</i>	<i>F</i>	<i>SS</i>	<i>SD</i>	-	<i>9/11</i>	<i>13</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>A</i>	<i>80</i>
<i>Coal</i>	<i>11-20</i>	<i>10YR 5/1</i>	<i>10YR 3/1</i>	<i>"</i>	<i>"</i>	<i>S</i>	<i>Structure less</i>	<i>SH</i>	<i>L</i>	<i>NS</i>	<i>NP</i>	-	<i>14/11</i>	<i>7</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>A</i>	<i>80</i>
<i>A1b</i>	<i>20-32</i>	<i>10YR 8/3</i>	<i>10YR 4/3</i>	<i>"</i>	<i>Common Anc</i>	<i>SL</i>	<i>moderate</i>	<i>SAB</i>	<i>H</i>	<i>F</i>	<i>"</i>	<i>Faint VF</i>	<i>13/16</i>	<i>9</i>	<i>3</i>	<i>5</i>	<i>8</i>	<i>0</i>	<i>C</i>	<i>80</i>
<i>Z1</i>	<i>32-44</i>	<i>10YR 7/2</i>	<i>10YR 5/3</i>	<i>Few Fine</i>	<i>"</i>	<i>"</i>	<i>moderate</i>	<i>SAB</i>	<i>H</i>	<i>Firm</i>	<i>"</i>	-	<i>9/9</i>	<i>16</i>	<i>32</i>	<i>4</i>	<i>3</i>	<i>0</i>	<i>G</i>	<i>80</i>
<i>Z2</i>	<i>44-56</i>	<i>10YR 6/3</i>	<i>10YR 5/3</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>H</i>	<i>VF</i>	<i>"</i>	<i>"</i>	-	<i>16/11</i>	<i>24</i>	<i>30</i>	<i>11</i>	<i>4</i>	<i>0</i>	<i>G</i>	<i>80</i>
<i>Z3</i>	<i>56-68</i>	<i>10YR 7/3</i>	<i>10YR 5/4</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>Weak</i>	<i>H</i>	<i>VF</i>	<i>"</i>	<i>"</i>	-	<i>17/16</i>	<i>20</i>	<i>11</i>	<i>14</i>	<i>6</i>	<i>0</i>	<i>-</i>	<i>80</i>

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOIL FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. WC 96-2	STOP NO.	AERIAL PHOTO NO.	DATE 13 April 96	BY KAC	
LANDTYPE PHASE			HABITAT TYPE		LOCATION		
SOIL CLASSIFICATION Disturbed			PARTICLE SIZE		Sec. T. R. REPRESENTIVE FAMILY		
AREA SW corner Far site		FOREST	RANGER DISTRICT		COUNTY	STATE	
SLOPE %	SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION		
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION	PERCOLATION		WATER		
PARENT MATERIAL		WEATHERING	FRACTURING	DRAINAGE CLASS			
% ROCK CUTCROP	EROSION		% VEG & LITTER				
GRAVELS 2mm-18.75mm Fine	1/16-3/4	GRAVELS coarse 18.75mm-75mm	3/4-3"	COBBLES & STONES > 75mm 3"+			% BARE GROUND

Epipedon - Diagnostic Horizon - **PROFILE DESCRIPTION**

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURES	CONSISTANCE				CLAY FILMS	FRAGMENTS				BOUNDARY	MOISTURE	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			
																			B
Dist	0-22	10YR 5/2	10YR 3/3	Common Fine	Common fine	SCL	massive	HA	Firm	NS	NP	-	2/8	21	9	0	0	A	W
"	22-58	10YR 7/4	10YR 5/4	Fine	fine	SL	"	"	VF	"	"	-	8/8	17	17	3	0	A	S
"	58-82	2.5YR 5/3	5YR 3/3	Fine	"	"	"	"	VF	"	"	-	13/14	34	10	0	0	-	-

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>GC 96-3</i>	STOP NO.	AERIAL PHOTO NO.	DATE <i>13 April 96</i>	BY <i>KAC</i>
LANDTYPE PHASE			HABITAT TYPE		LOCATION	
SOIL CLASSIFICATION <i>10E - Ustorthox</i>			PARTICLE SIZE		Sec. T. R. REPRESENTATIVE FAMILY	
AREA <i>South of Coal Stockpile</i>		FOREST	RANGER DISTRICT		COUNTY	STATE
SLOPE %	SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION	
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION	PERCOLATION		WATER	
PARENT MATERIAL		WEATHERING	FRACTURING	DRAINAGE CLASS		
% ROCK CUTCROP	EROSION		% VEG & LITTER			
GRAVELS: 2mm-18.75mm <i>1/16-3/4</i>		GRAVELS coarse 18.75mm-76mm <i>3/4-3"</i>		COBBLES & STONES > 76mm <i>3"+</i> % BARE GROUND		

Epipedon -
Diagnostic Horizon - PROFILE DESCRIPTION

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURE	CONSISTANCE				CLAY FILMS	FRAGMENTS				PI	BOUNDARY	MOISTURE D-dry
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			
<i>A1</i>	<i>0-6"</i>	<i>10YR 3/2</i>	<i>10YR 7/2</i>	<i>Line</i>	<i>common</i>	<i>SL</i>	<i>weak</i>	<i>SH</i>	<i>Fri</i>	<i>SS</i>	<i>SP</i>	<i>Faint</i>	<i>8</i>	<i>12</i>	<i>9</i>	<i>13</i>	<i>3.6</i>	<i>5</i>	<i>-</i>
<i>C</i>	<i>6-65"</i>	<i>10YR 7/2</i>	<i>10YR 4/4</i>	<i>Line</i>	<i>Line</i>	<i>η</i>	<i>η</i>	<i>1</i>	<i>Firm</i>	<i>Ns</i>	<i>NP</i>	<i>-</i>	<i>8</i>	<i>17</i>	<i>8</i>	<i>19</i>	<i>4.2</i>	<i>-</i>	<i>-</i>

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD
2

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>WC 96-4</i>	STOP NO.	AERIAL PHOTO NO.	DATE <i>13 April 96</i>	BY <i>KAC</i>	
LANDTYPE, PHASE <i>Barro</i>		HABITAT TYPE		LOCATION			
SOIL CLASSIFICATION <i>Ustorthox</i>				PARTICLE SIZE		Sec. T. R.	
AREA <i>Upper Facilities Area</i>		FOREST	RANGER DISTRICT	COUNTY	STATE		
SLOPE %	SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION		
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION	PERCOLATION	WATER			
PARENT MATERIAL		WEATHERING	FRACTURING	DRAINAGE CLASS			
% ROCK CUTCROP	EROSION		% VEG & LITTER				
GRAVELS 2mm-10.75mm <i>1/16-3/4</i>	GRAVELS coarse 18.75mm-76mm <i>3/4-3"</i>	COBBLES & STONES > 76mm 3"+					% BARE GROUND

Epipedon -
Diagnostic Horizon - PROFILE DESCRIPTION *50-70" is waste coal material*

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURE	CONSISTANCE				CLAY FILMS	FRAGMENTS				BOUNDARY	MOISTURE D-dry	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			
																			50
<i>Def</i>	<i>0-50</i>	<i>10YR 8/2</i>	<i>10YR 4/3</i>	<i>Few Fine</i>	<i>Common fine</i>	<i>SL</i>	<i>massive</i>	<i>SH</i>	<i>Fri</i>	<i>SS</i>	<i>SP</i>	-	<i>9/19</i>	<i>10</i>	<i>11</i>	<i>6</i>	<i>4</i>	<i>A</i>	<i>S</i>
<i>Dist</i>	<i>50-70</i>	<i>10YR 8/1</i>	<i>10YR 3/1</i>	-	<i>few very fine</i>	<i>S</i>	<i>single grain</i>	<i>L</i>	<i>LNS</i>	<i>NP</i>	-	-	<i>13/18</i>	<i>21</i>	<i>23</i>	<i>0</i>	<i>0</i>	-	-

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD
2

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOIL FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>WC 96-5</i>		STOP NO.		AERIAL PHOTO NO.		DATE <i>13 April 96</i>		BY <i>KAC</i>	
LANDTYPE PHASE				HABITAT TYPE				LOCATION			
SOIL CLASSIFICATION <i>Disturbed Soil</i>						PARTICLE SIZE			Sec. T. R. REPRESENTATIVE FAMILY		
AREA <i>Lower Facilitas Kidney Shaped Area</i>			FOREST		RANGER DISTRICT			COUNTY		STATE	
SLOPE %		SLOPE RANGE		SLOPE CONFIGURATION		ASPECT		ELEVATION		PRECIPITATION	
MOISTURE ZONE		SOIL TEMPERATURE		INFILTRATION		PERCOLATION		WATER			
PARENT MATERIAL				WEATHERING		FRACTURING		DRAINAGE CLASS			
% ROCK CUTCROP		EROSION				% VEG & LITTER					
GRAVELS 2mm-18.75mm fine		1/16-3/4"		GRAVELS coarse 18.75mm-75mm		3/4-3"		COBBLES & STONES > 75mm 3"+ % BARE GROUND			

Epipedon -
Diagnostic Horizon - PROFILE DESCRIPTION

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURE	CONSISTANCE				CLAY FILMS	FRAGMENTS				BOUNDARY	MOISTURE D-dry
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST		
<i>Dist 0-77</i>	<i>10YR 7/2</i>	<i>10YR 5/6</i>	<i>few fine</i>	<i>few very fine</i>	<i>SL/L</i>	<i>massive</i>	<i>VH</i>	<i>VF</i>	<i>SS</i>	<i>SP</i>	<i>-</i>	<i>8/9</i>	<i>13</i>	<i>21</i>	<i>4</i>	<i>11</i>	<i>G</i>	<i>11</i>
<i>Dist 77-65</i>	<i>7.5Y 5/1</i>	<i>7.5Y 3/1</i>	<i>"</i>	<i>few fine</i>	<i>S/SL</i>	<i>single granular</i>	<i>"</i>	<i>"</i>	<i>NS</i>	<i>NP</i>	<i>-</i>	<i>9/8</i>	<i>15</i>	<i>14</i>	<i>2</i>	<i>5</i>	<i>-</i>	<i>-</i>

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>W-96-6</i>	STOP NO.	AERIAL PHOTO NO.	DATE <i>13 April 196</i>	BY <i>KAC</i>
LANDTYPE PHASE			HABITAT TYPE		LOCATION	
SOIL CLASSIFICATION <i>107- Undisturbed</i>			PARTICLE SIZE <i>Winnetka series</i>		Sec. T. R. REPRESENTATIVE FAMILY	
AREA <i>lowly facillike Area</i>		FOREST	RANGER DISTRICT		COUNTY	STATE
SLOPE %		SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION
MOISTURE ZONE		SOIL TEMPERATURE		INFILTRATION	PERCOLATION	WATER
PARENT MATERIAL			WEATHERING	FRACTURING	DRAINAGE CLASS	
% ROCK CUTCROP		EROSION		% VEG & LITTER		
GRAVELS 2mm-18.75mm <i>1/16-3/4</i>		GRAVELS coarse 18.75mm-76mm <i>3/4-3"</i>		COBBLES & STONES >76mm <i>3"+</i> % BARE GROUND		

Epipedon -
Diagnostic Horizon -

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURES	CONSISTANCE				CLAY FILMS	MC FRAGMENTS				BOUNDARY	MOISTURE D-dry	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE	CO	K	ST			
																			B
A1	0-6	10YR 5/2	10YR 3/2	comp. fine	common fine	L	strong gran	S	VF	SS	SP	Distinct	6/9	11	13	10	8	A	-
C1	6-13	10YR 6/3	10YR 4/4	1	"	h	1	S	h	SS	SP	1	5/13	18	21	5	0	C	-
C2	13-28	10YR 6/3	10YR 5/6	11	"	h	Med. sub	h	h	NS	NP	1	13/16	14	31	11	5	G	-
C3	28-94	10YR 7/3	10YR 6/4	"	low very fine	1	1	h	h	h	h	1	5/16	8	5	7	26	G	-
C4	94-99	10YR 7/3	10YR 5/4	low fine	"	SL	weak sub	L	k	k	h	1	4/16	7	8	11	35	-	-

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLORE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>WC-96-7</i>	STOP NO.	AERIAL PHOTO NO.	DATE <i>13 April 1996</i>	BY <i>KAC</i>
LANDTYPE PHASE			HABITAT TYPE		LOCATION	
SOIL CLASSIFICATION <i>Disturbed AMc Reclamation</i>			PARTICLE SIZE		Sec. T. R. REPRESENTATIVE FAMILY	
AREA <i>North Stream Realignment</i>			FOREST	RANGER DISTRICT	COUNTY	STATE
SLOPE %	SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION	
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION	PERCOLATION	WATER		
PARENT MATERIAL		WEATHERING	FRACTURING	DRAINAGE CLASS		
% ROCK CUTCROP	EROSION		% VEG & LITTER			
GRAVELS 2mm-18.75mm 1/16-3/4"		GRAVELS coarse 18.75mm-76mm 3/4-3"		COBBLES & STONES >76mm 3"+ % BARE GROUND		

Epipedon -
Diagnostic Horizon - PROFILE DESCRIPTION *89-70 I cgd Lines from Drop Plant*

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURES	CONSISTANCE				CLAY FILMS	FRAGMENTS				BOUNDARY	MOISTURE D-dry	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			
																			PH
<i>Dist</i>	<i>0-29</i>	<i>10YR 7/2</i>	<i>10YR 4/3</i>	<i>few fine</i>	<i>common fine</i>	<i>SL</i>	<i>massive</i>	<i>SH</i>	<i>Fbi</i>	<i>SS</i>	<i>SP</i>	<i>princ. 2/8</i>	<i>8</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>5</i>
<i>u</i>	<i>29-70</i>	<i>10YR 3/1</i>	<i>10YR 3/1</i>	<i>-</i>	<i>few very fine</i>	<i>S</i>	<i>single grain</i>	<i>L</i>	<i>L</i>	<i>NS</i>	<i>NP</i>	<i>-</i>	<i>5/6</i>	<i>7</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>-</i>	<i>-</i>

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD
2

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL No.	STOP NO.	AERIAL PHOTO NO.	DATE	BY
			W-96-8		17 April 96	KAC
LANDTYPE PHASE <i>Proposed Stream Relocation - 5</i>			HABITAT TYPE		LOCATION	
SOIL CLASSIFICATION <i>Disturbed Soil</i>			PARTICLE SIZE		Sec. T. R. REPRESENTIVE FAMILY	
AREA			FOREST	RANGER DISTRICT	COUNTY	STATE
SLOPE % 1%	SLOPE RANGED -4%	SLOPE CONFIGURATION	ASPECT S	ELEVATION	PRECIPITATION	
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION	PERCOLATION		WATER	
PARENT MATERIAL			WEATHERING	FRACTURING	DRAINAGE CLASS	
% ROCK CUTCROP	EROSION			% VEG & LITTER		
GRAVELS 2mm-18.75mm 1/16-3/4		GRAVELS coarse 18.75mm-76mm 3/4-3"		COBBLES & STONES >76mm 3"+		
				% BARE GROUND		

Epipedon -
Diagnostic Horizon -

PROFILE DESCRIPTION

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURE	CONSISTANCE				CLAY FILMS	MG FRAGMENTS				BOUNDARY	MOISTURE D-dry	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			BC
-	0-25	10YR 7/2	10YR 7/4	few v. fine	many fine	SL	massive	S	L	NS	NP	N/4c	11/12	21	8	23	13	A	
	25-50	10YR 5/2	10YR 4/3	1	few fine	LS	weak	SH	FV	SS	n	Faint VF	4/9	13	7	16	18		
	50-80	10YR 8/3	10YR 5/2	few medium		SL	compact	L	L	NS	n	N/4c	21/16	26	14	5	21	-	

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

2

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLORE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. WE 96-9	STOP NO.	AERIAL PHOTO NO.	DATE 13 April 96	BY KAC	
LANDTYPE PHASE			HABITAT TYPE		LOCATION		
SOIL CLASSIFICATION Disturbed AMR Reclamation			PARTICLE SIZE		Sec. T. R. REPRESENTIVE FAMILY		
AREA South stream Alignment		FOREST		RANGER DISTRICT	COUNTY	STATE	
SLOPE %	SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION		
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION	PERCOLATION	WATER			
PARENT MATERIAL		WEATHERING	FRACTURING	DRAINAGE CLASS			
% ROCK CUTCROP	EROSION		% VEG & LITTER				
GRAVELS 2mm-18.75mm 1/16-3/4"		GRAVELS coarse 18.75mm-76mm 3/4-3"		COBBLES & STONES >76mm 3"+			% BARE GROUND

Epipedon -
Diagnostic Horizon -

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURES	CONSISTANCE				CLAY FILMS	FRAGMENTS				BOUNDARY	MOISTURE	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			
																			50
Dist	0-18	10YR6/3	10YR4/2	common fine	common fine		massive	SH	Fi	SS	SP	-	5/7	4	10	0	0	AH	
"	18-65	10YR3/1	10YR2/1	-	few coarse	S	single grains	L	L	NS	NP	-	3/6	0	0	0	0	-	

*18-65" is mostly cool waste
hasnt appear to be re-vegetation
dry plant*

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD
2

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B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOIL FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>WC 96-10</i>	STOP NO.	AERIAL PHOTO NO.	DATE <i>13 April 96</i>	BY <i>KAC</i>	
LANDTYPE PHASE			HABITAT TYPE		LOCATION		
SOIL CLASSIFICATION <i>Disturbed AML Reclamation</i>			PARTICLE SIZE		Sec. T. R. REPRESENTIVE FAMILY		
AREA <i>Trailer Office</i>		FOREST	RANGER DISTRICT		COUNTY	STATE	
SLOPE %	SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION		
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION	PERCOLATION		WATER		
PARENT MATERIAL		WEATHERING	FRACTURING	DRAINAGE CLASS			
% ROCK CUTCROP	EROSION		% VEG & LITTER				
GRAVELS 2mm-18.75mm 1/16-3/4"	GRAVELS COARSE 18.75mm-75mm 3/4-3"	COBBLES & STONES > 75mm 3"+					% BARE GROUND

Epipedon -
Diagnostic Horizon -

17-65 is definitely processed coal refuse

PROFILE DESCRIPTION

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURE	CONSISTANCE				CLAY FILMS	FRAGMENTS				BOUNDARY	MOISTURE D-dry. 1	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			
1st	0-17	10YR 7/3	10YR 4/3	low VB	common RAC	SL	massive	SH	SS	SP	-	8	4	8	5	3	0	S	
2nd	17-65	10YR 3/1	10YR 2/1	u	none	S	single grain	L	L	NS	NP	-	17	6	4	0	0	0	-

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

2

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL		SOIL NO. <i>WC96-11</i>	STOP NO.	AERIAL PHOTO NO.	DATE <i>13 Apr 96</i>	BY <i>KAC</i>
LANDTYPE PHASE			HABITAT TYPE		LOCATION	
SOIL CLASSIFICATION <i>107 Undisturbed</i>			PARTICLE SIZE		Sec. T. R. REPRESENTIVE FAMILY	
AREA <i>Rocky Point N - Timber</i>		FOREST	RANGER DISTRICT		COUNTY	STATE
SLOPE %	SLOPE RANGE	SLOPE CONFIGURATION	ASPECT	ELEVATION	PRECIPITATION	
MOISTURE ZONE	SOIL TEMPERATURE	INFILTRATION		PERCOLATION	WATER	
PARENT MATERIAL			WEATHERING	FRACTURING	DRAINAGE CLASS	
% ROCK CUTCROP		EROSION		% VEG & LITTER		
GRAVELS 2mm-18.75mm <i>1/16-3/4</i>		GRAVELS 18.75mm-76mm <i>3/4-3"</i>		COBBLES & STONES > 76mm <i>3"+</i> % BARE GROUND		

Epipedon -
Diagnostic Horizon -

PROFILE DESCRIPTION

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURE	CONSISTANCE				CLAY FILMS	MG FRAGMENTS				MOISTURE D-dry	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST		
																		#
A1	0-3"	10YR7/2	10YR5/3	low fine	low fine	SL	Weak SAB	SH	Fri	S	D	concrete	8/12	14	2	0	0	M
C1	3-12"	10YR6/3	10YR5/4	"	"	"	Very weak SAB	"	"	U	F	loam	11/9	26	5	0	0	A-S
C2	12-19"	10YR6/3	10YR7/3	"	"	C	Massive	H	EF	U	"	-	9/5	5	0	0	0	Shd
R	19"	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DETACHABILITY *Rock outcrop is bound on to 30% of this area which reduces the amount of salvageable topsoil*

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

2

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	

SOILS FIELD FORM FOR PEDON DESCRIPTION

MAP SYMBOL 107		SOIL NO.		STOP NO. W596-12		AERIAL PHOTO NO.		DATE 12 April 96		BY KAC	
LANDTYPE PHASE				HABITAT TYPE				LOCATION			
SOIL CLASSIFICATION				PARTICLE SIZE				Sec. T. R. REPRESENTATIVE FAMILY			
AREA Proposed For Area				FOREST		RANGER DISTRICT		COUNTY		STATE	
SLOPE %		SLOPE RANGE		SLOPE CONFIGURATION		ASPECT		ELEVATION		PRECIPITATION	
MOISTURE ZONE		SOIL TEMPERATURE		INFILTRATION		PERCOLATION		WATER			
PARENT MATERIAL				WEATHERING		FRACTURING		DRAINAGE CLASS			
% ROCK CUTCROP		EROSION				% VEG & LITTER					
GRAVELS 2mm-18.75mm 1/16-3/4"		GRAVELS COARSE 18.75mm-76mm 3/4-3"		COBBLES & STONES >76mm 3"+		% BARE GROUND					

Epipedon -
Diagnostic Horizon -

PROFILE DESCRIPTION

HORIZON	DEPTH	COLOR				TEXTURE % clay	STRUCTURE	CONSISTANCE				CLAY FILMS	MG FRAGMENTS				BOUNDARY	MOISTURE D-dry	
		DRY	MOIST	PORES	ROOTS			D	M	W	P		FINE G	CO G	K	ST			
																			BO
0-8	10YR 7/1	2.5Y 5/3	C	F	Many Fine	SL	SAB MOD	S	F	NS	NP	Faint VF	8/6	4	3	18	47	1	D
8-34	10YR 6/2	7.5Y 4/3	F	F	Few Fine	SL	SAB weak	SH	VF	"	"	-	33/31	24	8	2	2	2	S
34-50	10YR 7/2	8.5Y 5/4	F	F	"	SL	gran	H	"	"	"	-	14/12	27	11	5	6	6	S
50-68"	10YR 8/2	10YR 6/3	F	F	"	SL	"	H	"	"	"	-	18/10	17	13	78	-	-	-

DETACHABILITY

DETACHABILITY CLASS X PERMEABILITY RATING = SOIL ERODIBILITY INDEX (CLASS RATING)

CLASS RATING + SLOPE HAZARD = EROSION HAZARD

2

A. EROSION HAZARD	H. AVALANCHE HAZARD
B. RANGE PROD. POT.	I. DEBRIS SLIDE HAZARD
C. TIMBER PROD. POT.	J. SLUMP HAZARD
D. LIMITATIONS TO REFORESTATION	K. WET - DRY CREEP HAZARD
E. REVEG. POT. CUTS	L. CUT SLOPE HAZARD
F. REVEG. POT. FILLS	M. FILL SLOPE HAZARD
G. EROSION HAZARD C & F SLOPES	