Order 2 Soil Survey

of

Coal Hollow Mine Disturbance Area

Located near Alton, Utah

Prepared for Alton Coal Development, LLC

By

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Coal Hollow Mine
Soil Survey

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Purpose of Soil Survey

The purpose of this report is to summarize the results of an order 2 soils inventory conducted for Alton Coal Development, LLC (ACD) in an area proposed for development of a surface coal mine, Coal Hollow Project, in Kane County, approximately 2.5 miles south southeast of Alton, Utah. The survey area is on private lands owned or leased by ACD. This soil survey was prepared so that ACD could: 1) identify suitable sources of subsoil and topsoil; 2) determine topsoil and subsoil salvage depths and quantities; and, 3) develop a post mining reclamation plan using salvaged soil materials. This soil survey covers 630 acres.

Project Area

The Coal Hollow Project soil survey area is located in the Sink Valley portion of the Alton Amphitheater, figures 1-1 and 1-2. It is bounded on the northeast and east by the Paunsaugunt Plateau and by the Markagunt Plateau on the northwest. Black Mountain separates Sink Valley from Long Valley on the west. It is bounded on the south by the Skutumpah Terrace The project area includes portions of the southwest quarter of section 19, southeast quarter of section 20, west quarter of section 29, and east quarter of section 30 in Township 39 south, Range 5 west, Salt Lake Base meridian. Elevation ranges from approximately 6,840 to 7,100 feet.

The ACD soil survey area is drained by Lower Robinson Creek and Sink Valley Wash which flow into Kanab Creek (iGage, 1999).

Native vegetation in the ACD soil survey area consists of Utah juniper, pinyon pine, big sagebrush, and wet meadows. Portions of the project area were previously cleared of Utah juniper, pinyon pine, and sagebrush and planted to non-irrigated grass pasture.

Climate

An official U.S. Weather Bureau station is located in Alton, Utah. The period of available records for this station is January 1, 1928 through October 31, 2006 (Western Regional Climate Center, April 2007). Average annual precipitation is 16.43 inches and is evenly distributed throughout the year. The average annual air temperature is 45.7 °F. The precipitation pattern is ustic and soil temperature regime is mesic (C. Meir, 2006 AND V. Parslow, 2007) bordering on frigid. Table 1-1 contains a summary of weather data for Alton, Utah. Summers are warm with cool nights.

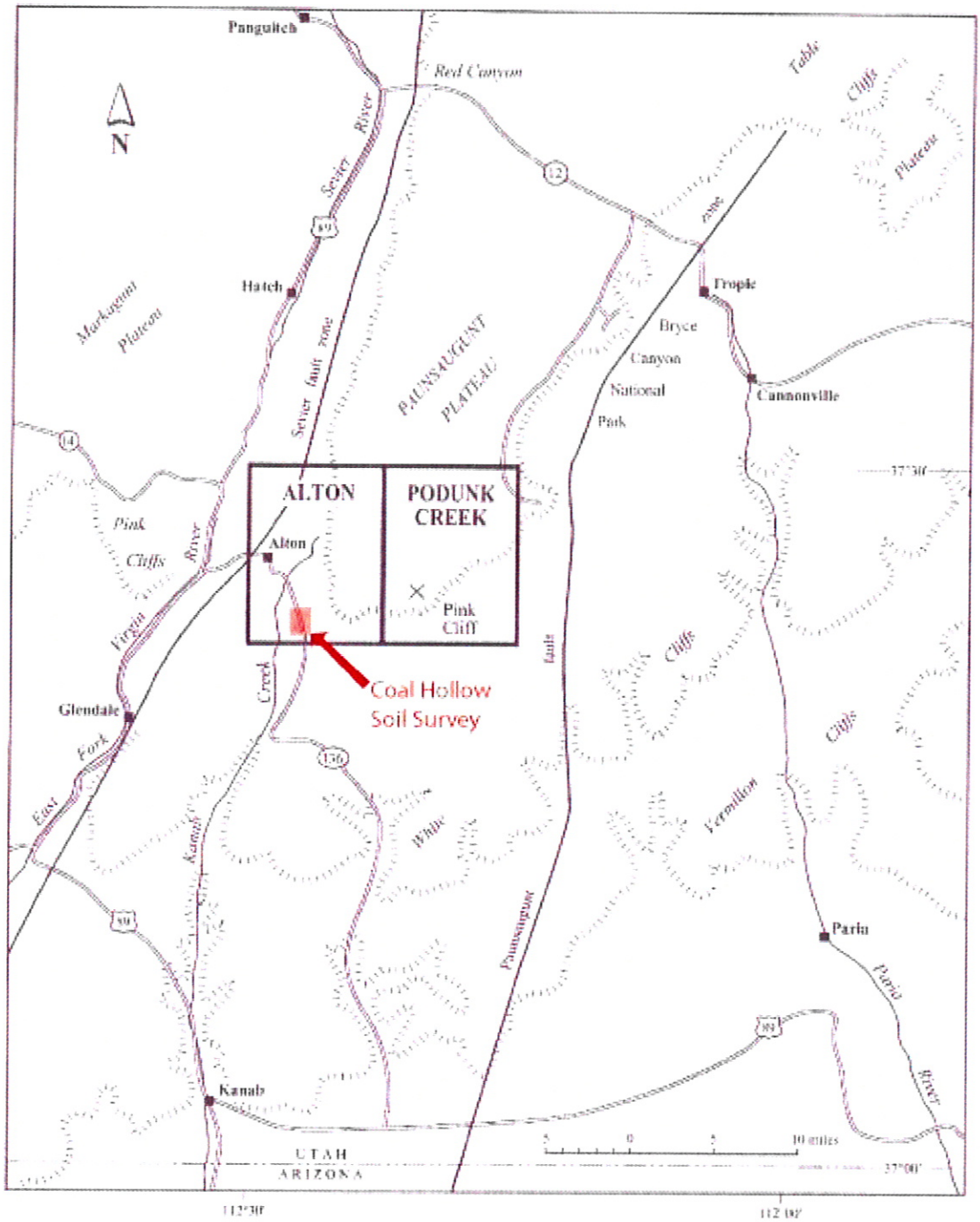

Figure 1. Index map of the Paunsaugunt Plateau region, showing the Alton and Podunk Creek quadrangles. The highest point (Pink Cliff) and only settlement in the study area (Alton) are indicated. The quadrangles were mapped together. The map is adapted from Gregory (1951, p. 3).

Figure 1-1. General location of Coal Hollow Soil Survey area. Location and shape are approximate. Base map is index map of Paunsaugunt Plateau region (Utah Geological Survey, 2001).

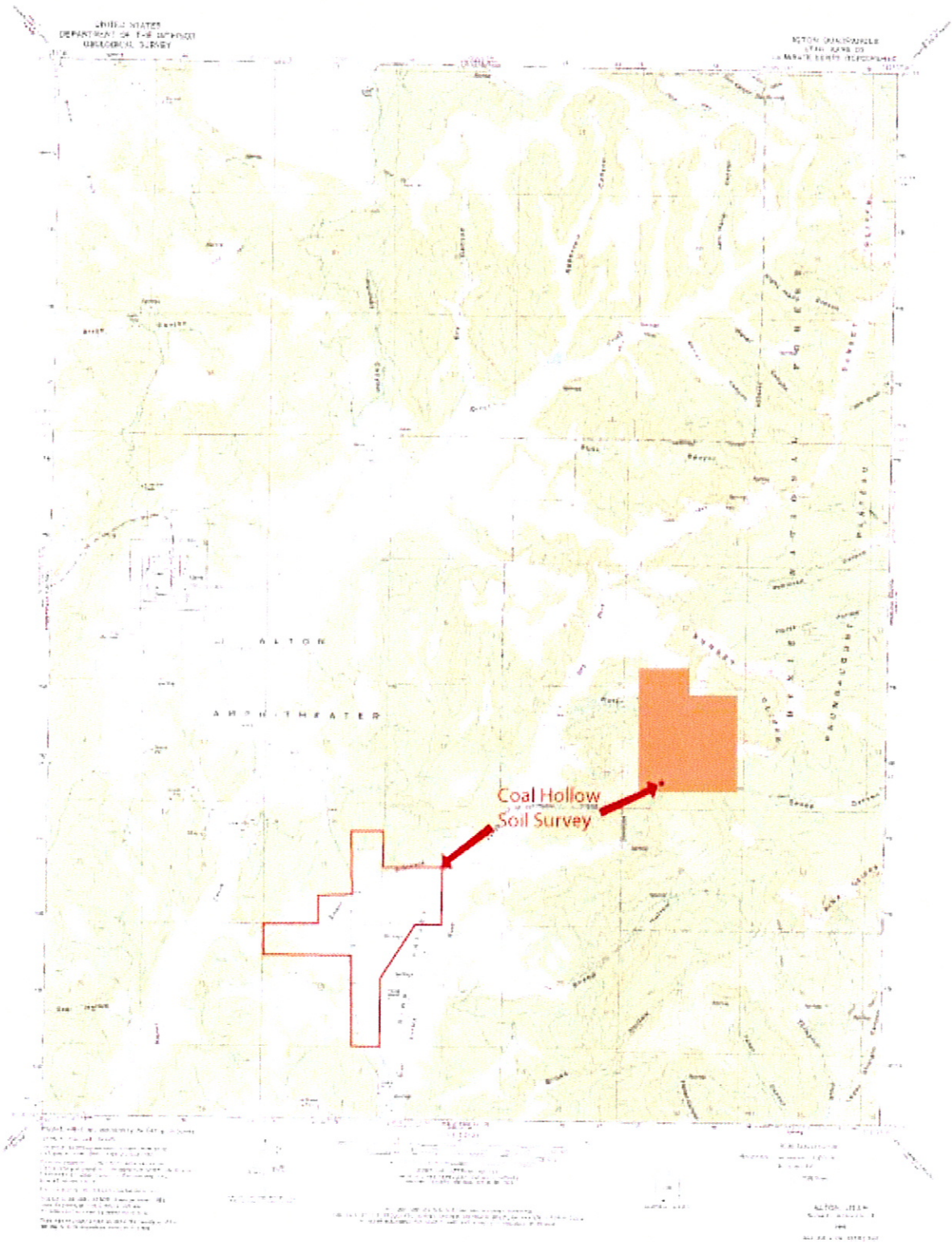

Figure 1-2. Location of Coal Hollow Soil Survey area south of Alton, Utah. Location is approximate. Base map is Alton, Utah quadrangle (iGage, 1999).

Table 1-1. Summary of weather data for Alton, Utah.

	Ave Max Temp (F)	Ave Min Temp (F)	Ave Total Precip (in)	Ave. Total Snowfall (in)	Ave Total Snow Depth (in)
January	39.6	15.1	1.79	21.1	6
February	42.2	17.5	1.79	19.2	8
March	47.8	21.8	1.57	14.5	5
April	57.7	28.0	1.05	4.4	1
May	67.3	34.8	0.84	0.6	0
June	76.8	42.0	0.56	0.1	0
July	82.7	49.8	1.42	0.0	0
August	80.4	48.9	1.74	0.0	0
September	73.9	41.8	1.49	0.0	0
October	63.0	33.0	1.43	1.3	0
November	49.9	23.0	1.23	6.6	1
December	41.8	16.8	1.52	15.4	2
Annual	60.3	31.0	16.43	83.3	2

Source: Western Regional Climate Center, April 2007.

How the Soil Survey was Made

This soil survey was made in accordance with the guidelines for an order II soil survey as detailed in the Soil Survey manual (USDA 1993). Soils were classified to the taxonomic family using the Keys to Soil Taxonomy, Ninth Edition (USDA 2003). The dominant soil sub-groups identified in the Coal Hollow soil survey area are Aridic Calciustepts, Aridic Calciustolls, Calcidic Haplustalfs, Aeric Epiaquepts, and Aridic Ustorthents. Tables of the taxonomic classification of the soil profiles are contained in appendix B.

Twenty three soil types were identified in the soil survey area. Seven soil types could be correlated to existing soil series (Soil Survey Staff, 2007). Ten soil types were correlated to existing soil series names at the family level. There were no established soil series names at the soil family level for the remaining six soil types, so they were assigned letters (e.g. A Soils Family) for simplified identification is the soils legend.

Field Evaluation of Soils

Soil pedon descriptions were completed for representative backhoe pits dug in September and November 2006 and in March, April, and September 2007. Pits in very deep soils were dug to a minimum 60 inches unless bedrock or wet soil conditions were limiting. But most soil pits were dug and described to 84 inches or deeper. Two soil pits in soils less than 20 inches deep were hand dug. Soil

pedon log sheets were completed for each soil pit using the methods detailed in the *Field Book for Describing and Sampling Soils*, version 2 (Schoeneberger et. al., 2002). Soil pits 1 through 42 were described by Bruce Chesler, soil scientist (B. Chesler, 2007). Soil pits 43 through 50 were described by Robert Long, Certified Professional Soil Scientist.

Aerial photographs (1:15,000 and 1:7,200) were used to delineate soil map unit boundaries based on slope gradient, geomorphic features, and vegetation. The aerial photography was taken in July 2006 by Olympus Aerial Surveys, Inc., Salt Lake City, Utah. A mirror stereoscope was used to view paired photo images.

Samples of soil horizons were collected in gallon size plastic bags and in micro-monolith boxes. The box samples were used for further determination of soil profile characteristics.

Analysis of Soil Samples

Soil samples (145) from 27 representative soil profiles that were collected during September 12-19, 2006 were shipped on September 25 and October 2, 2006 to Inter-mountain Laboratories in Sheridan, Wyoming for chemical and physical analysis. Each of the soil samples were analyzed for the parameters outlined by the Utah Division of Oil Gas and Mining's (DOGM) *Guidelines for Management of Topsoil and Overburden* (DOGM, 2005), Table 1-2.

Soil samples (32) collected during November 2006 and March 2007 from 8 representative soil profiles were shipped to Energy Labs in Casper, Wyoming for analysis of the topsoil suitability parameters listed in table 1-2 on March 29, 2007.

Five soil samples collected from two shallow soil pits were shipped to Energy Labs in Casper, Wyoming for analysis of the topsoil suitability parameters listed in table 1-2 on April 11, 2007.

Table 1-2. Soil analysis parameters for topsoil and overburden (Utah DOGM, 2005).

Topsoil Suitability Parameters	
Paste pH	Available Phosphorus
Saturation percent	Particle Size Analysis (% very fine sand, sand, silt, and clay)
Electrical Conductivity (ECe)	Organic Matter Percent
Soluble Na, K, Mg, and Ca	CaCo3 Percent
Sodium Adsorption Ratio	Extractable Potassium
Additional Analyses for Topsoil and Overburden	
Soluble Selenium	Soluble Boron
Alkalinity	

Laboratory data reports of the soil sample analyses are in Appendix B.

Geology and Setting

The Coal Hollow soil survey area is located in Sink Valley in the western part of the Alton Amphitheater southwest of the Paunsaugunt Plateau. Quaternary alluvium (Qa), Tropic shale (Kt), Dakota sandstone (Kd), and the Tibbet Canyon sandstone (Kst) member of the Straight Cliffs Formation are the primary sources of parent material in the soil survey area. Figure 1-3 illustrates geologic formations and features in the soil survey area (Utah Geological Survey, 2001). The Sink Valley fault runs north south through the Coal Hollow Soil Survey area (Utah Geological Survey, 2001).

Quaternary alluvium (Qa) consists of unconsolidated clay, silt, sand, and gravel deposits located in fan alluvium and terrace deposits of Holocene age (Utah Geological Survey, 2001). The primary sources of the Quaternary alluvium is the Tropic shale (Kt), Smoky Hollow sandstone member of the Straight Cliffs formation, John Henry sandstone member of the Straight Cliffs formation, and the Drip Tank sandstone member of the Straight Cliffs formation (Utah Geological Survey, 2001). Soils developed from Quaternary alluvium are situated on a large alluvial fan that flowed out of the Robinson Creek drainage and unnamed smaller drainages and across the Sink Valley fault.

Tropic shale (Kt) is a member of the Upper Cretataceous formation and is also referred to as Moncos shale (Hintze, 1977). It is a medium-brownish-gray to medium dark-gray, very thin-bedded, silty shale. Soils developed from Tropic shale are primarily east of the Sink Valley fault (Utah Geological Survey, 2001). Seeps on top of the Tropic shale have resulted in the development of aquic soils. Shallow soils have developed in Tropic shale along the Sink Valley fault escarpment.

Dakota sandstone (Kd) consists of interbeded yellowish-gray and brown sandstone, gray mudstone, black carbonaceous mudstone and coal, and some bentonite (Utah Geological Survey, 2001). Shallow and moderately deep soils have developed in Dakota sandstone at the east ends of the soil survey area where it is intermingled with Tropic shale.

Tibbet Canyon sandstone (Kst) consists of orangish-gray-weathering sandstone that intermingles with the underlying Tropic shale (Utah Geological Survey, 2001). Shallow and moderately deep soils have developed in Tibbet Canyon sandstone at the north end of the soil survey area.

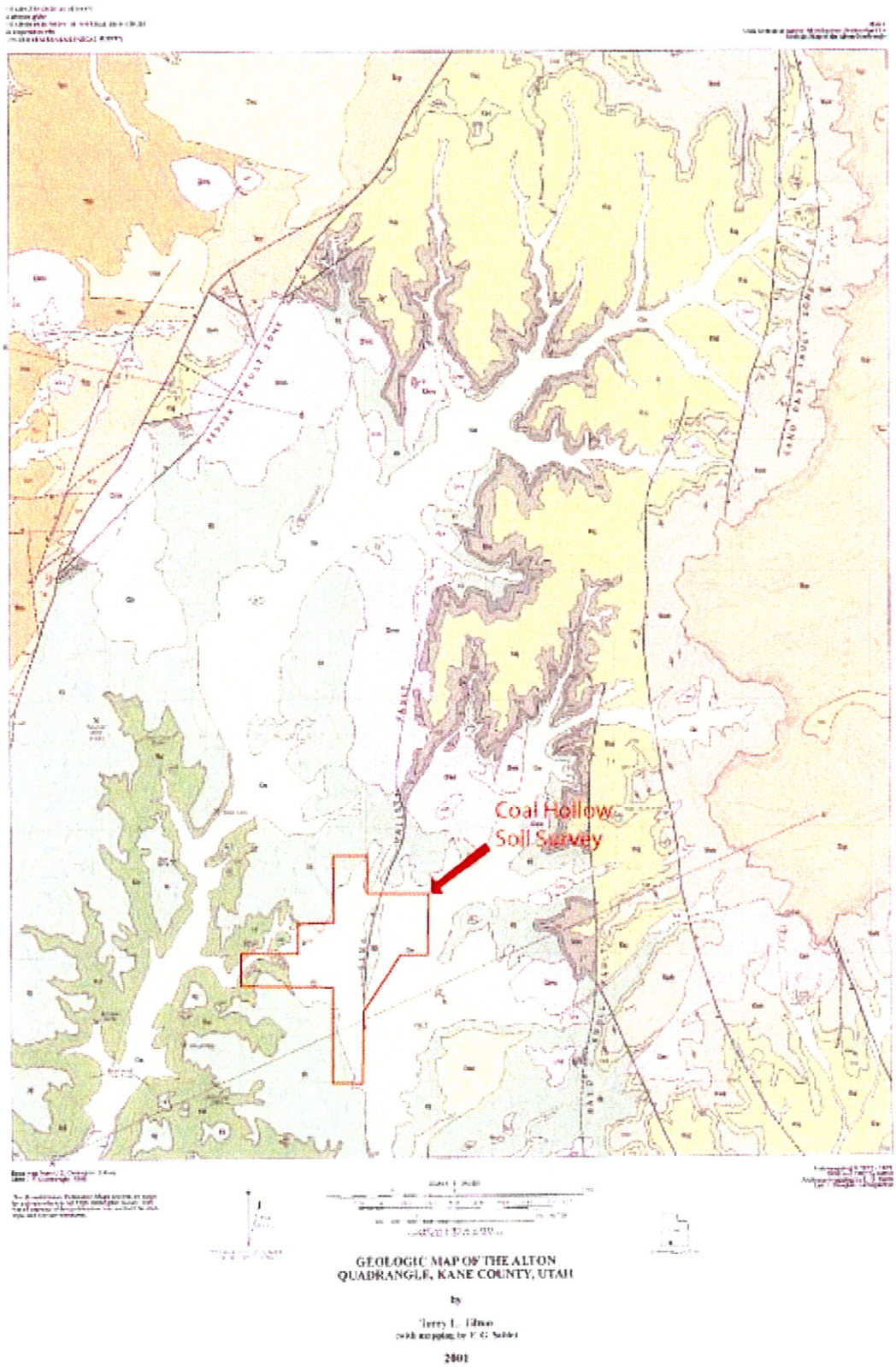

Figure 1-3. Alton quadrangle geological map showing location of Coal Hollow Soil Survey (Utah Geological Survey, 2001).

Prime Farmland

The Natural Resource Conservation Service conducted a prime farmland assessment in October 2006 and determined that "No Prime Farmland or Soils of Statewide Importance were found within the study area (Coal Hollow Mine area), per criteria outlined in the National Survey Handbook Part 622 and Exhibit UT603-1, respectively (C. Meier, 2006)." The assessment stated that the soils "..could classify as Soils of Statewide Importance, if irrigated."

"An available and reliable source of moisture to sustain crops common to the area is the primary limiting factor that excludes the observed soils from classifying as Prime Farmland or SSI (C. Meier, 2006)."

"In addition to a lack of a reliable source of water, soils did not classify as Prime Farmland due to high pH, high electrical conductivity, excessive erosion potential on steep slopes and slow permeability (C. Meier, 2006)."

Soil Survey Legend

Soils in the Coal Hollow project soil survey area have been grouped into thirteen soil map units based on taxonomic classification, depth to parent material, and slope. The composition of these map units is described in table 2-1. Detailed descriptions of each soil map unit are included in this section. The Coal Hollow soil survey map is Drawing 2-1.

Typifying soil profile descriptions for each soil type are in section 3 of this soil survey.

Soil profile description sheets are in appendix B.

Results of laboratory analysis of representative soil samples for each soil type are in appendix C.

1 A Family – Wapiti Family complex, 3 to 8 percent slopes

General Description

Map unit 1 is dominated by clayey soils with very slow hydraulic conductivity rates of less than 0.04 inches per hour based on the silty clay soil texture (p. 91, Renard, 1997). The depth to Tropic shale is greater than 40 inches in the major soils (A and Wapiti soil families), but minor inclusions with Tropic shale from 20 to 40 inches deep occur. The map unit is dominated by big sagebrush and grasses.

This map unit occurs at the north end of the map unit where the Coal Hollow project proposes to build facilities and establish topsoil and subsoil stockpiles.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
65	A Family	fine, mixed, superactive, mesic Aridic Calciustept	1*
20	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	32
10	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	33
5	M	fine, mixed, superactive, mesic Aridic Haplustepts	26

* Lab analysis of typifying soil pedon for map unit.

Map unit 1 description is continued on page 2-5.

Table 2-1. Soil map unit composition for the Coal Hollow project area.

Map Unit	Percent	Soil Type[1]	Taxonomic Classification[2]	Modal Pedon[3]
1		**A Family – Wapiti Family complex, 3 to 8 percent slopes**		
	65	A Family	fine, mixed, superactive, mesic Aridic Calciustept	1
	15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	32
	10	D	fine, mixed, superactive, mesic Aridic Calciustoll	33
	5	Manzanst Family	fine, mixed, superactive, mesic Aridic Haplustalf	48
	5	N Family	fine, mixed, superactive, frigid Aquic Calciustoll	26
2		**M Family - Calendar Family – D Family complex, 3 to 8 percent slopes**		
	60	M Family	fine, mixed, superactive, mesic Aridic Calciustepts	3
	25	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	4
	15	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	2
3		**Cibeque Family – Wapiti Familiy complex, 3 to 8 percent slopes**		
	60	Cibeque Family	fine-loamy, mixed, superactive, mesic Aridic Calciustept	6
	30	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	31
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	
	5	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	
4		**Jonale Family - Graystone Cobbly Substratum Family - Wapiti Family complex, 3 to 8 percent slopes**		
	50	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	17
	25	Graystone cobbly substratum Family	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	39
	15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	19
	5	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	

Table 2-1. Soil map unit composition for the Coal Hollow project area.

Map Unit	Percent	Soil Type[1]	Taxonomic Classification[2]	Modal Pedon[3]
5		**Calendar Family - M Family – Drifity Family complex, 8 to 25 percent slopes**		
	40	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	24
	30	M Family	fine, mixed, superactive, mesic Aridic Calciustept	25
	20	Drifity Family	loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthent	49
	10	Zigzag	Clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent	
6		**Graystone - Cookcan – Jonale Family complex, 1 to 5 percent slopes**		
	45	Graystone	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	15
	20	Cookcan	coarse-loamy, mixed, superactive, frigid Typic Calciaquoll	9B
	20	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	16
	15	I Family	fine-loamy, mixed, superactive, frigid Aquic Calciustept	14
7		**Happyhollow Family - Alamosa complex, 1 to 5 percent slopes**		
	55	Happyhollow Family	fine, mixed, superactive frigid Aeric Epiaquept	38
	20	Alamosa	fine-loamy, mixed, superactive, frigid Typic Argiaquoll	18A
	10	Jicarilla Family	fine, mixed, superactive, frigid Typic Argiaquoll	43
	10	Tetonview Family	fine-loamy, mixed, superactive frigid Aeric Calciaquoll	40
	3	Brumley	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf	
	2	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	
8		**Brumley – Graystone - Snilloc complex, 3 to 8 percent slopes**		
	40	Brumley	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf	22
	30	Graystone Cobbly Substratum Family	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	20
	20	Snilloc	coarse-loamy, mixed, superactive, mesic Aridic Calciustept	21
	10	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	

Table 2-1. Soil map unit composition for the Coal Hollow project area.

Map Unit	Percent	Soil Type[1]	Taxonomic Classification[2]	Modal Pedon[3]
9		**D Family - Deacon complex, 5 to 30 percent slopes**		
	55	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	41
	30	Deacon	fine-loamy, mixed, superactive, mesic Aridic Haplustoll	42
	10	A Family	fine, mixed, superactive, mesic Aridic Calciustept	
	5		Creek bottom	
10		**Zigzag clay, 8 to 25 percent slopes**		
	85	Zigzag	Clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent	50
	10	Drifity Family	loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthent	
	5	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	
11		**A family clay, 8 to 25 percent slopes**		
	85	A Family	fine, mixed, superactive, mesic Aridic Calciustept	28
	10	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	
	5	Zigzag	Clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent	
12		**Manzanst Taxadjunct Family clay, 3 to 12 percent slopes**		
	85	Manzanst Family	very fine, mixed, superactive, mesic Aridic Haplustalf	48
	10	Manzanst Family Deep	very fine, mixed, superactive, mesic Aridic Haplustalf	60
	5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	
13		**A Family – Happyhollow Family complex, 1 to 5 percent slopes**		
	80	A Family	fine, mixed, superactive, mesic Aridic Calciustept	59
	15	Happyhollow Family	fine, mixed, superactive frigid Aeric Epiaquept	45
	5	I Family	fine-loamy, mixed, superactive, frigid Aquic Calciustept	52

1 Soil families were given letter designations, because it was not possible to correlate the soils to established soil series since no NRCS published or SSURGO certified soil survey data exists in or adjacent to the Coal Hollow project area. Assignment of soil type letters enables comparison of map units and simplifies map unit names.

2 Soil families classified using Keys to Soil Taxonomy, Tenth Edition (NRCS 2006).

3 Soil pedon described within map unit boundaries that represents the characteristics of the soil family within the soil map unit.

Map Unit 1, continued from page 2-1

Typifying Soil Pedon Descriptions

Soil colors are for dry soil unless specified otherwise.

The typifying soil pedon for A family soils in map unit 1 is soil pedon 1. The surface is a grayish brown clay loam 12 inches thick, dark grayish brown (moist). The subsoil (calcic) consists of light brownish gray silty clay, light olive brown (moist). Decomposing Tropic shale occurs at 42 inches below the surface.

The typifying soil pedon for the Wapiti family soils in map unit 1 is soil pedon 32. The mollic surface is a brown loam 8 inches thick, very dark grayish brown (moist). The subsurface (argillic) is a pale brown clay loam and silty clay, brown (moist). The subsoil (calcic) is pink loam to 6 feet, brown (moist). The underlying soil to nearly 12 feet is light yellowish brown silty clay over pink coarse sands with 10 percent faint strong brown mottles.

Supporting Soil Pedons

Soil family A is also represented by soil pits 27 and 30 in map unit A. Soil pit 27 does not have Tropic shale within 140 inches of the surface. Soil pit 30 has decomposing Tropic shale at 105 inches below the surface.

Laboratory Analysis

Analysis of soil samples from soil pit 1 had a poor soil pH (8.7) from 24 to 42 inches and fair lime percents (22.6 to 28.3 percent) throughout the soil profile. The silty clay texture at 24 inches is in the poor category for texture. SAR increases gradually with depth to 4.02 in the 24 to 42 inch horizon and then reaches 12.3 in the tropic shale below 42 inches.

Soil Inclusions

Small inclusions of D Family and N Family soils occur within map unit 1. D Family soils are similar to the A Family soils, but have a mollic epipedon (dark surface). The N family soils are very deep, similar to the D Family soil, but have aquic soil conditions below 20 inches and are located in concave depressions within map unit 1.

2 M Family – Calendar Family - D Family complex, 3 to 8 percent slopes

General Description

This map unit is dominated by soils with Tropic shale parent material at 20 to 72 inches below the surface. The map unit is dominated by big sagebrush and grasses with some pinyon pine and Utah juniper encroaching along edges of the map unit near map unit 5. This map unit is dominated by clayey soils with very slow hydraulic conductivity rates of less than 0.04 inches per hour based on the silty clay soil texture (p. 91, Renard, 1997).

This map unit occurs at the north end of the map unit where the Coal Hollow project proposes to build facilities. A second small delineation of map unit 2 occurs along the south boundary of the proposed year 1 mining area west of the county road.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
60	M Family	fine, mixed, superactive, mesic Aridic Calciustepts	3*
25	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	4*
15	D family	fine, mixed, superactive, mesic Aridic Calciustoll	2*

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for M family soils in map unit 2 is soil pedon 3. The surface is a brown loam 4 inches thick, dark brown (moist). The subsurface (cambic) is a grayish brown clay loam and silty clay loam 15 inches thick, brown (moist). The underlying subsoil to 33 inches is light brownish gray silty clay, light olive brown (moist). Tropic shale parent material occurs at 33 inches below the surface.

The typifying soil pedon for Calendar family soils in map unit 2 is pedon 4. The surface is pale brown silty clay 4 inches thick, dark grayish brown (moist). The subsurface (cambic) is light brownish gray silty clay moderate to strong structure, dark grayish brown (moist) to 31 inches. Tropic shale parent material occurs at 31 inches.

The typifying soil pedon for D family soils in map unit 2 is pedon 2. The surface (mollic) is brown clay loam 12 inches thick, very dark grayish brown (moist). The subsurface (cambic and calcic) is pale brown silty clay and clay to 48 inches deep, brown (moist). The subsoil is white silty clay to 72 inches, brown (moist). Tropic shale parent material occurs at 72 inches below the surface.

Supporting Soil Pedons

Soil pedon 12 is representative of soil type M and is located in the delineation of map unit 2 along the south boundary of the year 1 mining area. The depth to Tropic shale in pedon 12 is 26 inches.

Laboratory Analysis

The main limiting feature of soils in map unit 2 is an increase of conductivity and SAR into the fair range as the soil depth reaches the interface with Tropic shale. The percent lime in the soil ranges from 18.6 to 27.5 above the Tropic shale. The saturation percentage increases with the percent clay, but remains in the fair range even with the clay and silty clay.

3 Cibeque Family - Wapiti Family complex, 3 to 8 percent slopes

General Description

Map unit 3 is characterized by very deep soils that show some indication of alluvial deposition most likely from the large alluvial fan that formed this portion of Sink Valley. Recent soil deposition from nearby Robinson Creek is indicated in pedon 6 by an increase of organic matter at 12 inches below the soil surface.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
60	Cibeque	fine-loamy, mixed, superactive, mesic Aridic Calciustept	6*
30	Wapiti	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	31
5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	
5	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for Cibeque family soils in map unit 3 is soil pedon 6. The surface is brown loamy sand 12 inches thick, dark yellowish brown (moist). The subsoil (calcic) is pale brown loam and sandy loam to 34 inches deep, brown (moist). The underlying soil to 60 inches is light grayish brown silty clay, brown (moist).

The typifying soil pedon for Wapiti family in map unit 3 is soil pedon 31. The surface (mollic) is dark grayish brown loam 7 inches thick, dark brown (moist). The subsurface (argillic) is light yellowish brown clay loam to 17 inches, dark yellowish brown (moist). The subsoil (lower argillic and calcic) is light brownish gray and brown clay loam and loam to 52 inches, grayish brown and brown (moist). The underlying soil to 110 inches is very pale brown sandy loam and loamy sand, brown and yellowish brown (moist).

Supporting Soil Pedons

Soil pedon 13 is representative of Cibeque family in map unit 3.

Laboratory Analysis

Soil pH increases to the fair category (8.3 to 8.5) at 6 inches below the surface in pedon 6. The soil pH is consistent with percent lime in fair category (18.4 to 29.2). The loamy sand surface has a fair water holding capacity. Organic matter has an irregular increase at 12 inches from 0.7 in the A2 horizon to 2.6 in the upper Bk horizon.

Soil Inclusions

Small inclusions of A and Calendar soil families occur in map unit 3. A family soils are similar to Cibeque soils, but have a higher percentage of clay in the control section (10 to 40 inches). Calendar soils are very deep but do not have either an argillic horizon (increase in illuvial clays) or a calcic horizon within 40 inches of the soil surface.

4 Jonale Family – Graystone cobbly substratum Family - Wapiti Family complex, 3 to 8 percent slopes

General Description

Map unit 4 is characterized by very deep fine-loamy and coarse-loamy soils with mollic epipedons and calcic horizons. Lime accumulations below 12 to 22 inches are common in these soils. Soil pH is strongly alkaline below 22 inches in some soils. Vegetation in this map unit is big sagebrush and grasses.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
50	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	17*
25	Graystone cobbly substratum family	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	39*
15	Wapiti Family	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll	19*
5	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	7*
5	A Family	fine, mixed, superactive, mesic Aridic Calciustept	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for Jonale family in map unit 4 is soil pedon 17. The surface (mollic) is a brown clay loam 9 inches thick, dark brown (moist). The subsurface (cambic) is a pale brown clay loam to 18 inches, brown (moist). The lower subsurface (Bwk) to 45 inches is light yellowish brown loam and clay loam, dark yellowish brown (moist). The underlying subsoil (calcic) is very pale brown clay loam and silty clay to 80 inches, yellowish brown (moist).

The typifying soil pedon for Graystone cobbly substratum family in map unit 4 is soil pedon 39. The surface is brown clay loam 12 inches thick, dark brown (moist). The subsurface (calcic) is a very pale brown to light yellowish brown sandy loam to 36 inches deep, yellowish brown (moist) with 0 to 15 percent gravels and cobbles. The underlying subsoil is very pale brown very cobbly loamy sand to 75 inches, brown (moist).

The typifying soil pedon for Wapiti family in map unit 4 is soil pedon 19. The surface (mollic) is a grayish brown loam 6 inches thick, very dark grayish brown (moist). The subsurface (upper argillic) is a brown and pale brown clay loam to 24 inches deep, dark grayish brown and yellowish brown (moist). The lower subsurface (lower argillic and upper calcic, Btk) is a pale brown loam to 37 inches deep, brown (moist). The underlying subsoil (calcic) is a pale brown and light yellowish brown sandy loam to 90 inches deep, yellowish brown (moist).

Supporting Soil Pedons

Jonale family is represented by soil pedons 5, 8, 10, 18B, 23, 34, and 35. Soil family H is represented by soil pedons 11, 36, and 37.

Laboratory Analysis

Jonale soil family is characterized by soil pH in the poor range of 8.6 to 9.0 (Utah DOGM, 2005) at depths below 22 to 40 inches. This strongly alkaline soil pH corresponds to lime percentages of greater than 30 in this same portion of the soil profile.

Graystone cobbly substratum soil family is dominated by sandy loam and loamy sand textures with some clay loam. Lime accumulation occurs below 12 to 16 inches, but percentages are lower relative to the fine-loamy type C soils. Soil pH becomes strongly alkaline at depths of 48 inches in some pedons. There is 15 to 45 percent gravels and cobbles below 36 inches.

Wapiti soil family has fair levels of carbonates throughout the soil profile. Soil pH was measured as poor below 68" in soil pedon 19.

Soil Inclusions

Soil family D is represented by pedon 7 in map unit 4. There are also small inclusions of soil family A where map unit 4 borders map units 1 and 11.

5 Calendar Family - M Family – Drifity Family complex, 8 to 25 percent slopes

General Description

These soils are moderately deep (20 to 40 inches) to shallow (less than 20 inches to Tropic shale. The moderately deep soils have clayey textures, while the shallow soils are loamy. Vegetation is pinyon pine, Utah juniper, black sage and grasses.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
45	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	24*
30	M family	fine, mixed, superactive, mesic Aridic Calciustept	25*
20	Drifity Family	loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthent	49*
5	Zigzag	Clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for Calendar family in map unit 5 is soil pedon 24. The surface is olive brown clay 5 inches thick, dark grayish brown (moist). The subsurface (cambic) is dark grayish brown and olive clay with moderate to strong blocky structure to 32 inches. Tropic shale parent material is at 32 inches.

The typifying soil pedon for M family in map unit 5 is soil pedon 25. The surface is covered with a half inch of decomposing needles and twigs. The soil surface is light brown clay 5 inches thick, brown (moist). The subsurface (calcic) is brown and strong brown clay with lime accumulations, dark brown (moist). Tropic shale parent material is at 32 inches.

The typifying soil pedon for Drififty family in map unit 5 is soil pedon 49. The surface light yellowish brown silty clay loam 3 inches thick, light olive brown (moist). The subsoil is a light olive brown loam to 10 inches, olive brown (moist). Interbeded sandstone and Tropic shale are at 10 inches.

Laboratory Analysis

Calendar soil family is characterized by percent clay of 44 to 47 with correspondingly high saturation percentages of 73.6 to 91.2. Conductivity increases to 7.8 at 17 inches below the surface.

Soil type M is characterized by percent clay of 40 to 47 with correspondingly high saturation percentages of 58.5 to 80.6 in the upper 20 inches of the soil profile. The percent clay decreases to 33 percent below 20 inches. Lime percentage is greater than 30 in the 5 to 20 inch depth, but less than 5 above and below this zone.

Drififty soil family is characterized by pH of 8.1 to 8.4, lime percentage of 18, and SAR of less than 0.1.

Soil Inclusions

There are some inclusions of Zigzag soils that are shallow (less than 20 inches) to Tropic shale. Zigzag soils are clayey.

6 Graystone – Cookcan – Jonale Family complex, 1 to 5 percent slopes

General Description

These medium to coarse textured soils are very deep. Wet soil conditions are present at varying depths in all of the map unit soils. The depth to wet soil conditions varies from 14 to 58 inches. This map unit is not a good source of subsoil. It is estimated that these soils are slower to warm up in the spring due to the wet soil conditions. Vegetation is grasses, sedges, and forbs.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
45	Graystone	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	15*
20	Cookcan	coarse-loamy, mixed, superactive, frigid Typic Calciaquoll	9B*
20	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	16*
15	I Family	fine-loamy, mixed, superactive, frigid Aquic Calciustept	14*

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for Graystone soils in map unit 6 is soil pedon 15. There is a dense root mat 1 inch thick on the surface. The surface is brown sandy loam 8 inches thick, dark brown (moist). The subsurface (cambic) is pale brown loam with moderate structure, dark yellowish brown (moist) to 20 inches. The subsoil (calcic) is very pale brown loam to 58 inches deep, yellowish brown (moist). The underlying soil is yellow and brownish yellow sandy loam with common prominent mottles to 96 inches, yellowish brown (moist).

The typifying soil pedon for Cookcan soils in map unit 6 is soil pedon 9B. The surface is dark grayish brown loam 6 inches thick, very dark grayish brown (moist). The lower surface is grayish brown sandy clay loam to 14 inches with few faint mottles, dark grayish brown (moist). The subsurface is light brownish gray sandy loam with common prominent mottles, dark gray (moist). The subsoil is light gray sandy loam with many prominent mottles, grayish brown (moist). The soil was wet below 48 inches.

The typifying soil pedon for Jonale soil family in map unit 6 is soil pedon 16. There is a dense root mat 1 ½ inch thick on the surface. The surface is dark grayish brown silty clay loam 8 inches thick, very dark grayish brown (moist). The subsurface (cambic) is pale brown silty clay to 18 inches, strong brown (moist).

The subsoil is pink clay loam to 36 inches, brown (moist). The lower subsoil is pink silty clay loam and loam with few faint strong brown mottles to 68 inches, brown (moist). The underlying soil is light brownish gray clay loam with common prominent yellowish red mottles, grayish brown (moist).

Supporting Soil Pedons

Soil pedon 9A is similar to Graystone soils, but it has carbonates throughout the soil profile without any zone of accumulation.

Laboratory Analysis

Strongly alkaline soil pH (8.6 to 9.0) within 12 to 20 inches of the soil surface is the main limiting feature of the soils in map unit 6. Soil pedon 9A has very strongly alkaline pH (greater than 9.0) below 12 inches of the surface.

Lime percentage exceeds 30 in 3 of 5 pedons within 12 to 20 inches of the surface. Lime percentage ranges from 15 to 26 in the other two pedons from the surface to 48 inches.

Soil Inclusions

Soil pedon 14 is representative of I family soils within map unit 6 that do not have a mollic epipedon (dark surface) and have aquic (wet) soil conditions within 30 inches of the surface. These soils have a calcic horizon.

7 Happyhollow Family – Alamosa complex, 1 to 5 percent slopes

General Description

This soil map unit is located on a Tropic shale structural bench on the east side of the Sink Valley fault. Soils are characterized by clay and a high water table that is perched on top of the heavy clay soils. The high water table is at or within a foot of the soil surface during the wet period of the year. It is estimated that these soils are slower to warm up in the spring due to the wet soil conditions. Vegetation is sedges and forbs.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
55	Happyhollow Family	fine, mixed, superactive frigid Aeric Epiaquept	38*
20	Alamosa	fine-loamy, mixed, superactive, frigid Typic Argiaquoll	18A*
10	Jicarilla Family	fine, mixed, superactive, frigid Typic Argiaquoll	43
10	Tetonview Family	fine-loamy, mixed, superactive frigid Aeric Calciaquoll	40*
3	Brumley	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf	
2	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for Happyhollow family soils in map unit 7 is soil pedon 38. The surface is dark grayish brown (moist) silty clay 6 inches thick. The subsurface is a yellowish brown (moist) silty clay 6 inches thick. The calcic horizon begins at 12 inches below the surface and is a light yellowish brown (moist) to very pale brown (moist) silty clay. The calcic horizon continues to 48 inches or deeper. The water table was at 29 inches when the pit was described in March 2007. Mottles and gleyed soil were observed below 12 inches. Vegetation is grasses, sedges, widely scattered Wyoming big sagebrush, and wild rose.

The typifying soil pedon for Alamosa soils in map unit 7 is soil pedon 18A. The mollic surface is a very dark grayish brown (moist) loam to 7 inches. The cambic horizon is a brown (moist) loam to 15 inches deep. The calcic horizon is a light olive brown (moist) sandy loam to 30 inches. The underlying soil is grayish brown (moist) clay loam and sandy clay loam to 60 inches deep. Mottles were observed below 7 inches. The water table was at 51 inches when the described in September 2006.

Supporting Soil Pedons

Happyhollow family soil type was observed in pedon 45 within map unit 7 and a similar clayey soil in pedon 44. The Alamoss soil was also observed in pit 46.

Laboratory Analysis

The Happyhollow family soil is characterized by silty clay from the surface down to 24 inches or greater. Soil pH is 8.3 to 8.5 in the 12 to 24" horizon. Saturation percentage ranges from 69.9 to 81.8 in the upper 24 inches. The calcium carbonate equivalent ranges from 17.8 to 28.3 in the upper 20 inches and then increases to 44.5 below 20 inches. This soil pit was not sampled below 24 inches, because of the high water table.

Alamosa soil is characterized by medium textured soils (loam, clay loam, and sandy clay loam) in the upper 60 inches. The calcium carbonate equivalent ranges increases from 20.2 percent in the upper 7 inches to 29.3 percent in the 30 to 45 inch horizon.

Soil Inclusions

A soil similar to Alamosa soils, but with more clay in the control section is in localized areas. Soil mottles were observed and water was flowing into pit 43 when it was described in April 2007. The water table appeared to be perched on top of the underlying clay horizon at 54 inches.

Tetonview family soils were identified in soil pit 40. Mottles were observed below 6 inches and a water table at 23 inches when the pit was described in March 2007. This soil has a dark surface (mollic) and a calcic horizon.

Dry soil profiles occur on small isolated mounds within map unit 7. These non-hydric soils include Brumley and Jonale family soils. Both are very deep soils with a calcic horizon. Jonale family soils have a dark surface (mollic).

8 Brumley – Graystone Cobbly - Snilloc complex, 3 to 8 percent slopes

General Description

These soils developed in very deep alluvium on the east side of the Coal Hollow project area. They are medium to coarse textured. Evidence of a fluctuating water table was observed in most soils below 48 to 60 inches, depending on location and physiographic setting. This map unit would be a good source of cover material, but most of the planned disturbance in this area will be limited to cover soil stockpiles.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
40	Brumley	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf	22*
30	Graystone	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll	20*
20	Snilloc	coarse-loamy, mixed, superactive, mesic Aridic Calciustept	21*
10	Jonale Family	fine-loamy, mixed, superactive, mesic Aridic Calciustoll	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

Colors are for dry soil unless other wise noted.

The typifying soil pedon for the Brumley soils in map unit 8 is soil pedon 22. The surface is pale brown sandy loam to 6 inches. The argillic and upper calcic horizon is a light yellowish brown silty clay loam and sandy clay loam to 28 inches. The underlying soil is very pale brown sandy loam to 84 inches. Mottles increase significantly below 48 inches indicating that there is fluctuating water table during wet years. This soil supports Gamble oak, snowberry, grasses, and forbs.

The typifying soil pedon for the Graystone soil in map unit 8 is soil pedon 20. The surface is brown loam to 6 inches. The cambic horizon is light yellowish brown clay loam to 13 inches. The calcic horizon is very pale brown to light yellowish brown sandy loam and loamy sand to 54 inches. The underlying soil is a light yellowish brown loam to 72 inches and loamy sand to 96 inches. This soil supports Pinyon pine, Utah Juniper, Gamble oak, and snowberry.

The typifying soil pedon for Snilloc soils in map unit 8 is soil pedon 21. The surface is a light yellowish brown sandy clay loam to 8 inches. The calcic horizon is a pale brown sandy clay loam to 18 inches. The underlying soil is a pale brown strongly alkaline sandy loam to 96 inches. This soil was described in an opening of Wyoming big sagebrush within a larger area of Gamble oak.

Supporting Soil Pedons

A moist phase of the Brumley soil was observed in pit 47 in big sagebrush in map unit 8. A few faint mottles were observed below 24 inches. The amount of soil mottling increased significantly below 44 inches. This soil is on a low mound surrounded on three sides by wet soils in map unit 7. A water table was not observed when the pit was described in April 2007, but the mottles indicate that it is common for the water to rise within 44 inches of the surface in most years, and 24 inches in wet year.

Laboratory Analysis

The Brumley soil has calcium carbonate equivalents ranging from 17.5 to 23.8 percent.

The Graystone soil has a low saturation percentage in the 13 to 28 inch horizon (calcic). Calcium carbonate equivalents range from 16.5 to 25.4 percent. Available water capacity is 0.08 in layers of loamy sands below 28 inches.

The Snilloc family soil is characterized by strongly alkaline soil pH (8.7) below 36 inches. Calcium carbonate equivalents range from 16.8 to 29.8 percent.

Soil Inclusions

The Jonale family soils occur within this map unit. These soils are similar to Brumley soils, but have a dark surface (mollic).

9 D Family - Deacon complex, 5 to 30 percent slopes

General Description

These clayey soils are very deep and dominated by clayey textures. They have a dark surface (mollic epipedon). The D family soil has an increase in lime at 6 to 12 inches below the surface, while the Deacon soil has similar levels of lime throughout the soil profile. Soils in this map unit appear to have developed from the large alluvial fan that covers most of Sink Valley. The map unit is delineated along Robinson Creek and in an area south of the creek that could be the remnants of a historic channel. Vegetation is dominantly big sagebrush, rabbitbrush, and grasses with pinyon pine and Utah juniper encroaching from adjacent areas.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
55	D Family	fine, mixed, superactive, mesic Aridic Calciustoll	41*
30	Deacon	fine-loamy, mixed, superactive, mesic Aridic Haplustoll	42*
10	A Family	fine, mixed, superactive, mesic Aridic Calciustept	
5		Creek bottom	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for the D family soil in map unit 9 is soil pedon 41. The surface is brown sandy clay loam to 6 inches, dark brown (moist). The lower surface is brown clay to 12 inches, dark brown (moist). The subsurface (cambic) is pale brown silty clay to 36 inches, brown (moist). The subsoil (calcic) is very pale brown silty clay loam and sandy loam to 80 inches, yellowish brown (moist).

The typifying soil pedon for Deacon soils in map unit 9 is soil pedon 42. The surface is brown loam 9 inches thick, very dark grayish brown (moist). The subsurface (cambic) is pale brown silty clay to 24 inches, brown (moist). The upper subsoil (lower cambic) is pale brown sandy clay loam to 36 inches, brown (moist). The lower subsoil is light yellowish brown loam to 48 inches, yellowish brown (moist).

Supporting Soil Pedons

Soil pedon 29 is representative of the D family soil in map unit 9.

Laboratory Analysis

Poor soil pH at depth and clayey horizons characterize soils in map unit 9. Soil pH is poor below 64 inches in the D family soil (pit 41) and below 36 inches in the Deacon soil. Horizons of silty clay and clay occur in the D family soil (pit 41) between 6 and 36 inches. The clayey horizon in the Deacon soil is between 9 and 24 inches.

Soil Inclusions

The channel area of Robinson Creek comprises a small portion of this map unit. The creek bottom is not vegetated.

10 Zigzag clay, 8 to 25 percent slopes

General Description

These clayey soils are shallow to Tropic shale and formed along the Sink Valley escarpment. Vegetation is pinyon pine, Utah juniper, black sage, and Indian ricegrass.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
85	Zigzag	clayey, mixed, superactive, nonacid, mesic, shallow Aridic Ustorthent	50*
10	Drififty Family	loamy, mixed, superactive, nonacid, mesic Aridic Lithic Ustorthent	
5	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Description

The typifying soil pedon for the Zigzag soil in map unit 10 is soil pedon 50. The surface is light brownish gray clay to 4 inches, dark grayish brown (moist). The subsurface is light brownish gray clay to 19 inches, dark grayish brown and olive brown (moist). Tropic shale is at 19 inches.

Laboratory Analysis

Clayey soil texture is the main limiting feature to the Zigzag soil in map unit 10. Lime percentage is between 18 and 19 throughout the soil profile. SAR is less than 1. Soil pH is in the good to fair range (8.1 to 8.4).

Soil Inclusions

The Drififty family soil occurs along ridges where the Tropic shale is interbeded with sandstone. These soils are loamy and less than 20 inches deep. Calendar family soil occur in concave toeslope areas. These soils are clayey and moderately deep (20 to 40 inches) to Tropic shale.

11 A Family clay, 8 to 25 percent slopes

General Description

These soils are very deep and are on the footslope and backslope of the Sink Valley fault escarpment. Vegetation is grasses, rabbitbrush, and big sagebrush.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
85	A Family	fine, mixed, superactive, mesic Aridic Calciustept	28*
10	Calendar Family	fine, mixed, superactive, mesic Aridic Haplustepts	
5	Zigzag	Clayey, mixed, superactive, nonacid, mesic, shallow Aridic Ustorthent	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Description

The typifying soil pedon for the A family soil in map unit 11 is soil pedon 28. The surface is grayish brown clay to 8 inches, dark grayish brown (moist). The subsurface (cambic) is gray clay with moderate blocky structure to 24 inches, grayish brown (moist). The upper subsoil (calcic, Bwk) is gray clay with common fine soft calcium carbonate masses to 48 inches, grayish brown (moist). The lower subsoil (calcic, Bk) is light grayish brown clay with common fine and medium soft calcium carbonate masses to 102 inches, grayish brown (moist).

Laboratory Analysis

Clay texture is the primary limiting feature with the A family soil in map unit 11. SAR and conductivity increase significantly in the 24 to 48 inch horizon, but both

are still within the fair range (Utah DOGM, 2005). Lime percentage ranges from 17 to 19. Samples were not available for analysis for the 48 to 102 inch zone.

Soil Inclusions

Inclusions of the Calendar family soil occur along shoulders of hills and ridges. These soils are clayey and moderately deep (20 to 40 inches) to Tropic shale.

Small inclusions of the Zigzag soil occur on the summits of ridges and hills. These soils are clayey and shallow (less than 20 inches) to Tropic shale.

12 Manzanst Taxadjunct Family clay, 3 to 12 percent slopes

General Description

These clayey soils are deep to very deep to Tropic shale and formed on gently sloping to moderately steep slopes along the west side of Sink Valley. Vegetation is pinyon pine, Utah juniper, black sage, and Indian ricegrass. The very deep phase is on the backslopes and footslopes. The deep phase (40 to 60 inches to Tropic shale) of Manzanst family soil occurs on the shoulders of the hill sideslopes.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
85	Manzanst taxadjunct, very deep phase	very fine, mixed, superactive, nonacid, mesic, Aridic Ustorthent	48*
10	Manzanst taxadjunct, deep phase	very fine, mixed, superactive, nonacid, mesic, Aridic Ustorthent	60
5	A Family	fine, mixed, superactive, mesic Aridic Calciustepts	

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Description

The typifying soil pedon for the Manzanst taxadjunct soil in map unit 10 is soil pedon 48. The surface is grayish brown clay (moist) 3 inches, very dark grayish brown (moist). The subsurface is light brownish gray clay to 30 inches, dark grayish brown (moist). The substratum is light brownish gray clay with 3 to 10 percent very fine and fine calcium carbonate masses to 84 inches, dark grayish brown (moist).

The typifying pedon for the Manzanst taxadjunct deep phase is pedon 60. It is similar to pedon 48. Tropic shale is at 48 inches.

Laboratory Analysis

Clayey soil texture and SAR are the main limiting features of the Manzanst soil family in map unit 12. The SAR ranges from 10.80 to 12.70 below 12 inches.

Soil Inclusions

The A family soil occurs on the toeslopes and in swales where alluvium has accumulated. These soils are clayey and very deep (greater than 60 inches). They have an accumulation of carbonates in the subsoil.

13 A Family – Happyhollow Family complex, 1 to 5 percent slopes

General Description

These clayey soils are very deep to Tropic shale and formed on nearly level to gently sloping slopes in the south central portion of Sink Valley. Vegetation is grasses. The very deep phase is on the backslopes and footslopes. The deep phase (40 to 60 inches to Tropic shale) of Manzanst family soil occurs on the shoulders of the hill sideslopes.

Taxonomic Soil Classifications

Percent of Map Unit	Soil Series Family	Taxonomic Family	Typifying Soil Pedon
80	A Family	fine, mixed, superactive, mesic Aridic Calciustepts	59
15	Happyhollow Family	fine, mixed, superactive frigid Aeric Epiaquept	45
5	I Family	fine-loamy, mixed, superactive, frigid Aquic Calciustept	52

* Lab analysis of typifying soil pedon for map unit.

Typifying Soil Pedon Descriptions

The typifying soil pedon for the A family soil in map unit 13 is soil pedon 59. The surface is light yellowish brown clay loam to 10 inches, dark grayish brown (moist). The subsurface is light yellowish brown and very pale brown clay loam to 45 inches, yellowish brown and pale brown (moist). The substratum is very pale brown and pale yellow sandy clay loam to 76 inches. Reddish yellow medium and coarse mottles were observed below 62 inches.

The typifying soil pedon for the Happyhollow family soil is soil pedon 45. The surface is light brownish gray loam to 12 inches, dark grayish brown (moist). The subsurface is light gray and very pale brown sandy clay loam to 48 inches, gray

and light yellowish brown (moist). The substratum is very pale brown sandy clay loam to 84 inches, light yellowish brown (moist). The lower substratum is light gray silty clay to 100 inches, gray (moist). Yellow and brownish yellow medium and coarse mottles were observed below 5 inches.

Laboratory Analysis

Field conductivity (ECe) measurements for soil pit 59 ranged from 0.39 to 1.30 mmhos/cm.

Lab analysis of soil pit 28 is representative of the A family soil in map unit 13. Clay texture is the primary limiting feature with the A family soil in map unit 13. SAR and conductivity increase significantly in the 24 to 48 inch horizon (pedon 28), but both are still within the fair range (Utah DOGM, 2005). Lime percentage ranges from 17 to 19. Samples were not available for analysis for the 48 to 102 inch zone.

Soil Inclusions

The I family soils are similar to the A family soil, but they have aquic conditions below 20 inches. Reddish yellow fine mottles were observed in soil pedon 52 below 24 inches.

Typifying Soil Profile Descriptions

The following soil profile descriptions are representative of the major named soils identified in the eleven soil map units for the Coal Hollow project area. Soil texture and pH are the results of laboratory analysis of samples collected from each horizon. Photographs of the soil profiles are in appendix E and photographs of the soil profile micromonolith boxes are in appendix F.

Soils were correlated to established soils series when possible (NRCS 2007). Soils that are within the range of characteristics of and established series are listed as soils (e.g. Graystone soils). The soils that are not completely within the range of characteristics for a similar established series within the same taxonomic family are listed as family soils (e.g. Calendar family soils). The state of origin for each soil series is listed in parenthesis. When no established series were listed for a soil family, then a single capital letter was used in place of a series name (e.g. A Family Soils).

Typifying pedon descriptions are provided for major soil types.

A Family Soils

The A family soil occurs as major named component in map units 1 and 11. It also occurs as a minor component in map units 3, 4, and 9. This soil is very deep (greater than 60 inches). There are no established soil series in this soil family (NRCS 2007).

Taxonomic classification: fine, mixed, superactive, mesic Aridic Calciustepts

Soil pit 1 is representative of the A family soils that occur within the Coal Hollow project area. It is located in map unit 1. It formed in alluvium deposited by a large alluvial fan over Tropic shale residuum. Slope is 3 percent on a west slope (280°) on a concave fanslope. Vegetation is big sagebrush, grasses and forbs. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 6 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium platy parting to fine granular structure; soft, very friable, slightly sticky, and slightly plastic; many very fine, common fine and medium, and few coarse roots; common very fine interstitial and few fine tubular pores; strong effervescence, neutral (pH 7.3); clear smooth boundary.

Bk1 – 6 to 12 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/3) moist; moderate medium and coarse angular blocky structure; hard, very firm, very sticky, and very plastic; common very fine, few fine, medium, and coarse roots; few very fine tubular pores; strong effervescence, moderately alkaline (pH 8.3); gradual wavy boundary.

Bk2 – 12 to 24 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/3) moist; strong medium and coarse prismatic structure; very hard, very firm, very sticky, and very plastic; few very fine and fine roots; few very fine tubular pores; strong effervescence, strongly alkaline (pH 8.5); gradual smooth boundary.

Bk3 – 24 to 42 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/3) moist; strong medium and coarse prismatic parting to strong angular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; strong effervescence, strongly alkaline (pH 8.7); clear wavy boundary.

C – 42 to 60 inches; light gray (2.5Y 7/2) clay, grayish brown (2.5Y 5/2) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; strong effervescence, moderately alkaline (pH 8.4); clear wavy boundary.

Alamosa Soils

The Alamosa soil occurs as a major named component in map units 7 and 11. This soil is very deep (greater than 60 inches). Alamosa soils mapped in the Coal Hollow Project Area are within the range of characteristics listed in the official description (Colorado) of the Alamosa series (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, frigid Typic Argiaquolls

Soil pit 18A is representative of the Almosa soils that occur within the Coal Hollow project area. It is located in map unit 7 in a wet meadow east of the Sink Valley fault escarpment. It formed in formed in alluvium from Tropic shale deposited by a large alluvial fan. Slope is 4 percent on a west southwest slope (250°). Water table was at 51 inches on September 14, 2006. Vegetation is sedges, grasses, and iris. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 7 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky parting to medium granular structure; soft, friable, slightly sticky, and slightly plastic; many very fine, fine and medium roots; many very fine interstitial pores; slight effervescence, slightly alkaline (pH 7.7); abrupt smooth boundary

Bw – 7 to 15 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; common faint mottles; moderate fine and medium subangular blocky structure; soft, friable, slightly sticky, and slightly plastic; few very fine and common fine and medium roots; few fine and common medium interstitial pores; moderate effervescence, moderately alkaline (pH 8.0); abrupt smooth boundary.

Bk – 15 to 30 inches; pale yellow (2.5Y 7/3) sandy loam, grayish brown (2.5Y 5/3) moist; common faint mottles; moderate fine and medium subangular structure; slightly hard, friable, slightly sticky, and non-plastic; common medium and few very fine and fine roots; few very fine tubular pores; 30 percent angular sandstone gravels; strong effervescence, moderately alkaline (pH 8.1); abrupt smooth boundary.

2Btk – 30 to 45 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; many prominent mottles; moderate fine subangular structure; slightly hard, firm, slightly sticky, and slightly plastic; common medium and few very fine and fine roots; few very fine tubular pores; 35 percent clay films on ped faces; strong effervescence, moderately alkaline (pH 8.0); abrupt smooth boundary.

2Cg – 45 to 60 inches; light olive brown (5Y 6/2) sandy clay loam, olive gray (5Y 5/2) moist; massive; few fine and medium roots; few fine tubular pores; violent effervescence, moderately alkaline (pH 8.0).

Brumley Soils

The Brumley soils occur as a major named component in map unit 8. It also occurs as a minor component in map unit 7. This soil is very deep (greater than 60 inches). Brumley soils mapped in the Coal Hollow Project Area are within the range of characteristics contained in the official description of the Brumley series (Colorado). The official Brumley description does not contain an Oe or Oi horizon of oak leaves and decomposing litter (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Calcidic Haplustalfs

Soil pit 22 is representative of the Brumley soils that occur within the Coal Hollow project area. It is located in map unit 8 on a convex hillslope. It formed in alluvium from Tropic shale deposited by a large alluvial fan. Slope is 8 percent on a southwest slope (220°). Vegetation is Gamble oak, snowberry, and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH. The field description for pit 22 describes some soil mottles, but the box sample does not show any signs of redox mottles; and two supporting soil pits (47 and 51) do not contain any mottles.

Oe – 7 to 4 inches; oak leaves, duff and twigs.

Oi – 4 to 0 inches; partially decomposing oak leaf litter.

A – 0 to 6 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, non sticky, and non plastic; common very fine, fine and

medium roots; few very fine and few fine interstitial pores; slight effervescence, slightly alkaline (pH 7.7); abrupt smooth boundary.

Btk1 – 6 to 15 inches; light yellowish brown (10YR 6/4) silty clay loam, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky, and plastic; few very thin clay films on ped faces; common fine and medium and few very fine and coarse roots; few very fine and fine tubular pores; slight effervescence, slightly alkaline (pH 7.7); clear smooth boundary.

Btk2 – 15 to 28 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky, and slightly plastic; common thin clay films on ped faces; few fine, medium and coarse roots; few very fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

Bk1 – 28 to 48 inches; very pale brown (10YR 7/4) sandy loam, yellowish brown (10YR 5/4) moist; few prominent mottles; strong medium and coarse subangular blocky structure; hard, firm, non sticky, and non plastic; few fine, medium and coarse roots; few very fine and fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear wavy boundary.

Bk2 – 48 to 60 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; common prominent mottles; massive; slightly hard, friable, non sticky, and non plastic; few fine, medium and coarse roots; common very fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear wavy boundary.

C – 60 to 84 inches; very pale brown (10YR 7/3) sandy loam, yellowish brown (10YR 5/4) moist; many prominent mottles; massive; slightly hard, friable, non sticky, and non plastic; few very fine, fine, medium and coarse roots; many very fine interstitial pores; slight effervescence, moderately alkaline (pH 8.2).

Calendar Family Soils

The Calendar soil family occurs as a major named component in map units 2 and 5. It also occurs as a minor component in map units 3, 10, and 11. This soil is moderately deep (20 to 40 inches) to Tropic shale. The official description for the Calendar series (New Mexico) has 10YR colors in the A horizon and has a Bk horizon above the shale (NRCS 2007).

Taxonomic classification: fine, mixed, superactive, mesic Aridic Haplustepts

Soil pit 24 is representative of the Calendar soil family that occurs within the Coal Hollow project area. It is located in map unit 5. It formed in Tropic shale residuum on a convex hillslope. Slope is 13 percent on a north northeast slope (20°). Vegetation is pinyon pine and Utah juniper with scattered big sagebrush and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 5 inches; dark grayish brown (2.5Y 4/3) clay, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky parting to medium granular structure; soft, very friable, sticky, and very plastic; common very fine, few fine, medium, and coarse roots; common very fine and few fine interstitial pores; no effervescence, slightly alkaline (pH 7.6); clear wavy boundary.

Bw1 – 5 to 17 inches; dark grayish brown (2.5Y 4/2) clay, dark grayish brown (2.5Y 4/3) moist; moderate fine and medium subangular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine and fine roots; few very fine tubular pores; no effervescence, slightly alkaline (pH 7.7); clear wavy boundary.

Bw2 – 17 to 32 inches; light olive gray (5Y 6/2) clay, olive (5Y 5/3) moist; strong medium and coarse angular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; no effervescence, slightly alkaline (pH 8.1); abrupt wavy boundary.

Cr – 32 inches; decomposing Tropic shale and sandstone.

Cibeque Family Soils

The Cibeque soil family occurs as a major named component in map unit 3. This soil is very deep (greater than 60 inches). The official description for Cibeque series (Arizona) has a warmer annual temperature (about 53° F) and longer frost free period (120 to 170 days) than the Alton, Utah area (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Aridic Calciustepts

Soil pit 6 is representative of the Cibeque soil family that occurs within the Coal Hollow project area. It is located in map unit 3 It formed in alluvium over Tropic shale. Slope is 3 percent on a west northwest slope (290°). Vegetation is big sagebrush, rabbitbrush and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A1 – 0 to 6 inches; brown (10YR 5/3) loamy sand, dark yellowish brown (10YR 3/4) moist; weak medium granular structure; loose, loose, non sticky, and non plastic; common very fine, few fine, common medium and few coarse roots; many very fine interstitial pores; strong effervescence, moderately alkaline (pH 8.1); clear wavy boundary.

A2 – 6 to 12 inches; yellowish brown (10YR 5/4) loamy sand, dark grayish brown (10YR 4/2) moist; weak medium subangular structure; soft, very friable, non sticky, and non plastic; common very fine and fine and few medium roots; many very fine interstitial pores; strong effervescence, moderately alkaline (pH 8.3); clear smooth boundary.

Bk1 – 12 to 24 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate fine and medium subangular structure; slightly hard, firm, slightly sticky, and non plastic; common very fine and few fine roots; common very fine interstitial and few fine tubular pores; strong effervescence, moderately alkaline (pH 8.0); abrupt smooth boundary.

Bk2 – 24 to 34 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; strong medium and coarse subangular structure; hard, very firm, non sticky, and non plastic; few very fine roots; common very fine interstitial and few fine tubular pores; strong effervescence, moderately alkaline (pH 8.3); gradual smooth boundary.

2C – 34 to 60 inches; light brownish gray (10YR 6/2) silty clay, brown (10YR 4/3) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; slight effervescence, moderately alkaline (pH 8.3).

Cookcan Soils

The Cookcan soil occurs as a major named component in map unit 6. This soil is greater than 40 inches deep. The official description for Cookcan series does not contain a cambic (Bwg) horizon (Idaho), but is otherwise similar to the soil mapped in the Coal Hollow Project Area (NRCS 2007).

Taxonomic classification: coarse-loamy, mixed, superactive, frigid Typic Calciaquolls

Soil pit 9B is representative of the Cookcan soils that occur within the Coal Hollow project area. It is located in map unit 6 in a small alluvial basin. It formed in alluvium from Tropic shale and mixed sediments. Slope is 1 percent on a south slope (190°). Vegetation is grasses, big sagebrush, and rabbitbrush. Water table was at 57 inches when pit was described on September 12, 2006. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH. No laboratory analysis was completed on the 2C horizon.

A1 – 0 to 6 inches; dark grayish brown (2.5Y 4/2) loam, very dark gray (2.5Y 3/0) moist; weak medium granular structure; soft, friable, slightly sticky, and slightly plastic; many coarse, common very fine, fine, and few medium roots; many very fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

Bwg – 6 to 14 inches; grayish brown (2.5Y 5/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium and coarse granular structure; slightly hard, firm, slightly sticky, and slightly plastic; many medium, common very fine and fine roots; common very fine tubular pores; slight effervescence, moderately alkaline (pH 8.2); abrupt smooth boundary.

Bkg – 14 to 28 inches; light grayish brown (2.5Y 6/2) sandy loam, dark gray (2.5Y 4/0) moist; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky, and slightly plastic; common very fine, fine, and medium roots; common very fine tubular pores; strong effervescence, strongly alkaline (pH 8.5); abrupt smooth boundary.

Bk – 28 to 48 inches; light gray (2.5Y 7/2) sandy loam, light olive brown (2.5Y 5/4) moist; soil to wet to identify structure structure; hard, firm, slightly sticky, and slightly plastic; few fine, and medium roots; few very fine tubular pores; strong effervescence, moderately alkaline (pH 8.3); abrupt smooth boundary.

C – 48 to 57 inches; water table at 57 inches, few very fine roots, no effervescence.

D Family Soils

The D family soil occurs as a major named component in map units 2 and 9. It also occurs as a minor component in map units 1 and 4. This soil is very deep (greater than 60 inches). There are no established soil series in this soil family (NRCS 2007).

Taxonomic classification: fine, mixed, superactive, mesic Aridic Calciustolls

Soil pit 2 is representative of the D family soils that occur within the year one portion of the Coal Hollow project area. It is located in map unit 2. It formed in colluvial landslide deposit over Tropic shale. Slope is 6 percent on a south southwest slope (200°). Vegetation is big sagebrush, rabbitbrush and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A1 – 0 to 7 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 3/2) moist; moderate medium and coarse platy parting to fine granular structure; soft, very friable, sticky, and plastic; many very fine, common fine and medium, and few coarse roots; common very fine interstitial and common fine tubular pores; strong effervescence, slightly alkaline (pH 7.6); clear smooth boundary.

A2 – 7 to 12 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium angular blocky structure; very hard, very firm, very sticky, and very plastic; common very fine, fine and medium, and few coarse roots; common very fine interstitial and few fine tubular pores; strong effervescence, slightly alkaline (pH 7.7); clear wavy boundary.

Bwk1 – 12 to 24 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/3) moist; strong medium and coarse prismatic parting fine and medium angular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine and fine roots; few very fine tubular pores; strong effervescence, slightly alkaline (pH 7.8); gradual wavy boundary.

Bwk2 – 24 to 48 inches; light brownish gray (2.5Y 6/3) clay, dark grayish brown (2.5Y 4/3) moist; strong medium and coarse angular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; strong effervescence, slightly alkaline (pH 8.0); gradual irregular boundary.

Bk – 48 to 72 inches; light gray (2.5Y 7/2) silty clay, grayish brown (2.5Y 5/3) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; few very fine tubular pores; moderate effervescence, slightly alkaline (pH 7.8); gradual wavy boundary.

C – 72 to 96 inches; light gray (2.5Y 7/3) clay, grayish brown (2.5Y 5/3) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; moderate effervescence, slightly alkaline (pH 7.8).

Deacon Soils

The Deacon soils occur as a major named component in map unit 9. This soil is deep (greater than 40 inches) to very deep. Soils mapped in the Coal Hollow Project Area have have characteristics that are within the range of characteristics described in the official description (New Mexico) for the Deacon series (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Aridic Haplustolls

Soil pit 42 is representative of the Deacon soils that occur within the year one portion of the Coal Hollow project area. It is located in map unit 9 adjacent to Robinson Creek. It formed in alluvium derived from Tropic shale and deposited by a large alluvial fan. Slope is 7 percent. Vegetation is Utah juniper, sagebrush, rabbitbrush, and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH. Soils were not described below 48 inches in this pit.

Bk – 15 to 30 inches; pale yellow (2.5Y 7/3) sandy loam, grayish brown (2.5Y 5/3) moist; common faint mottles; moderate fine and medium subangular structure; slightly hard, friable, slightly sticky, and non-plastic; common medium and few very fine and fine roots; few very fine tubular pores; 30 percent angular sandstone gravels; strong effervescence, moderately alkaline (pH 8.1); abrupt smooth boundary.

2Btk – 30 to 45 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; many prominent mottles; moderate fine subangular structure; slightly hard, firm, slightly sticky, and slightly plastic; common medium and few very fine and fine roots; few very fine tubular pores; 35 percent clay films on ped faces; strong effervescence, moderately alkaline (pH 8.0); abrupt smooth boundary.

2Cg – 45 to 60 inches; light olive brown (5Y 6/2) sandy clay loam, olive gray (5Y 5/2) moist; massive; few fine and medium roots; few fine tubular pores; violent effervescence, moderately alkaline (pH 8.0).

Brumley Soils

The Brumley soils occur as a major named component in map unit 8. It also occurs as a minor component in map unit 7. This soil is very deep (greater than 60 inches). Brumley soils mapped in the Coal Hollow Project Area are within the range of characteristics contained in the official description of the Brumley series (Colorado). The official Brumley description does not contain an Oe or Oi horizon of oak leaves and decomposing litter (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Calcidic Haplustalfs

Soil pit 22 is representative of the Brumley soils that occur within the Coal Hollow project area. It is located in map unit 8 on a convex hillslope. It formed in alluvium from Tropic shale deposited by a large alluvial fan. Slope is 8 percent on a southwest slope (220°). Vegetation is Gamble oak, snowberry, and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

Oe – 7 to 4 inches; oak leaves, duff and twigs.

Oi – 4 to 0 inches; partially decomposing oak leaf litter.

A – 0 to 6 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, non sticky, and non plastic; common very fine, fine and medium roots; few very fine and few fine interstitial pores; slight effervescence, slightly alkaline (pH 7.7); abrupt smooth boundary.

Btk1 – 6 to 15 inches; light yellowish brown (10YR 6/4) silty clay loam, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky, and plastic; few very thin clay films on ped faces; common fine and medium and few very fine and coarse roots; few very fine and fine tubular pores; slight effervescence, slightly alkaline (pH 7.7); clear smooth boundary.

Btk2 – 15 to 28 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky, and slightly plastic; common thin clay films on ped faces; few fine, medium and coarse roots; few very fine a tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

Bk1 – 28 to 48 inches; very pale brown (10YR 7/4) sandy loam, yellowish brown (10YR 5/4) moist; few prominent mottles; strong medium and coarse subangular blocky structure; hard, firm, non sticky, and non plastic; few fine, medium and coarse roots; few very fine and fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear wavy boundary.

Bk2 – 48 to 60 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; common prominent mottles; massive; slightly hard, friable, non sticky, and non plastic; few fine, medium and coarse roots; common very fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear wavy boundary.

C – 60 to 84 inches; very pale brown (10YR 7/3) sandy loam, yellowish brown (10YR 5/4) moist; many prominent mottles; massive; slightly hard, friable, non sticky, and non plastic; few very fine, fine, medium and coarse roots; many very fine interstitial pores; slight effervescence, moderately alkaline (pH 8.2).

Calendar Family Soils

The Calendar soil family occurs as a major named component in map units 2 and 5. It also occurs as a minor component in map units 3, 10, and 11. This soil is moderately deep (20 to 40 inches) to Tropic shale. The official description for the Calendar series (New Mexico) has 10YR colors in the A horizon and has a Bk horizon above the shale (NRCS 2007).

Taxonomic classification: fine, mixed, superactive, mesic Aridic Haplustepts

Soil pit 24 is representative of the Calendar soil family that occurs within the Coal Hollow project area. It is located in map unit 5. It formed in Tropic shale residuum on a convex hillslope. Slope is 13 percent on a north northeast slope (20°).

grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 5 inches; dark grayish brown (2.5Y 4/3) clay, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky parting to medium granular structure; soft, very friable, sticky, and very plastic; common very fine, few fine, medium, and coarse roots; common very fine and few fine interstitial pores; no effervescence, slightly alkaline (pH 7.6); clear wavy boundary.

Bw1 – 5 to 17 inches; dark grayish brown (2.5Y 4/2) clay, dark grayish brown (2.5Y 4/3) moist; moderate fine and medium subangular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine and fine roots; few very fine tubular pores; no effervescence, slightly alkaline (pH 7.7); clear wavy boundary.

Bw2 – 17 to 32 inches; light olive gray (5Y 6/2) clay, olive (5Y 5/3) moist; strong medium and coarse angular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; no effervescence, slightly alkaline (pH 8.1); abrupt wavy boundary.

Cr – 32 inches; decomposing Tropic shale and sandstone.

Cibeque Family Soils

The Cibeque soil family occurs as a major named component in map unit 3. This soil is very deep (greater than 60 inches). The official description for Cibeque series (Arizona) has a warmer annual temperature (about 53° F) and longer frost free period (120 to 170 days) than the Alton, Utah area (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Aridic Calciustepts

Soil pit 6 is representative of the Cibeque soil family that occurs within the Coal Hollow project area. It is located in map unit 3 It formed in alluvium over Tropic shale. Slope is 3 percent on a west northwest slope (290°). Vegetation is big sagebrush, rabbitbrush and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A1 – 0 to 6 inches; brown (10YR 5/3) loamy sand, dark yellowish brown (10YR 3/4) moist; weak medium granular structure; loose, loose, non sticky, and non plastic; common very fine, few fine, common medium and few coarse roots; many very fine interstitial pores; strong effervescence, moderately alkaline (pH 8.1); clear wavy boundary.

A2 – 6 to 12 inches; yellowish brown (10YR 5/4) loamy sand, dark grayish brown (10YR 4/2) moist; weak medium subangular structure; soft, very friable, non sticky, and non plastic; common very fine and fine and few medium roots;

many very fine interstitial pores; strong effervescence, moderately alkaline (pH 8.3); clear smooth boundary.

Bk1 – 12 to 24 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate fine and medium subangular structure; slightly hard, firm, slightly sticky, and non plastic; common very fine and few fine roots; common very fine interstitial and few fine tubular pores; strong effervescence, moderately alkaline (pH 8.0); abrupt smooth boundary.

Bk2 – 24 to 34 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; strong medium and coarse subangular structure; hard, very firm, non sticky, and non plastic; few very fine roots; common very fine interstitial and few fine tubular pores; strong effervescence, moderately alkaline (pH 8.3); gradual smooth boundary.

2C – 34 to 60 inches; light brownish gray (10YR 6/2) silty clay, brown (10YR 4/3) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; slight effervescence, moderately alkaline (pH 8.3).

Cookcan Soils

The Cookcan soil occurs as a major named component in map unit 6. This soil is greater than 40 inches deep. The official description for Cookcan series does not contain a cambic (Bwg) horizon (Idaho), but is otherwise similar to the soil mapped in the Coal Hollow Project Area (NRCS 2007).

Taxonomic classification: coarse-loamy, mixed, superactive, frigid Typic Calciaquolls

Soil pit 9B is representative of the Cookcan soils that occur within the Coal Hollow project area. It is located in map unit 6 in a small alluvial basin. It formed in alluvium from Tropic shale and mixed sediments. Slope is 1 percent on a south slope (190°). Vegetation is grasses, big sagebrush, and rabbitbrush. Water table was at 57 inches when pit was described on September 12, 2006. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH. No laboratory analysis was completed on the 2C horizon.

A1 – 0 to 6 inches; dark grayish brown (2.5Y 4/2) loam, very dark gray (2.5Y 3/0) moist; weak medium granular structure; soft, friable, slightly sticky, and slightly plastic; many coarse, common very fine, fine, and few medium roots; many very fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

Bwg – 6 to 14 inches; grayish brown (2.5Y 5/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium and coarse granular structure; slightly hard, firm, slightly sticky, and slightly plastic; many medium,

common very fine and fine roots; common very fine tubular pores; slight effervescence, moderately alkaline (pH 8.2); abrupt smooth boundary.

Bkg – 14 to 28 inches; light grayish brown (2.5Y 6/2) sandy loam, dark gray (2.5Y 4/0) moist; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky, and slightly plastic; common very fine, fine, and medium roots; common very fine tubular pores; strong effervescence, strongly alkaline (pH 8.5); abrupt smooth boundary.

Bk – 28 to 48 inches; light gray (2.5Y 7/2) sandy loam, light olive brown (2.5Y 5/4) moist; soil to wet to identify structure structure; hard, firm, slightly sticky, and slightly plastic; few fine, and medium roots; few very fine tubular pores; strong effervescence, moderately alkaline (pH 8.3); abrupt smooth boundary.

C – 48 to 57 inches; water table at 57 inches, few very fine roots, no effervescence.

D Family Soils

The D family soil occurs as a major named component in map units 2 and 9. It also occurs as a minor component in map units 1 and 4. This soil is very deep (greater than 60 inches). There are no established soil series in this soil family (NRCS 2007).

Taxonomic classification: fine, mixed, superactive, mesic Aridic Calciustolls

Soil pit 2 is representative of the D family soils that occur within the year one portion of the Coal Hollow project area. It is located in map unit 2. It formed in colluvial landslide deposit over Tropic shale. Slope is 6 percent on a south southwest slope (200°). Vegetation is big sagebrush, rabbitbrush and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A1 – 0 to 7 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 3/2) moist; moderate medium and coarse platy parting to fine granular structure; soft, very friable, sticky, and plastic; many very fine, common fine and medium, and few coarse roots; common very fine interstitial and common fine tubular pores; strong effervescence, slightly alkaline (pH 7.6); clear smooth boundary.

A2 – 7 to 12 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium angular blocky structure; very hard, very firm, very sticky, and very plastic; common very fine, fine and medium, and few coarse roots; common very fine interstitial and few fine

tubular pores; strong effervescence, slightly alkaline (pH 7.7); clear wavy boundary.

Bwk1 – 12 to 24 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/3) moist; strong medium and coarse prismatic parting fine and medium angular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine and fine roots; few very fine tubular pores; strong effervescence, slightly alkaline (pH 7.8); gradual wavy boundary.

Bwk2 – 24 to 48 inches; light brownish gray (2.5Y 6/3) clay, dark grayish brown (2.5Y 4/3) moist; strong medium and coarse angular blocky structure; extremely hard, extremely firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; strong effervescence, slightly alkaline (pH 8.0); gradual irregular boundary.

Bk – 48 to 72 inches; light gray (2.5Y 7/2) silty clay, grayish brown (2.5Y 5/3) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; few very fine tubular pores; moderate effervescence, slightly alkaline (pH 7.8); gradual wavy boundary.

C – 72 to 96 inches; light gray (2.5Y 7/3) clay, grayish brown (2.5Y 5/3) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; moderate effervescence, slightly alkaline (pH 7.8).

Deacon Soils

The Deacon soils occur as a major named component in map unit 9. This soil is deep (greater than 40 inches) to very deep. Soils mapped in the Coal Hollow Project Area have have characteristics that are within the range of characteristics described in the official description (New Mexico) for the Deacon series (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Aridic Haplustolls

Soil pit 42 is representative of the Deacon soils that occur within the year one portion of the Coal Hollow project area. It is located in map unit 9 adjacent to Robinson Creek. It formed in alluvium derived from Tropic shale and deposited by a large alluvial fan. Slope is 7 percent. Vegetation is Utah juniper, sagebrush, rabbitbrush, and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH. Soils were not described below 48 inches in this pit.

A — 0 to 9 inches; brown (10YR 5/3) cobbly loam, very dark grayish brown (10YR 3.2) moist; moderate fine granular structure; soft, very friable, non-sticky, and non-plastic; common very fine and fine and few medium roots; 10 percent gravels and 5 percent cobbles; moderate effervescence, moderately alkaline (pH 7.9); clear smooth boundary.

Bw — 9 to 24 inches; pale brown (10YR6/3) cobbly silty clay, dark brown (10YR 4/3) moist; strong medium and coarse subangular blocky structure; slightly hard, firm, sticky, and plastic; few very fine, fine, and medium roots; 10 percent gravels and 5 percent cobbles; strong effervescence, moderately alkaline (pH 8.1); gradual wavy boundary.

Bwk – 24 to 36 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; strong medium and coarse subangular blocky structure; slightly hard, firm, slightly sticky, and slightly plastic; few fine and medium roots; 5 percent gravels and 3 percent cobbles; strong effervescence, moderately alkaline (pH 8.3); clear wavy boundary.

Bk – 36 to 48 inches; light yellowish brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, slightly sticky, and non-plastic; few very fine and fine roots; trace of gravels and cobbles; strong effervescence, strongly alkaline (pH 8.6).

Drififtу Family Soils

The Drififtу family soil occurs as a major named component in map unit 5. It also occurs as a minor component in map unit 10. This soil is shallow (less than 20 inches) to sandstone and shale. The official series description for Drififtу series (Utah) has a clay content in the particle-size control section that is coarser (10 to 18 percent clay) than in the soils found in the Coal Hollow Project Area (18 to 30 percent clay). The average annual precipitation is also slightly lower 12 to 14 inches) than in the Alton, Area (NRCS 2007).

Taxonomic classification: loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthents

Soil pit 49 is representative of the Drififtу family soils that occur within the Coal Hollow project area. It is located in map unit 5 in the northern portion of the Coal Hollow project area. It formed in interbeded sandstone and shale. Slope is 16 percent on a south slope (180°). Vegetation is pinyon pine, Utah juniper, black sagebrush, and Indian ricegrass. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 3 inches; light yellowish brown (2.5Y 6/4) gravelly silty clay loam, light olive brown (2.5Y 5/4) moist; weak fine and medium subangular parting to moderate fine granular structure; slightly hard, very friable, slightly sticky,

and slightly plastic; common very fine and few fine, medium and coarse roots; common very fine interstitial and tubular pores; 30 percent angular sandstone gravels; strong effervescence, moderately alkaline (pH 8.1); clear smooth boundary.

C – 3 to 10 inches; light olive brown (2.5Y 5/4) gravelly loam, olive brown (2.5Y 45/4) moist; massive; slightly hard, very friable, slightly sticky, and slightly plastic; common very fine and few fine, medium and coarse roots; few very fine tubular pores; 25 percent angular sandstone gravels; strong effervescence, moderately alkaline (pH 8.4); clear smooth boundary.

R – 10 inches; sandstone interbeded with shale.

Graystone Soils

The Graystone soils occur as a major named component in map unit 6. This soil is very deep (greater than 60 inches). The official description for Graystone series (Wyoming) does not contain a cambic (Bwk) horizon or an organic (Oe) horizon, but is otherwise similar to the soil mapped in the Coal Hollow Project Area (NRCS 2007).

Taxonomic classification: coarse-loamy, mixed, superactive, mesic Aridic Calciustolls

Soil pit 15 is representative of the Graystone soils that occur within the Coal Hollow project area. It is located in map unit 6 in a small alluvial basin. It formed in alluvium from Tropic shale and mixed sediments. Slope is 2 percent on a west slope (260°). Vegetation is grasses, sedges, and black sagebrush. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

Oe – 1-0 inches; dense root mat; abrupt smooth boundary.

A – 0 to 8 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate medium and coarse granular structure; soft, friable, slightly sticky, and non plastic; many very fine, fine, and medium and common coarse roots; common very fine interstitial pores; slight effervescence, moderately alkaline (pH 8.0); abrupt smooth boundary.

Bwk – 8 to 20 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky, and plastic; common very fine and fine, and few medium roots; many very fine and few medium and coarse tubular pores; strong effervescence, strongly alkaline (pH 8.5); abrupt wavy boundary.

Bk1 – 20 to 37 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; strong medium and coarse subangular blocky structure; very hard, very firm, sticky, and plastic; common very fine and few fine and medium

roots; few very fine and fine tubular pores; strong effervescence, 4 percent very fine soft calcium carbonate masses, strongly alkaline (pH 8.7); abrupt smooth boundary.

Bk2 – 37 to 58 inches; very pale brown (10YR 7/3) loam, yellowish brown (10YR 5/4) moist; moderate medium and coarse subangular blocky structure; slightly hard, firm, sticky, and plastic; few very fine and fine roots; few very fine tubular pores; strong effervescence, 8 percent very fine and fine soft calcium carbonate masses, strongly alkaline (pH 8.6); abrupt wavy boundary.

C1 – 58 to 73 inches; pale brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; common prominent yellowish brown mottles (10YR 5/8, moist); massive; soft, very friable, non sticky, and non plastic; few very fine and fine roots; violent effervescence, moderately alkaline (pH 8.4); abrupt smooth boundary.

C2 – 73 to 96 inches; very pale brown (10YR 7/3) sandy loam, yellowish brown (10YR 5/4) moist; common prominent yellowish brown mottles (10YR 5/8, moist); massive; soft, very friable, non sticky, and non plastic; few very fine and fine roots; violent effervescence, moderately alkaline (pH 8.3).

Graystone Cobbly Substratum Family Soils

The Graystone cobbly substratum soil family occurs as a major named component in map units 4 and 8. This soil is very deep (greater than 60 inches) and is cobbly to very cobbly below 24 inches. The official description for Graystone series (Wyoming) does not contain coarse fragments in the substratum (NRCS 2007).

Taxonomic classification: coarse-loamy, mixed, superactive, mesic Aridic Calciustolls

Soil pit 39 is representative of the Graystone cobbly substratum family soils that occur within the Coal Hollow project area. It is located in map unit 4 on a fan terrace slope. It formed in alluvium from Tropic shale deposited by a large alluvial fan. Slope is 3 to 8 percent on a west slope. The area has been cultivated and planted to upland grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH. No laboratory analysis was completed on 2C horizon.

Ap – 0 to 6 inches; brown (10YR 5/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, friable, slightly sticky, and slightly plastic; common very fine and fine and few medium roots; no effervescence, slightly alkaline (pH 7.8); clear wavy boundary.

A2 – 6 to 12 inches; yellowish brown (10YR 5/4) clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky parting to medium granular structure; soft, friable, slightly sticky, and slightly plastic; few very fine, common fine and few medium roots; very slight effervescence, slightly alkaline (pH 7.8); clear smooth boundary.

Bk1 – 12 to 24 inches; light yellowish brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; strong medium and coarse angular blocky structure; very hard, very firm, non sticky, and non plastic; few very fine roots; strong effervescence, 8 percent soft fine calcium carbonate masses, moderately alkaline (pH 8.0); gradual wavy boundary.

Bk2 – 24 to 36 inches; very pale brown (10YR 7/3) cobbly sandy loam, yellowish brown (10YR 5/4) moist; strong medium and coarse angular blocky structure; very hard, very firm, non sticky, and non plastic; 10 percent gravel and 5 percent cobble; few very fine roots; strong effervescence, 10 percent soft fine calcium carbonate masses, moderately alkaline (pH 7.9); gradual wavy boundary.

2C – 36 to 75 inches; very pale brown (10YR 7/3) very cobbly loamy sandy, brown (10YR 5/3) moist; strong medium and coarse angular blocky structure; very hard, very firm, non sticky, and non plastic; 15 percent gravel and 30 percent cobble; few very fine roots; strong effervescence, 15 percent soft fine calcium carbonate masses, 1 mm thick calcium carbonate concretions on bottom of rock fragments, moderately alkaline (pH 7.9); gradual wavy boundary.

Happyhollow Family Soils

The Happyhollow soil occurs as a major named component in map units 7. This soil is deep to very deep (40 inches to greater than 60 inches). Precipitation range in the official description of the Happyhollow series (Wisconsin) is much higher (28 to 33 inches) than in the Alton, Utah area. No other soil series are listed within this soil family (NRCS 2007).

Taxonomic classification: fine, mixed, superactive frigid Aeric Epiaquepts

Soil pit 38 is representative of the Happyhollow family soils that occur within the Coal Hollow project area. It is located in map unit 7 in a wet meadow east of the Sink Valley fault escarpment. It formed in formed in alluvium from Tropic shale deposited by a large alluvial fan. Slope is 2 percent on a south slope (190°). Water table was at 29 inches on March 7, 2007. Vegetation is sedges, grasses, sagebrush and wild rose. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH. Soil profile was too wet to sample or describe below 40 inches.

A – 0 to 6 inches; light brownish gray (10YR 6/2) silty clay, very dark grayish brown (10YR 4/2) moist; strong fine and medium subangular blocky structure; slighty hard, friable, sticky, and plastic; many very fine, fine and common medium roots; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

AB – 6 to 12 inches; very pale brown (10YR 7/3) silty clay, yellowish brown (10YR 5/4) moist; strong fine and medium prismatic structure; hard, firm, sticky, and plastic; many very fine, fine and common medium roots; strong effervescence, 3 percent fine soft calcium carbonate masses, moderately alkaline (pH 8.3); abrupt smooth boundary.

Bk – 12 to 20 inches; light gray (10YR 7/2) silty clay, light yellowish brown (10YR 6/4) moist; 35 percent gleyed; massive; hard, firm, sticky, and plastic; violent effervescence, 25 percent fine and medium soft calcium carbonate masses, strongly alkaline (pH 8.5); abrupt smooth boundary.

Bk2 – 20 to 40 inches; white (10YR 8/1) silty clay, light gray (10YR 7/2) moist; gleyed colors; massive; hard, firm, sticky, and plastic; violent effervescence, 40 percent medium soft calcium carbonate masses, strongly alkaline (field pH 8.7).

I Family Soils

The I family soil is a minor component in map unit 6. This soil is very deep (greater than 60 inches). There are no established soil series in this soil family (NRCS 2007).

Taxonomic classification: fine-loamy, mixed superactive, frigid Aquic Calciustepts

Jicarilla Family Soils

The Jicarilla family soil (New Mexico) is a minor component in map unit 7. This soil is very deep (greater than 60 inches).

Taxonomic classification: fine, mixed, superactive, frigid Typic Argiaquolls

Jonale Family Soils

The Jonale soil family occurs as a major named component in map units 4 and 6. It also occurs as a minor component in map units 7 and 8. This soil is very deep (greater than 60 inches). The official description for Jonale series (New Mexico) has a warmer annual temperature (about 54° F) and longer frost free period (150 to 180 days) than the Alton, Utah area (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Aridic Calciustolls

Soil pit 17 is representative of the Jonale family soils that occur within the Coal Hollow project area. It is located in map unit 4. It formed in alluvium and colluvium on an alluvial fan slope. Slope is 3 percent on a southwest slope (210°). Vegetation is big sagebrush, rabbitbrush and grasses with scattered pinyon pine and juniper. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium and coarse platy parting to fine granular structure; soft, friable, sticky, and plastic; many very fine, common fine and medium, and few coarse roots; common very fine interstitial and few fine tubular pores; 1 percent gravels; slight effervescence, slightly alkaline (pH 7.8); clear smooth boundary.

Bw -- 9 to 18 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; moderate fine and medium angular blocky structure; very hard, very firm, sticky, and plastic; common very fine, few fine and medium, and coarse roots; few very fine and fine tubular pores; 2 percent gravels; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

Bwk1 – 18 to 30 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; strong fine and medium angular blocky structure; very hard, very firm, sticky, and plastic; few very fine, fine, and medium roots; few very fine and fine tubular pores; 2 percent gravels; strong effervescence, moderately alkaline (pH 8.0); clear wavy boundary.

Bwk2 – 30 to 45 inches; pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) moist; strong fine and medium angular blocky structure; very hard, very firm, sticky, and plastic; few very fine and fine roots; few fine and medium tubular pores; 2 percent gravels; strong effervescence, 4 percent very fine and fine soft calcium carbonate masses, moderately alkaline (pH 8.1); gradual wavy boundary.

Bk1 – 45 to 60 inches; very pale brown (10YR 7/3) clay loam, yellowish brown (10YR 5/4) moist; strong medium and coarse subangular blocky structure; slightly hard, firm, sticky, and plastic; few very fine roots; few fine and medium tubular pores; 2 percent gravels; strong effervescence, 8 percent very fine and fine soft calcium carbonate masses, moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2 – 60 to 80 inches; very pale brown (10YR 7/4) silty clay, yellowish brown (10YR 5/4) moist; massive; extremely hard, extremely firm, very sticky, and very plastic; common very fine and few fine tubular pores; strong effervescence, 6 percent very fine and fine soft calcium carbonate masses, moderately alkaline (pH 8.0).

M Family Soils

The M family soil occurs as major named component in map units 2 and 5. It also occurs as a minor component in map units 1, 4, and 9. This soil is moderately deep (20 to 40 inches) to Tropic shale. It is the moderately deep phase of the A Family Soil. There are no established soil series in this soil family (NRCS 2007).

Taxonomic classification: fine, mixed, superactive, mesic Aridic Haplustepts

Soil pit 3 is representative of the M family soils that occur within the year one portion of the Coal Hollow project area. It is located in map unit 2 on a convex hillslope. It formed in formed in Tropic shale residuum. Slope is 9 percent on a south southeast slope (160°). Vegetation is big sagebrush, rabbitbrush and grasses. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 4 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak medium and coarse platy parting to moderate fine granular structure; soft, very friable, slightly sticky, and slightly plastic; common very fine and few fine and medium roots; common very fine and few fine tubular pores; slight effervescence, moderately alkaline (pH 8.1); clear smooth boundary.

Bw – 4 to 13 inches; grayish brown (10YR 5/2) clay loam, brown (10YR 4/3) moist; strong medium and coarse prismatic parting to strong medium angular blocky structure; slightly hard, firm, sticky, and plastic; common very fine and few fine and medium roots; common very fine interstitial and few fine tubular pores; strong effervescence, moderately alkaline (pH 8.3); clear wavy boundary.

Bwk – 13 to 20 inches; light brownish gray (2.5Y 6/2) silty clay loam, olive brown (2.5Y 4/3) moist; strong medium and coarse prismatic parting to strong medium angular blocky structure; very hard, very firm, very sticky, and very plastic; few very fine and fine roots; few very fine tubular pores; strong effervescence, moderately alkaline (pH 8.1); gradual wavy boundary.

Bk – 19 to 33 inches; light brownish gray (2.5Y 6/2) silty clay loam, light olive brown (2.5Y 5/3) moist; strong medium and coarse angular blocky structure; very hard, very firm, very sticky, and very plastic; few very fine roots; few very fine tubular pores; strong effervescence, moderately alkaline (pH 8.4); gradual wavy boundary.

Cr – 33 inches; decomposing Tropic shale.

Manzanst Taxadjunct Family Soils

The Manzanst family soil (Colorado) is the dominant soil component in map unit 12 and a minor component in map unit 1. This soil is very deep (greater than 60 inches). The official description for Manzanst series (Colorado) has a warmer annual temperature (about 50° F) and longer frost free period (135 to 155 days) than the Alton, Utah area (NRCS 2007). Soils in the Coal Hollow project area area a taxadjunct to the official series classification since they have clay percentages in the control section of 60 percent and higher.

Taxonomic classification: fine, smectitic, superactive, mesic Aridic Haplustalfs

Soil pit 48 is representative of the Manzanst soil family that occurs within the Coal Hollow project area. It is located in map unit 12 at the south end of the project area on a linear east northeast facing slope of 4 to 5 percent. It developed Tropic shale residuum. Mottles that occur below 30 inches may be the result of water perching on the underlying dense clay horizons. This profile was difficult to dig with a large excavator.

A – 0 to 3 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky parting to moderate medium granular structure; hard, friable, moderately sticky, and moderately plastic; common very fine, fine and medium roots; common very fine and fine tubular pores; slight effervescence, slightly alkaline (pH 7.7); clear smooth boundary.

Bt1 – 3 to 12 inches; light brownish gray (10YR 6/2) clay, dark grayish brown (10YR 4/24) moist; moderate medium prismatic parting to moderate medium subangular blocky structure; very hard, firm, sticky, and plastic; common very fine, fine and few medium roots; few very fine tubular pores; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

Bt2 – 12 to 30 inches; light brownish gray (10YR 6/2) clay, dark grayish brown (10YR 4/24) moist; strong medium and coarse prismatic parting to moderate medium subangular blocky structure; very hard, firm, sticky, and plastic; few very fine and fine roots; slight effervescence, moderately alkaline (pH 8.2); clear smooth boundary.

Bt3 – 30 to 48 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/24) moist; strong medium prismatic parting to moderate medium subangular blocky structure; extremely hard, very firm, very sticky, and very plastic; 16 percent strong brown (7.5YR 5/6) fine and medium mottles; moderate effervescence, 3 percent very fine and fine soft lime masses, moderately alkaline (pH 8.1); gradual smooth boundary.

Bt3 – 48 to 84 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/24) moist; strong medium prismatic parting to strong medium subangular blocky structure; extremely hard, extremly firm, very sticky, and very plastic; 7 percent reddish yellow (7.5YR 6/6) fine mottles; moderate to strong effervescence, 10 percent fine soft lime masses, 2 percent fine gypsum masses, moderately alkaline (pH 8.1); gradual smooth boundary.

N Family Soils

The N soil family occurs to a very limited extent in map unit 1. The soil is similar to the D family soil, but aquic soil conditions were identified. This soil is very deep (greater than 60 inches).

Taxonomic classification: fine, mixed, superactive, frigid Aquic Calciustolls

Snilloc Soils

The Snilloc soils occur as a major named component in map unit 8. This soil is very deep (greater than 60 inches). Snilloc soils mapped in the Coal Hollow Project Area are within the range of characteristics contained in the official description (Wyoming) of the Snilloc series (NRCS 2007).

Taxonomic classification: coarse-loamy, mixed, superactive, mesic Aridic Calciustepts

Soil pit 21 is representative of the Snilloc soils that occur within the Coal Hollow project area. It is located in map unit 8 on a convex hillslope. It formed in alluvium from Tropic shale deposited by a large alluvial fan. Slope is 2 percent on a south southwest slope (190°). Vegetation is big sagebrush and grasses surrounded by Gamble oak. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 8 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 4/4) moist; moderate medium and coarse subangular blocky structure; soft, very friable, non sticky, and non plastic; many very fine, common fine and medium, few coarse roots; common very fine and fine interstitial pores; very slight effervescence, moderately alkaline (pH 8.4); clear smooth boundary.

Bwk1 – 8 to 18 inches; light brown (7.5YR 6/3) sandy clay loam, brown (7.5YR 4/3) moist; moderate fine and medium subangular blocky structure; very hard, very firm, sticky, and slightly plastic; few very fine, common very fine and few fine and medium roots; few very fine, fine, and medium tubular pores; strong effervescence, moderately alkaline (pH 8.1); clear wavy boundary.

Bwk2 – 18 to 36 inches; light brown (7.5YR 6/3) sandy loam, brown (7.5YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard,

firm, slightly sticky, and slightly plastic; common very fine and few fine and medium roots; few very fine tubular pores; slight effervescence, moderately alkaline (pH 8.4); clear wavy boundary.

Bk – 36 to 50 inches; light brown (7.5YR 6/3) sandy loam, brown (7.5YR 5/4) moist; strong medium and coarse subangular blocky structure; slightly hard, very friable, non sticky, and non plastic; few very fine roots; few very fine tubular pores; slight effervescence, strongly alkaline (pH 8.7); clear smooth boundary.

2C1 – 50 to 62 inches; pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, non sticky, and non plastic; few very fine and fine tubular pores; slight effervescence, strongly alkaline (pH 8.7); clear smooth boundary.

2C2 – 62 to 96 inches; very pale brown (10YR 7/3) sandy loam, yellowish brown (10YR 5/4) moist; single grain; loose, loose, non sticky, and non plastic; many very fine and few fine tubular pores; slight effervescence, strongly alkaline (pH 8.7); clear smooth boundary.

Tetonview Family Soils

The Tetonview family soil (Montana) is a minor component in map unit 7. This soil is deep (greater than 40 inches).

Taxonomic classification: fine-loamy, mixed, superactive frigid Aeric Calciaquolls

V Family Soils

The V family soil was correlated to the O family during preparation of the soil survey report.

Wapiti Family Soils

The Wapiti soil family occurs as a major named component in map units 1, 3 and 4. This soil is very deep (greater than 60 inches). The official description of Wapiti series (Colorado) is similar to the soil mapped in the Coal Hollow project area, but has a warmer annual temperature (51°F) and a longer growing season (125 to 155 days) than the Alton, Utah area (NRCS 2007).

Taxonomic classification: fine-loamy, mixed, superactive, mesic Calcidic Argiustolls

Soil pit 19 is representative of the Wapiti soil family that occurs within the Coal Hollow project area. It is located in map unit 4 on a convex fan terrace slope. It formed in alluvium from Tropic shale deposited by a large alluvial fan. Slope is 5 percent on a south west slope (260°). Vegetation is big sagebrush, rabbitbrush,

grasses and scattered Utah juniper. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 6 inches; grayish brown (10YR 5/2) loam, brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky, and slightly plastic; many very fine, few fine, medium, and coarse roots; many very fine interstitial pores; slight effervescence, moderately alkaline (pH 8.0); clear smooth boundary.

Bt – 6 to 12 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; hard, very firm, slightly sticky, and slightly plastic; few thin clay films in pores; few very fine and fine roots; few very fine and fine tubular pores; slight effervescence, moderately alkaline (pH 8.2); clear wavy boundary.

Btk1 – 12 to 24 inches; pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; very hard, very firm, sticky, and plastic; common medium clay films on ped faces and few thin clay films in pores; few very fine and fine roots; few very fine and fine tubular pores; strong effervescence, 4 percent very fine soft calcium carbonate masses, moderately alkaline (pH 8.2); clear wavy boundary.

Btk2 – 24 to 37 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; strong fine and medium subangular blocky structure; hard, very firm, sticky, and plastic; few thin clay films on ped faces and in pores; few fine roots; few very fine and fine tubular pores; strong effervescence, 8 percent fine soft calcium carbonate masses, strongly alkaline (pH 8.5); clear wavy boundary.

Bk1 – 37 to 51 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; strong fine and medium subangular blocky structure; hard, very firm, slightly sticky, and non plastic; few very fine and fine roots; few very fine tubular pores; strong effervescence, 4 percent fine soft calcium carbonate masses, moderately alkaline (pH 8.4); clear smooth boundary.

Bk2 – 51 to 68 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, non sticky, and non plastic; few very fine and fine roots; common very fine and few fine tubular pores; violent effervescence, 6 percent fine soft calcium carbonate masses, strongly alkaline (pH 8.5); clear wavy boundary.

Bk3 – 68 to 90 inches; light yellowish brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; massive; loose, loose, non sticky, and non plastic; many very fine interstitial pores; strong effervescence, 6 percent fine soft calcium carbonate masses, strongly alkaline (pH 8.7).

Zigzag Soils

The Zigzag soils occur as a major named component in map unit 10. It also occurs as a minor component in map units 5 and 11. This soil is shallow (less than 20 inches) to Tropic shale. Soils mapped as Zigzag in the Coal Hollow Project Area have characteristics within the range described in the official series description (Colorado) for Zigzag soils (NRCS 2007).

Taxonomic classification: Clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthents

Soil pit 50 is representative of the Zigzag soils that occur within the Coal Hollow project area. It is located in map unit 10 on the Sink Valley fault escarpment. It formed in Tropic shale residuum. Slope is 16 percent on a west northwest slope (292°). Vegetation is Utah juniper, black sagebrush, and Indian ricegrass. Soil colors are for dry soil unless specified otherwise. Soil pH values are laboratory pH.

A – 0 to 4 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; weak medium subangular structure; slightly hard, very friable, sticky, and plastic; common very fine and few fine and medium roots; common very fine interstitial and tubular pores; strong effervescence, moderately alkaline (pH 8.4); clear smooth boundary.

C1 – 4 to 11 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky, and plastic; common very fine and few fine and medium roots; few very fine tubular pores; strong effervescence, moderately alkaline (pH 8.1); clear smooth boundary.

C2 – 11 to 19 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky, and plastic; few very fine and fine roots; few very fine tubular pores; strong effervescence, moderately alkaline (pH 8.4); clear smooth boundary.

Cr – 19 inches; decomposing Tropic shale.

Soil Limiting Features

Topsoil and subsoil salvage depths were determined by the depth to carbonates, poor soil pH (greater than 8.5), salinity (EC less than 4.0), sodicity (SAR less than 4), texture and depth to parent material. Clayey soils, carbonate accumulations and corresponding poor pH are the primary limiting soil features in the Coal Hollow project area. The depth to each of these limiting soil features varies by soil type and map unit.

The determination of good, fair, poor, or unsuitable qualities of the topsoil and subsoil is based on the soil suitability criteria established by the Utah Division of Oil Gas and Mining's *Guidelines for Management of Topsoil and Overburden* (Utah DOGM, 2005). The Utah DOGM suitability guidelines are summarized in table 4-1.

Table 4-1. Soil suitability and unsuitability criteria (Utah DOGM, 2005).

Criteria	Good	Fair	Poor	Unacceptable
Saturation %	25 to 55	≥56 to 80	<25 or >80	
pH	6.5 to 8.2	6.0 to 6.4 8.2 to 8.5	5.5 to 6.0 8.6 to 9.0	<5.5 >9.0
EC (mS/cm 25°C)	0 to 4	4 to 8	8 to 15	>15
SAR	0 to 4	5 to 10	10 to 14	>14
$CaCO_3$ %	<15	15 to 30	>30	
Texture	sl, l, sil, scl, vfsl, fsl	cl, sicl, sc, ls, lfs	sic, s, sc, c, cos, fs, vfs	g, vcos
Total Organic Carbon	<10%			≤10%
Available Water Capacity	>0.10 moderate	0.05 to 0.10 low	<0.05 very low	
K factor	<0.37	0.37	>0.37	

Topsoil and Subsoil Salvage Depths

Table 4-2 identifies the depth of topsoil, subsoil, and clayey subsoil that may be available for salvage based on field evaluations of soil pits and laboratory analysis of soil samples. Salvage depths may include some poor quality materials when the weighted average of mixed soil is still within the fair range. Field data sheets are in appendix B. Results of the laboratory analysis of soil samples are contained in appendix C.

Soils with less than good EC and SAR qualities were not included in the salvage depths.

Clayey subsoil (clay and silty clay) is common in the Coal Hollow project area. It is of lesser quality relative to the other subsoil, but will be needed to achieve an adequate reclamation soil profile depth.

Actual topsoil and subsoil salvage depths will be closely monitored by Alton Coal Development staff in consultation with a certified professional soil scientist to ensure that unsuitable materials are not incorporated into the topsoil and subsoil stockpiles or placed directly into the reclamation soil profile.

Table 4-2. Topsoil and subsoil salvage depths by map unit in disturbance area.

Map Unit	Percent of Map Unit	Soil Types	Topsoil Depth	Good/ Fair Subsoil Depth	Poor Subsoil Depth	Average Total Salvage Depth
	%		inches	Inches	Inches	Inches
1		**A Family – Wapiti Family complex, 3 to 8 percent slopes**				
	65	A Family	9	17	64	
	15	Wapiti Family	7	57	21	
	10	D Family	11	16	59	
	5	Manzanst Family	6	24	0	
	5	N Family	8	12	85	
		Average salvage depths[1]	9	23	55	87
2		**M family – Calendar Family - D Family complex, 3 to 8 percent slopes**				
	60	M Family	7	14	9	
	25	Calendar Family	5	23	14	
	15	D Family	11	16	59	
		Average salvage depths[1]	7	17	18	42
3		**Cibeque Family – Wapiti Family complex, 3 to 8 percent slopes**				
	60	Cibeque Family	6	0	66	
	30	Wapiti Family	7	57	21	
	5	A Family	9	17	64	
	5	Calendar Family	5	23	14	
		Average salvage depths[1]	6	19	50	75
4		**Jonale Family – Graystone cobbly substratum Family – Wapiti Family complex, 3 to 8 percent slopes**				
	50	Jonale Family	9	23	47	
	25	Graystone cobbly substratum Family	12	20	0	
	15	Wapiti Family	7	57	21	
	5	D Family	11	16	59	
	5	A Family	9	17	64	
		Average salvage depths[1]	10	27	33	70
5		**Calendar Family – M Family - Drifity Family complex, 8 to 25 percent slopes**				
	40	Calendar Family	5	23	14	
	30	M Family	7	14	9	
	20	Drifity Family	10	0	0	
	10	Zigzag	4	15	0	
		Average salvage depths[1]	7	15	8	30

Map Unit	Percent of Map Unit	Soil Types	Topsoil Depth	Good/ Fair Subsoil Depth	Poor Subsoil Depth	Average Total Salvage Depth
	%		inches	Inches	Inches	Inches
6		**Graystone – Cookcan – Jonale Family complex, 1 to 5 percent slopes**				
	45	Graystone	12	50	20	
	20	Cookcan	6	42	0	
	20	Jonale Family	9	23	47	
	15	I Family	12	42	0	
		Average salvage depths[1]	10	42	18	70
7		**Happyhollow Family - Alamosa complex, 1 to 5 percent slopes**				
	55	Happyhollow Family	11	21	42	
	20	Alamosa	10	81	0	
	10	Jicarilla Family	7	47	42	
	10	Tetonview Family	8	16	0	
	3	Brumley	9	76	0	
	2	Jonale Family	9	23	47	
		Average salvage depths[1]	10	37	28	75
8		**Brumley – Graystone - Snilloc complex, 3 to 8 percent slopes**				
	40	Brumley	9	76	0	
	30	Graystone	13	55	11	
	20	Snilloc	8	28	60	
	10	Jonale Family	9	23	47	
		Average salvage depths[1]	10	55	20	85
9		**D Family - Deacon complex, 5 to 30 percent slopes**				
	55	D Family	11	16	59	
	30	Deacon	9	27	12	
	10	A Family	9	17	64	
	5	Creek bottom	0	0	0	
		Average salvage depths[1]	10	19	42	71
10		**Zigzag clay loam, 8 to 25 percent slopes**				
	85	Zigzag	4	14	0	
	10	Drifity Family	10	0	0	
	5	Calendar Family	5	23	14	
		Average salvage depths[1]	5	13	1	19
11		**A family, 8 to 25 percent slopes**				
	85	A Family	9	17	64	
	10	Calendar Family	5	23	14	
	5	Zigzag	4	14	0	
		Average salvage depths[1]	8	17	56	81
12		**Manzanst Family clay loam, 3 to 12 percent slopes**				
	85	Manzanst Family very deep to shale	6	0	24	
	10	Manzanst Family deep to shale	6	0	20	
	5	A Family	9	17	64	
		Average salvage depths[1]	6	1	26	33
13		**A Family – Happyhollow Family complex, 1 to 5 percent slopes**				
	80	A Family	9	17	64	
	15	Happyhollow Family	11	21	42	
	5	I Family	12	42	0	
		Average salvage depths[1]	9	19	58	86

1. Weighted average salvage depths for map unit are the sum of soil type salvage depths multiplied by percent of map unit.

Topsoil and Subsoil Quantities

The estimated quantities of topsoil and subsoil that will be salvaged from mining disturbance areas are contained in table 4-3. The estimated quantities of salvaged topsoil where facilities, roads, and stockpiles will be constructed are contained in table 4-4. Drawing 2-2 shows the topsoil and subsoil handling plan.

Table 4-3.1. Estimated topsoil and subsoil quantities that can be salvaged from year 1 mining disturbance areas.

Map Unit	Area	Topsoil	Good/ Fair Subsoil	Poor Subsoil
	acres	Cubic Yards	Cubic Yards	Cubic Yards
1	23.6	28,556	72,976	174,509
2	5.7	5,364	13,028	13,794
3	26.7	21,538	68,024	179,483
4	74.5	100,161	270,435	330,532
5	13.3	12,517	26,822	14,305
6	14.7	19,763	83,006	35,574
7	2.1	2,823	10,446	7,905
8	0.4	538	2,958	1,076
9	7.4	9,949	18,903	41,785
10	0.0	0	0	0
11	5.2	5,593	11,885	39,150
12	4.7	3,791	632	16,429
13	0.1	121	255	780
Total	178.4	210,715	579,550	855,322

Table 4-3.2. Estimated topsoil and subsoil quantities that can be salvaged from year 2 mining disturbance areas.

Map Unit	Area	Topsoil	Good/ Fair Subsoil	Poor Subsoil
	acres	Cubic Yards	Cubic Yards	Cubic Yards
1	0.0	0	0	0
2	0.0	0	0	0
3	20.3	16,375	51,855	136,461
4	1.8	2,420	6,534	7,986
5	0.0	0	0	0
6	1.2	1,613	6,776	2,904
7	35.0	47,056	174,106	131,756
8	0.8	1,076	5,916	2,151
9	0.0	0	0	0
10	7.8	5,243	13,633	1,049
11	1.6	1,721	3,657	12,046
12	12.9	10,406	1,734	45,093
13	0.0	33,396	70,503	215,219
Total	109.0	119,306	334,713	554,664

Table 4-3.3. Estimated topsoil and subsoil quantities that can be salvaged from year 3 mining disturbance areas.

Map Unit	Area	Topsoil	Good/ Fair Subsoil	Poor Subsoil
	acres	Cubic Yards	Cubic Yards	Cubic Yards
1	0.0	0	0	0
2	0.0	0	0	0
3	0.0	0	0	0
4	0.0	0	0	0
5	0.0	0	0	0
6	0.0	0	0	0
7	11.4	15,327	56,709	42,915
8	6.6	8,873	48,803	17,747
9	0.0	0	0	0
10	0.0	0	0	0
11	0.0	0	0	0
12	18.1	14,601	2,433	63,270
13	2.4	2,904	6,131	18,715
Total	38.5	41,705	114,076	142,646

Table 4-4. Estimated topsoil quantities that will be salvaged where facilities, roads, and stockpiles will be constructed in Coal Hollow project area during year 1.

Map Unit	Facilities, Roads, and Stockpile Disturbance Area	Topsoil
	acres	cubic yards
1	33.0	39,930
2	12.3	11,576
3	0.3	242
4	8.3	11,159
5	14.5	13,646
6	0.0	0
7	2.9	3,899
8	11.1	14,923
9	16.3	21,914
10	1.1	739
11	6.7	7,206
12	0.0	0
13	1.0	1,210
Totals	107.5	126,445

Estimated quantities of salvaged topsoil and subsoil should be sufficient to construct a reclamation profile with a minimum thickness of 48 inches as required by Utah DOGM regulations (p. 4, Utah DOGM, 2005). Table 4-5 lists the total estimated quantities of topsoil and subsoil by mining year and the resulting soil profile that could be constructed, if all of the estimated material was salvaged. These estimated quantities are presented for the purpose of illustrating that there

should be sufficient quantities of topsoil and subsoil to construct a 48 inch soil profile.

Topsoil replacement on the roads, facilities, and stockpile areas is estimated to be 8 to 9 inches.

Table 4-5. Estimated total quantities of topsoil and subsoil by mining year.

Mining Year	Topsoil Salvage	Good/Fair Subsoil Salvage	Poor Subsoil Salvage	Acres
	Cubic Yards	Cubic Yards	Cubic Yards	Cubic Yards
1	210,715	579,550	855,322	178.4
2	119,306	334,713	554,664	109.0
3	41,705	114,076	142,646	38.5
Total	371,725	1,028,339	1,552,632	325.9

Table 4-6. Potential reclamation soil profile thickness based on estimated topsoil and subsoil quantities listed in table 4-5 for the mining disturbance areas.

Mining Year	Topsoil Salvage	Good/Fair Subsoil Salvage	Poor Subsoil Salvage	Total Reclamation Profile Depth
	Inches	Inches	Inches	Inches
1	9	24	36	70
2	8	23	38	69
3	8	22	28	58
Weighted Project Average	8	23	35	66

Native Soil Profile Features

The combined depth of topsoil and subsoil varies in native soil profiles within the Coal Hollow project area depending on physiographic setting and soil texture. The depth to which soil carbonates have leached over time is an indicator of how deep soil moisture normally penetrates. Variations in available water holding capacity (determined by soil texture, EC, and SAR) result in varying soil depths, but are similar within soil types. Table 5-1 contains the average depths to carbonates, poor soil pH, or unsuitable SAR levels by soil map unit.

Table 5-1. Average depths to limiting soil features by map unit.

Map Unit	Depth to Limiting Soil Feature	Limiting Soil Feature
	inches	
1	33	Soil carbonate accumulation.
2	37	Soil carbonate accumulation. Moderately deep to shale. Fair EC and SAR.
3	22	Soil carbonate accumulation and pH.
4	30	Soil carbonate accumulation and pH.
5	32	Moderately deep or shallow to shale.
6	18	Poor to unacceptable pH and carbonate accumulation.
7	30	Soil carbonate accumulation and pH.
8	36	Soil carbonate accumulation and pH.
9	36	Poor pH and soil carbonate accumulation.
10	19	Shallow to shale.
11	24	Soil carbonate accumulation.
12	24	Heavy clay texture and pH.
13	26	Soil carbonate accumulation and pH.
Ave	30	Average does not include map units 6 (very limited area) ad 10 (shallow soils) and is not weighted by amount of map unit occurence.

Overburden Quality

SAR and pH are limiting features of the Tropic shale overburden that can have an impact on the establishment of acceptable post mining vegetation. SAR levels in shale overburden from core hole 5 ranged from 33.4 to 52.4. The pH ranged from 8.3 to 9.5 in the core hole 5 samples. Unacceptable SAR levels of 15.9 to 52.2 were also identified in core hole 7. These SAR levels are well above the Utah DOGM's poor range for soil and soil substitutes. It will be important to have adequate depth of suitable cover above this unsuitable material. Utah DOGM Guidelines for Management of Topsoil and Overburden stipulates a minimum of "four feet of cover is required over any toxic or acid-forming materials (p. 4, Utah DOGM, 2005)."

SAR and pH levels in mixed alluvium samples from core hole 3 were within the Utah DOGM good to fair range.

Reclamation Soil Profile Depth

The soil depths listed in table 5-1 represent the average depths to which natural soil development has taken place over time based on normal climatic patterns for the Alton, Utah area. Alton Coal Development will construct a post mining reclamation soil profile that is a minimum 48 inches thick (p. 4, Utah DOGM, 2005). This depth is 1.55 times the native depth to limiting soils features (see table 5-1). It will hold approximately 8.64 inches of moisture (one half of normal October March precipitation) based on an available water capacity (AWC) of 0.18 inches of water per inch of soil. The AWC of 0.18 inches of water per inch of soil is the low end for heavy clay loams, clays, and silty clays, which are dominant in the Coal Hollow project area.

Stockpile and Placement of Topsoil and Subsoil

Topsoil and subsoil will be salvaged and stockpiled or directly placed in its final location separately. Alton Coal Development will minimize the stockpiling of topsoil and subsoil by implementing direct placement of these soil materials as much as possible. Direct placement of topsoil and subsoil will minimize impacts on the soil resource. Topsoil and subsoil stockpiles will be identified with signs and protected from other mining activities. Topsoil and subsoil stockpile locations are shown on Drawing 2-2.

Topsoil and subsoil stockpiles will be protected from wind and water erosion until vegetation has become established.

Topsoil placement depths will range from 6 to 12 inches depending on the soil type and map unit that is being salvaged. It is anticipated that the average topsoil placement depth will be 9 inches in both mined and non-mined areas.

The balance of the 48 inch reclamation soil profile will consist of subsoil. Approximately 90 percent of the subsoil will be comprised of soil with good or fair pH and lime characteristics. The remaining subsoil may have soil pH or lime characteristics in the poor range, if adequate quantities of good to fair subsoil are not identified during salvage operations. No subsoil or overburden with any unacceptable characteristics will be placed within 48 inches of the final reclamation surface (Utah DOGM, 2005).

Substitute Subsoil

The depth of overburden overlaying the Tropic shale ranges from a few feet to fifty feet or more. Laboratory analysis of this material indicates that some of it is similar in quality to the native subsoil, based on the Utah DOGM soil suitability

guidelines (Utah DOGM, 2005). Depending on location, the upper twenty to fifty feet of mixed alluvial (non-shale) overburden is suitable for use as substitute subsoil, based on lab analysis of samples from deep backhoe pits at core hole locations 1, 3, 5, and 6 in April 2007, and core hole 8 in November 2007. Table 5-2, shows the maximum, minimum, and average lab analysis values for the April 2006 core hole samples. The average values in table 5-2 represent an estimate of the resulting values when material from below the topsoil layer and above thirty feet is mixed during excavation. Laboratory analysis results of this overburden testing are in appendix C.

Table 5-2. Ranges and averages of soil suitability for overburden sampled from pits adjacent to core holes 1, 3, 5, and 6 (April 2007) and core hole 8 (November 2007). Data is for alluvial material above 40 feet. Tropic shale overburden is unsuitable for use as subsoil substitute and has not been included in this table.

	Maximum	Minimum	Average
Sand % Silt % Clay % texture	82.0 61.0 61.0	0 13.0 5.0	35.3 35.9 28.8 Clay Loam
pH	8.4	7.8	8.2
ECe (ms/cm)	4.20	0.25	0.67
Saturation %	97.6	20.2	52.6
SAR	3.94	0.05	0.63
AcidBase Potential t/kT	650	160	315
Lime %	64.7	15.6	31.56
Organic Carbon	1.21	0.11	0.46
Boron	0.40	<0.10	0.29

The only parameter listed in table 5-2 with an average value that could be limiting to the establishment of vegetation would be the percent lime. Percent lime values for 9 of the 16 samples are between 15 and 30 percent, which puts them in the fair category (Utah DOGM, 2005).

Tropic shale is closer to the surface at the core hole 7 location which has resulted in the overburden being unacceptable for use as subsoil. SAR values ranges from 15.9 to 52.2 below 6 feet. Conductivity in this material ranges from 0.90 to 10.0 mmhos/cm. Percent clay ranges 49 to 61 percent. Materials similar to that characterized by core hole 7 should not be used as substitute subsoil within the 48 inch reclamation soil profile; and should be covered with as much suitable alluvium as possible.

ACD will monitor pH, conductivity, texture and percent lime in the field during mining operations to ensure that only materials with good or fair suitability are placed in the upper 4 feet of the reclamation soil profile (p. 4, Utah DOGM's *Guidelines for Management of Topsoil and Overburden*, 2005). Representative overburden samples will be analyzed for SAR at a qualified laboratory.

Incoming C0250005

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service
2390 West HWY 56
Cedar City, Utah 84720
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10/30/2006

Priscilla Burton
Environmental Scientist III
Division of Oil, Gas and Mining
State of Utah- Department of Natural Resources
PO Box 145801
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

RE: Prime Farmland Determination, Alton Coal Development Company, LLC, Proposed Coal Hollow Mine, C/025/0005, Task ID#2567

Dear Priscilla:

As requested, a Farmland Conversion Impact Rating (Form AD 1006) is enclosed, for the proposed Coal Hollow Mine area, located near Alton City in Kane County, Utah.

No Prime Farmland or Soils of Statewide Importance were found within the study area, per criteria outlined in the National Soil Survey Handbook Part 622 and Exhibit UT603-1, respectively. No NRCS published, or SSURGO certified soil survey data exists for the project area, so an on-site investigation, soil sampling and descriptions were used for this assessment. Although soils within the proposed activity area do not presently meet the criteria for Prime Farmland or Soils of Statewide Importance (SSI), they could classify as Soils of Statewide Importance, if irrigated.

Soils are alluvium and residuum, primarily formed from Tropic Shale parent material that exhibit mollic epipedons and contain little to no rock fragments on the soil surface or in the soil profiles, to a depth of 60 inches. Subsurface textures are typically silty clay, with the upper horizons from 0 to 27 inches ranging from silty clay loam to clay loam textures. Visible calcium carbonate and salt concentrations were observed in the soil profile, ranging from 10 inches to 27 inches deep and extending to depths of 60 inches or greater. Slopes range from 1 to 10 percent, with some minor areas exceeding 20 percent. Observed soils are predominantly Fine, mixed, superactive, mesic Pachic Calciustolls and Fine, mixed, superactive, mesic Aridic Natrustolls.

An available and reliable source of moisture to sustain crops common to the area is the primary limiting factor that excludes the observed soils from classifying as Prime Farmland or SSI. In the case

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of SSI, a reliable source of water is the only factor that excludes soils from classifying as such where slopes are less than 14 percent.

In addition to a lack of a reliable source of water, soils did not classify as Prime Farmland due to high pH, high electrical conductivity, excessive erosion potential on steep slopes and slow permeability rates.

Within the scope of the proposed project area, no conversion of Prime Farmland or Soils of Statewide Importance would occur because soils in the project area do not classify as such.

If you need any additional information of have questions, please do not hesitate to contact me.

Sincerely,

Corey Meier
Soil Scientist

Enclosures

Cc: Michael Domeier, State Soil Scientist, SLC, UT

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 10/30/06
Name Of Project Proposed Coal Hollow Mine	Federal Agency Involved USDA - NRCS
Proposed Land Use Coal mine	County And State Kane, Utah
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☐	No ☑	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %		Amount Of Farmland As Defined in FPPA Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System		Date Land Evaluation Returned By NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	0.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

Site Selected:	Date Of Selection 10/30/06	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection: The project impacts Fine, mixed, superactive, mesic Pachic Calciustolls and Fine, mixed, superactive, mesic Aridic Natrustolls. No NRCS SSURGO certified soil survey presently exists for the project area. Impacted soils and determinations were evaluated by conducting a local site assessment. Observed soils do not classify as Prime Farmland, but do classify as Soils of Statewide Importance, if irrigated. Because no irrigation is present, soils do not classify as Soils of Statewide Importance.

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 – Federal agencies involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form.

Step 2 – Originator will send copies A, B and C together with maps indicating locations of site(s), to the Natural Resources Conservation Service (NRCS) local field office and retain copy D for their files. (Note: NRCS has a field office in most counties in the U.S. The field office is usually located in the county seat. A list of field office locations are available from the NRCS State Conservationist in each state).

Step 3 – NRCS will, within 45 calendar days after receipt of form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland.

Step '4 – In cases where farmland covered by the FPPA will be converted by the proposed project, NRCS field offices will complete Parts II, IV and V of the form.

Step 5 – NRCS will return copy A and B of the form to the Federal agency involved in the project. (Copy C will be retained for NRCS records).

Step 6 – The Federal agency involved in the proposed project will complete Parts VI and VII of the form.

Step 7 – The Federal agency involved in the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA and the agency's internal policies.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

Part I: In completing the "County And State" questions list all the local governments that are responsible for local land controls where site(s) are to be evaluated.

Part III: In completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them.

2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities) that will cause a direct conversion.

Part VI: Do not complete Part VI if a local site assessment is used.

Assign the maximum points for each site assessment criterion as shown in § 658.5 (b) of CFR. In cases of corridor-type projects such as transportation, powerline and flood control, criteria #5 and #6 will not apply and will, be weighed zero, however, criterion #8 will be weighed a maximum of 25 points, and criterion #11 a maximum of 25 points.

Individual Federal agencies at the national level, may assign relative weights among the 12 site assessment criteria other than those shown in the FPPA rule. In all cases where other weights are assigned relative adjustments must be made to maintain the maximum total weight points at 160.

In rating alternative sites, Federal agencies shall consider each of the criteria and assign points within the limits established in the FPPA rule. Sites most suitable for protection under these criteria will receive the highest total scores, and sites least suitable, the lowest scores.

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, adjust the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points, and alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site "A."}$$

Taxonomic classification of the soil profiles was finalized using the field description notes, results of laboratory analysis of soil samples, and examination of the micromonolith box samples. The following diagnostic soil horizons were identified in some of the Coal Hollow soil profiles.

- Mollic epipedons (dark soil surface);
- Calcic horizon (accumulation of secondary calcium carbonates);
- Cambic horizon (indication of soil development);
- Argillic horizon (accumulation of illuvial clays);
- Aquic conditions (presence of ground water in the soil profile), and
- Lithic or paralithic contact with sandstone or shale parent material.

Mollic epipedon determination is based on the soil color using the Munsell Soil Color Charts. Surface dry colors must have a value of 5 or less with a chroma of 3 or less, while the moist color must have a value of 3 or less with a chroma of 3 or less.

Calcic horizons must be at least 6 inches thick and have secondary calcium carbonates in the subsurface or subsoil. The amount of calcium carbonate required is dependent on the percent clay in the fine-earth fraction.

Cambic horizons are an indication of early soil development. Soils with moderate or strong soil structure in the subsurface are an indication of a cambic horizon.

Argillic horizons are identified by an accumulation of illuvial clay in a subsurface horizon. The amount of clay increase is based on the overlying soil horizon. The presence of clay films in the argillic horizon is also required.

Aquic conditions are identified in the soil profile by the presence of redox concentrations, mottled soil colors, or gleyed colors. The depth at which these features occur determines the suborder (less than 20 inches) or sub-group (20 to 30 inches) classification of the soil. The presence of aquic features below 30 inches does not have an effect on the taxonomic classification of the soil, but was included in the soil type description.

Lithic or paralithic contacts are diagnostic when shale or sandstone occurs within 20 inches or the soil surface. Moderately deep contacts (20 to 40 inches deep) are identified in the soil type descriptions.

It was not possible to correlate the Coal Hollow soil profiles to established soil series. Because most of the established series within the taxonomic soil families were from areas with warmer soil temperatures, longer growing seasons, or other dissimilar features. Most of the established soil series were from eastern New Mexico, southeastern Colorado, northeastern Wyoming, or the Dakotas. Soils in the Alton, Utah area have not been mapped by the Natural Resource Conservation Service (C. Meier, 2006).

Table B-1. Taxonomic classification of soil pedons sorted by pedon, Coal Hollow Soil Survey.

Pedon	Soil Type	Map Unit	Taxonomic Family Classification
LOF-1	A Family	1	fine, mixed, superactive, mesic Aridic Calciustept
LOF-2	D Family	2	fine, mixed, superactive, mesic Aridic Calciustoll
LOF-3	M Family	2	fine, mixed, superactive, mesic Aridic Calciustept
LOF-4	Calendar Family	2	fine, mixed, superactive, mesic Aridic Haplustepts
RDV-5	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
RDV-6	Cibeque Family	3	fine-loamy, mixed, superactive, mesic Aridic Calciustept
RDV-7	D Family	4	fine, mixed, superactive, mesic Aridic Calciustoll
1YR-8	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
1YR-9A	Graystone	6	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
1YR-9B	Cookcan	6	coarse-loamy, mixed, superactive, frigid Typic Calciaquoll
1YR-10	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
1YR-11	Graystone	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
1YR-12	M Family	2	fine, mixed, superactive, mesic Aridic Calciustept
SP-13	Cibeque Family	3	fine-loamy, mixed, superactive, mesic Aridic Calciustept
SP-14	I Family	6	fine-loamy, mixed, superactive, frigid Aquic Calciustept
SP-15	Graystone	6	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-16	Jonale Family	6	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-17	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-18A	Alamosa	7	fine-loamy, mixed, superactive, frigid Typic Argiaquoll
WRD-18B	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-19	Wapiti Family	4	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
WRD-20	Graystone	8	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-21	Snilloc	8	coarse-loamy, mixed, superactive, mesic Aridic Calciustept
WRD-22	Brumley	8	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf
WRD-23	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
DAH-24	Calendar Family	5	fine, mixed, superactive, mesic Aridic Haplustepts
DAH-25	M Family	5	fine, mixed, superactive, mesic Aridic Calciustept
SP-26	N Family	1	fine, mixed, superactive, frigid Aquic Calciustoll
SP-27	A Family	1	fine, mixed, superactive, mesic Aridic Calciustept
SP-28	A Family	11	fine, mixed, superactive, mesic Aridic Calciustept
SP-29	D Family	9	fine, mixed, superactive, mesic Aridic Calciustoll
SP-30	A Family	1	fine, mixed, superactive, mesic Aridic Calciustept
SP-31	Wapiti Family	3	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
SP-32	Wapiti Family	1	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
SP-33	D Family	1	fine, mixed, superactive, mesic Aridic Calciustoll
SP-34	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-35	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-36	Graystone	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-37	Graystone	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-38	Happyhollow Family	7	fine, mixed, superactive, frigid Aeric Epiaquept
SP-39	Graystone cobbly	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-40	Tetonview Family	7	fine-loamy, mixed, superactive, frigid Aeric Calciaquoll
SP-41	D Family	9	fine, mixed, superactive, mesic Aridic Calciustoll
SP-42	Deacon	9	fine-loamy, mixed, superactive, mesic Aridic Haplustoll
SP-43	Jicarilla Family	7	fine, mixed, superactive, frigid Typic Argiaquoll
SP-44	Happyhollow Family	7	fine, mixed, superactive, frigid Aeric Epiaquept
SP-45	Happyhollow Family	13	fine, mixed, superactive, frigid Aeric Epiaquept
SP-46	Alamosa	7	fine-loamy, mixed, superactive, frigid Typic Argiaquoll
SP-47	Brumley	8	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf

Table B-1. Taxonomic classification of soil pedons sorted by pedon, Coal Hollow Soil Survey.

Pedon	Soil Type	Map Unit	Taxonomic Family Classification
SP-48	Manzanst Taxa Family	12	very fine, mixed, superactive, mesic Aridic Haplustalf
SP-49	Drifify Family	5	loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthent
SP-50	Zigzag	10	clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent
SP 51	Brumley	8	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf
SP-52	I Family	13	fine-loamy, mixed, superactive, frigid Aquic Calciustept
SP-53	Disturbed		Disturbed
SP-54	Happyhollow Family	7	fine, mixed, superactive, frigid Aeric Epiaquept
SP-55	Cibeque Family	3	fine-loamy, mixed, superactive, mesic Aridic Calciustept
SP-56	Wapiti Family	3	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
SP-57	Cibeque Family	13	fine-loamy, mixed, superactive, mesic Aridic Calciustept
SP-58	Manzanst Taxa Family	12	very fine, mixed, superactive, mesic Aridic Haplustalf
SP-59	A Family	13	fine, mixed, superactive, mesic Aridic Calciustept
SP-60	Manzanst Taxa Family	12	very fine, mixed, superactive, mesic Aridic Haplustalf

Table B-2. Taxonomic classification of soil pedons sorted by soil type, Coal Hollow Soil Survey.

Pedon	Soil Type	Map Unit	Taxonomic Family Classification
LOF-1	A Family	1	fine, mixed, superactive, mesic Aridic Calciustept
SP-27	A Family	1	fine, mixed, superactive, mesic Aridic Calciustept
SP-28	A Family	11	fine, mixed, superactive, mesic Aridic Calciustept
SP-30	A Family	1	fine, mixed, superactive, mesic Aridic Calciustept
SP-59	A Family	13	fine, mixed, superactive, mesic Aridic Calciustept
SP-46	Alamosa	7	fine-loamy, mixed, superactive, frigid Typic Argiaquoll
WRD-18A	Alamosa	7	fine-loamy, mixed, superactive, frigid Typic Argiaquoll
SP 51	Brumley	8	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf
SP-47	Brumley	8	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf
WRD-22	Brumley	8	fine-loamy, mixed, superactive, mesic Calcidic Haplustalf
DAH-24	Calendar Family	5	fine, mixed, superactive, mesic Aridic Haplustepts
LOF-4	Calendar Family	2	fine, mixed, superactive, mesic Aridic Haplustepts
RDV-6	Cibeque Family	3	fine-loamy, mixed, superactive, mesic Aridic Calciustept
SP-13	Cibeque Family	3	fine-loamy, mixed, superactive, mesic Aridic Calciustept
SP-55	Cibeque Family	3	fine-loamy, mixed, superactive, mesic Aridic Calciustept
SP-57	Cibeque Family	13	fine-loamy, mixed, superactive, mesic Aridic Calciustept
1YR-9B	Cookcan	6	coarse-loamy, mixed, superactive, frigid Typic Calciaquoll
LOF-2	D Family	2	fine, mixed, superactive, mesic Aridic Calciustoll
RDV-7	D Family	4	fine, mixed, superactive, mesic Aridic Calciustoll
SP-29	D Family	9	fine, mixed, superactive, mesic Aridic Calciustoll
SP-33	D Family	1	fine, mixed, superactive, mesic Aridic Calciustoll
SP-41	D Family	9	fine, mixed, superactive, mesic Aridic Calciustoll
SP-42	Deacon	9	fine-loamy, mixed, superactive, mesic Aridic Haplustoll
SP-53	Disturbed		Disturbed
SP-49	Drifiity Family	5	loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthent
1YR-11	Graystone	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
1YR-9A	Graystone	6	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-15	Graystone	6	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-36	Graystone	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-37	Graystone	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-20	Graystone	8	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-39	Graystone cobbly	4	coarse-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-38	Happyhollow Family	7	fine, mixed, superactive, frigid Aeric Epiaquept
SP-44	Happyhollow Family	7	fine, mixed, superactive, frigid Aeric Epiaquept
SP-45	Happyhollow Family	13	fine, mixed, superactive, frigid Aeric Epiaquept
SP-54	Happyhollow Family	7	fine, mixed, superactive, frigid Aeric Epiaquept
SP-14	I Family	6	fine-loamy, mixed, superactive, frigid Aquic Calciustept
SP-52	I Family	13	fine-loamy, mixed, superactive, frigid Aquic Calciustept
SP-43	Jicarilla Family	7	fine, mixed, superactive, frigid Typic Argiaquoll
1YR-10	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
1YR-8	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
RDV-5	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-16	Jonale Family	6	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-34	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
SP-35	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-17	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-18B	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll
WRD-23	Jonale Family	4	fine-loamy, mixed, superactive, mesic Aridic Calciustoll

Table B-2. Taxonomic classification of soil pedons sorted by soil type, Coal Hollow Soil Survey.

1YR-12	M Family	2	fine, mixed, superactive, mesic Aridic Calciustept
DAH-25	M Family	5	fine, mixed, superactive, mesic Aridic Calciustept
LOF-3	M Family	2	fine, mixed, superactive, mesic Aridic Calciustept
SP-48	Manzanst Taxa Family	12	very fine, mixed, superactive, mesic Aridic Haplustalf
SP-58	Manzanst Taxa Family	12	very fine, mixed, superactive, mesic Aridic Haplustalf
SP-60	Manzanst Taxa Family	12	very fine, mixed, superactive, mesic Aridic Haplustalf
SP-26	N Family	1	fine, mixed, superactive, frigid Aquic Calciustoll
WRD-21	Snilloc	8	coarse-loamy, mixed, superactive, mesic Aridic Calciustept
SP-40	Tetonview Family	7	fine-loamy, mixed, superactive, frigid Aeric Calciaquoll
SP-31	Wapiti Family	3	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
SP-32	Wapiti Family	1	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
SP-56	Wapiti Family	3	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
WRD-19	Wapiti Family	4	fine-loamy, mixed, superactive, mesic Calcidic Argiustoll
SP-50	Zigzag	10	clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent

Aridic Calcinstepl

UTM 0371325 4140717

USDA - Fo[illegible]ice

SOIL DESCRIPTION

(Re[illegible]e FSH 2509.18) #13 (P) LOF-1

Fine, mixed, superactive, mesic

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
1	FINE, SMECTITIC TYPIC USTORTHENT	9-12-06	BC	23 (K)	LOF 1	ALTON	Sec. ____ T. ____ R. ____

9. Area	10. Forest	11. Ranger District	12. State	13. County
LAND OUT MEA	COAL HOLLOW PROJECT, PRIVATE LAND 2 MI. SOUTH OF ALTON, UTAH		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
LANDSLIDE DEPOSIT ALLUVIUM + COLLUVIUM	STRAIGHT CLIFFS FM + TROPIC SHALE	70.	NONE → SLIGHT	RILL

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock a. GR	b. CB	c. ST	d. BY
ALLUVIAL FANSCAPE	3	PLANAR	150'	280	SPD	2	1	0	

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
WYOMING BIGSAGEBRUSH - GRASSES, FORBS	15-17"		> 5 FT

HORIZON DESIGNATION (a)	DEPTH (b) INCHES	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) LAB	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-6	10YR 4/2	10YR 5/2	/	CLAY LOAM SICL 36	1MPL → FGR	SO	VFR	SS/PS	/	CR-0 CB-0 ST-0	3VF 2F,M 1C	2VF IN 1F TU	ST	7.3	C,S
BK1 CK1	6-12	2.5Y 4/3	2.5Y 5/2	/	CLAY LOAM SICL 36	2M-C ABK	SHA	VFI	VS/VP	/	CR-0 CB-0 ST-0	2VF 1F,M,C	1VF TU	ST	8.3	G,W
BK2 CK2	12-24	2.5Y 5/3	2.5Y 6/2	/	SICL 42	3M-C PR	VH	VFI	VS/VP	/	CR-0 CB-0 ST-0	1VF 1F	1VF TU	ST	8.5	G,S
BK3 C3	24-42	2.5Y 5/3	2.5Y 6/2	/	SICL 46	3MPR → 3ABK	EHA	EFI	VS/VP	/	CR-0 CB-0 ST-0	1VF	V.1VF TU	ST	8.7	G,W
CR	42-60	2.5Y 5/2	2.5Y 7/2	/	CLAY SICL 42	MASSIVE	EH	EFI	VS/VP	/	CR-0 CB-0 ST-0	/	/	ST	8.4	G,W
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	42"		> 5 FEET

28 Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	CALCIC	10-30"

0371357
UTM 4 792

SOIL DESCRIPTION

(Ref. SH 2509.18) #14 (P) LOF-2

USDA - Forest Service: Mill

Aridic Calciustept
~~Ustic Haplocalcid~~

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
2 ~~Landout~~ AREA	mixed, super, mesic FINE, ~~SMECTITIC~~ ~~TYPIC~~ ~~USTORTHENT~~	9-12-06	BC	4-5 (K)	LOF-2	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW SOIL SURVEY	PRIVATE LANDS 2 MI. SOUTH OF ALTON	UTAH	UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
LANDSLIDE DEPOSIT LANDSLIDE - COLLUVIUM	TROPIC SH + STR. CLIFFS	FN 70	NONE → SLIGHT	RILL

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
FOOTSLOPE - TOESLOPE	6	PLANAR	150'	200	SPD	2	2	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Artrva - RABB. + BRUSH - GRASSES	15-17"		>8 FT.

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A1	0-7	10YR 3/2	10YR 5/3	/	CLAY LOAM SiL 31	2M-C PL → FCR	SO	VFR	S/P	/	GR - CB - ST -	3VF 2F, M 1C	2VF IN 2F TU	ST	7.6	C, S
A2 ~~CK1~~	7-12	10YR 4/2	10YR 5/2	/	CLAY LOAM SiC 32	2M-F ABM	VH	VFI	VS/VP	/	GR - CB - ST -	2VF 2F, M 1C	2VF IN 1F TU	ST	7.7	C, W
Book 1 ~~CK2~~	12-24	2.5Y 4/3	2.5Y 6/2	/	SiC 46	3C-M PR → 3ABM	EHA	EFI	VS/VP	/	GR - CB - ST -	1VF-F	1VF TU	ST	7.8	G, W
Book 2 ~~CK3~~	24-48	2.5Y 4/3	2.5Y 6/3	/	CLAY SiC 41	3M-C ABM	EHA	EFI	VS/VP	/	GR - CB - ST -	VVF	1VF TU	ST	8.0	G, I
BK ~~C4~~	~~48-72~~ 72	2.5Y 5/3	2.5Y 7/2	/	SiC 45	MASSIVE	EHA	EFI	VS/VP	/	GR - CB - ST -	/	1VF TU	me ~~SE~~	7.8	G, W
C	72-96	2.5Y 5/3	2.5Y 7/3	/	CLAY 47	MASSIVE	EHA	EFI	VS/VP	/	GR - CB - ST -	/	/	me ~~SE~~	7.8	G, W
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40	38	0	> 5 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	/	10-30"

FS 2509.1 (2/86)

4 SAMPLES TAKEN — Aridic Calcustept (Reference FSH 2509.18) 50-51 (K) UTM 4140866

1. Map Unit	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
2	Fine, ~~smectitic~~ Typic mixed super, mesic ~~Hypothermic~~	9-18-09	BC	16-11 (P)	LOF-3	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
LOAD OFF AREA	MODERATELY DEEP		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
ALLUVIUM / COLLUVIUM / LSD	TROPIC / STR. CLIFFS	70	a. Kind NONE-SLIGHT b. Class RILL

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
FANSLOPE - TOESLOPE	a. % 9 b. Shape CONVEX c. Length 200 d. Aspect 160°	SPD	a. GR 0 b. CB 0 c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBRUSH - RABBITBRUSH	15-17		NONE TO 5 FT

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-4	10YR 3/3	10YR 4/3	/	LOAM SIL	28	1M-CPL → FGR	SO	VFR	SS PS	/	GR - CB - ST -	2VF 1F,M	2VF IN 1F TU	SE	8.1	GS
BW1 C1	4-11	10YR 4/3	10YR 5/2	/	CLAY LOAM SICL	28 32	3M-CPR → 3 ABK	SH	FI	S P	/	GR - CB - ST -	2VF 1F,M	2VF IN 1F TU	ST	8.3	GW
BWK C2	11-19	2.5Y 4/3	2.5Y 6/2	/	SICL SILTY CLAY	34	3MPR → 3 ABK	VH	VFI	VS/VP	/	GR - 0 CB - 0 ST - 0	1VF 1F	1VF TU	ST	8.1	G,W
BK C3	19-33	2.5Y 5/3	2.5Y 6/2	/	SILTY CLAY SICL	40 37	3 M-C ABK	VH	VFI	VS VP	/	GR - 0 CB - 0 ST - 0	1VF	1VF TU	ST	8.4	G,W
Cr	33+	SOFT TROPIC			SICL	45	SADLE BEDROCK					GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-33"	37	0	33"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	CALCIC	10-30"

Previous edition ... lete.

FS-2500-1 (2/86)

USDA - Forest Service

Aridic Haplustept

SOIL DESCRIPTION (Reference FSH 2509.18) 52-53 K

UTM 4140 6

1. Map Unit Symbol	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. T. R.
2	FINE, ~~SMECTITIC~~ TYPIC USTORTHENT mixed mesic	9-18-06	BC	12-13 (P)	LOF-4	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
LAND OF FAIRY COAL HOLLOW SOIL SURVEY	PRIVATE LANDS 2½ MI. SE OF ALTON		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
COLLUVIUM / LANDSLIDE DEPOSITS FROM	STRAIGHT CLIFFS + TROPIC	70	NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock	
TOESLOPE · FANSLOPE	6	CONVEX	220'	190°	SPD	CHEMICAL CRUST a. GR 0 b. CB 0	c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBRUSH RABBITBRUSH	15-17"		NONE TO 5 FT.

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) LAB	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (k) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-5	10YR 4/2	10YR 6/3	/	SILT LOAM SiL 42 23	2M-F PL → 1F GR	SO	VFR	SS PS	/	GR-0 CB-0 ST-0	3VF 2F-M 2C	3VF IN	SE	7.8	C.S
Bw1 C1	5-10	10YR 4/2	10YR 6/2	/	SiC 40	2M-F SBK	SO	FR	S P	/	GR-0 CB-0 ST-	2VC-F 1M,C	2VF IN 2F TN	SE	7.7	C.W
Bw2 C2	10-19	2.5Y 4/2	2.5Y 6/2	/	SiC 45	3C-M PR	VH	VFI	VS VP	/	GR-0 CB-0 ST-0	1VF-F 1M	2VF IN	SE	7.8	G.W
Bw3 C3	19-31	2.5Y 4/3	2.5Y 6/3	/	SiC 44	3MPR → 3ABK	VH	VFI	VS VP	/	GR-0 CB-0 ST-0	VIVF	IVF IN	SE	7.9	G.W
C4	31+ *			/	CLAY SiCL 42	CLAY MASSIVE	EH	EFI	ES EP		GR-0 CB-0 ST-0	/	IVF TN	SE	7.8	
											GR- CB- ST-					
	* NO LAB ANALYSES										GR- CB- ST-					
											GR- CB- ST-					
											GR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	42	0	> 50 INCHES

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	CALCIC ?	10-30

Previous edition obsolete. FS-2500-1 (2/86)

Marginal increase for calcic - correlate to Aridic Calciustept

USDA - Forest Aridic Calciustoll / FLUVENTIC HAPLUSTOLL

SOIL DESCRIPTION

(Reference 12509.18)

RDV-5 / UTM 414C 8

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location: Sec. T. R.
4	Fi-loamy, mixed, super, mesic ~~HAPLUSTOLL~~	9/13/06	BC	13-14-15-16		ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW			UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM / RESIDUUM	MIXED SEDIMENTARY		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. CR	b. CB	c. ST	d. BY
ALLUVIAL FANSLOPE	4	CONVEX	170'	250°	WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
PINYON-JUNIPER W/ BIG SAGEBRUSH	15-17"		NONE

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	COLOR (c) Dry (2)	COLOR (c) Mottling (3)	LAB TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	CONSISTENCE (f) Moist (2)	CONSISTENCE (f) Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	SPECIAL FEATURES (g) Roots (3)	SPECIAL FEATURES (g) Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A1	0-5	10YR 3/3	10YR 5/3	/	LOAM 18	2M-F GR	SO	VFR	SO/PO	/	CR-0 CB-0 ST-0	2VF 2F 1C	3VF IN 2F TU	SE	8.1	C,W
A2	5-10	10YR 3/4	10YR 5/4	/	LOAM 20	2M-F SBK	SH	FR	SO/PO	/	CR- CB- ST-	2F 1VF 1M-C	2VF-F IN	ST	8.1	G,W
BK CKT	10-25	10YR 5/4 10YR 5/6	10YR 6/4 (80) 10YR 6/6 (20)	/	SANDY LOAM 14	2C-M SBK	HA	FI	SS/PO	/	CR- CB- ST-	1VF 1F	2VF-F TU	ST	8.4	A,S
2C1 ~~2CT~~	25-48	2.5Y 5/3	2.5Y 6/2	/	SILT LOAM 12	3M-C ABK	EH	EF	SS/SP	/	CR- CB- ST-	V.VF	1VF TU	ST	8.8	G,W
2C2	48-60	2.5Y 5/2	2.5Y 7/2	/	LOAM 22	MASSIVE	EH	EF	SS/PS	/	CR- CB- ST-	/	1VF TU	ST	9.0	
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	15	0	>60 INCHES

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC	CAMBIC / CALCIC	10-30"

FS 2000.1 (2/02)

USDA - Forest Service ~~Mollic~~ Aridic Calciustept ~~Ust 1 Fluvent or~~

SOIL DESCRIPTION

(Refer to FSH 2509.18)

ROV-6 UTM 414024 = 0370421

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
3	~~Co-loamy~~ fine-loamy ~~Haplobaroll~~ 2	9-13-06	BC	17, 18-19	ROV-6	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
Coal Hollow	, mixed, super, mesic		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM OVER RESIDUUM	TROK SHALE	68	NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
	3	PLANK	250'	290°	WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBRUSH - RABBITBRUSH	15-17"		>8 Ft

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A1	0-6	10YR 3/4	10YR 5/3	/	LSAND	6	1MGR	LO	LO	SO/PO	/	GR - CB - ST -	3VF, F 2M, K	3VF IN	ST	8.1	C.W
A2	6-12	10YR 4/2	10YR 5/4	/	LSAND	6	1MSBK → SG	SO	VFR	SO/PO	/	GR - CB - ST -	2VF, 2F 1M	3VF IN	ST	8.3	C.S
BK1 ~~AC~~	12-24	10YR 4/3	10YR 6/3	/	LOAM	18	2M-F SBK	SH	FI	SS/PO	/	GR - CB - ST -	2VF 1F	2VF IN 1F TU	ST	8.0	A.S
BK2 ~~CK~~	24-34	10YR 4/3 10YR 4/6	10YR 6/3 10YR 6/6	(75) (25)	SANDY LOAM	8	3M-C SBK	HA	VH	SO/PO	/	GR - CB - ST -	1VF	2VF IN 1F TU	ST	8.3	G.S
2C	34-60	10YR 4/3	10YR 6/2	/	SILTY CLAY	40	MASSIVE	EH	EFI	VS/VP	/	GR - 0 CB - 0 ST - 0	1VF	1VF TU	SE	8.5	
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	<10	0	>60"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC W/MIXNG	CALCIC	10-30"

PSC clay is 18.3% based on lab data

USDA - Forest Service

mixed, super, mesic

SOIL DESCRIPTION

(Refer to FSH 2509.18)

RDV-7 UTM 41408 03709.07

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
4	Aridic Calciustoll Fine ~~Typic~~ ~~Ustorthent~~	9-13-06	BC	20.21	RDV-7	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW	APPROX. 2 MI SE OF ALTON PRIVATE LAND		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM OVER RESIDUUM	MIXED ALLUVIUM / TROPIC SHALE		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
FANSLOPE	3	SL CONVEX	150'	255°	SPD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBRUSH - RABBITBRUSH	15-17"		>6 FT

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A1	0-6	10YR 3/2	10YR 5/2	/	CLAY LOAM	23	1M-F GR	SO	VFR	SS/PS	/	GR - CB - ST -	3VF 3F 2M, 1C	3VF IN	SE	7.5	C, W
A2	6-12	10YR 4/3	10YR 5/2	/	CLAY	44	2M-F SBK	HA	FI	VS/VP	/	GR - CB - ST -	2VF 2F, M 1C	2VF IN 1F TY	SE	7.6	G, W
2BK1	12-24	2.5Y 4/2	2.5Y 6/2	/	CLAY	47	2C-M ABK	HA	EFI	VS/VP	/	GR - CB - ST -	1F, 1M	1VF TU	ST	8.0	G, S
2BK2	24-60	2.5Y 4/3	2.5Y 6/2	/	CLAY	44	3C-M ABK	VH	EFI	VS/VP	/	GR - 0 CB - 0 ST - 0	/	1VF TU	ST	8.0	
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	45	0	>60"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC W/ MIXING	CALCIC	10-30"

FS 2509.1 (2/86)

SOIL DESCRIPTION

(Ref. SH 2509.18) KUDAM

UTM 0371[illegible] 4139829

USDA - Fore[illegible]ice: Super, mesic Aridic Calciustoll

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
~~3~~ 4	FI-LOAMY ~~ENTIC~~ ~~ARGI~~ mixed, ~~HAPLUSTOLL~~ USTOLL	9-12-06	BC	2 PITS	1YR-8	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW 1YR MINE	3 MI. SE OF ALTON PRIVATE LAND		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM	MIXED SEDIMENTARY		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
ALLUVIAL FAN	2	CONCAVE	100'	230'	WELL WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBRUSH, PINYON, CHNA	15-17"		>7 1/2 FT

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A8	0-8	10YR 3/3	10YR 5/3		SILT LOAM 30 22	1MPL → 2MGR	SE	FR	SS PO		GR-0 CB-0 ST-0	3VF 2F,M	3VF IN	NE	8.0	C,S
Bwk AB ~~B1~~	8-14	10YR 4/3	10YR 6/3		SICL CLAY LOAM 30	2M-F SBK	HA	FI	S/P		GR-0 CB-0 ST-0	2VF 1F,M	2VF IN 1F TU	SE	8.1	C,W
Bwk BW ~~B2~~	14-22	10YR 4/4	10YR 7/3		LOAM SICL 22	2C-A SBK	HA	VFI	S/P		GR-0 CB-0 ST-0	1F, 1VF	1VF,F TU	SE	8.5	C,W
Bwk BW2 ~~C1~~	22-45	10YR 5/4	10YR 7/3		LOAM SIL 16	2M-F SBM	HA	VFI	SO PO		GR-0 CB-0 ST-0	1VF	1VF,F TU	ST	8.9	G,S
2C1	45-65	10YR 5/4	10YR 7/4		LOAMY SAND SL 8 14	MASSIVE	SO	FR	SO PO		GR-0 CB-0 ST-0	1VF	1VF TU	ST	9.0	G,S
2C2	65-85	10YR 5/3	10YR 7/4		LOAMY SAND SL 8 12	MASSIVE					GR-0 CB-0 ST-0		3VF IN	SE	8.9	
											GR- CB- ST-					
			A	0-5"	CLAY	LOAM TEXTURES					GR- CB- ST-					
											GR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	19	0	>60

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC W/ MIXING	CAMBIC	10-30"

FS 2509.1 (2/86)

SOIL DESCRIPTION

USDA - Forest Service

Aridic Calciustoll ~~FLUVENTIC HAPLUSTOLL~~ (Refer ... 2509.18)

UTM 41 ... 21

1. Map Unit Symbol: 6	2. Family or Series: ~~FI-SILTY~~ (OR FI-10) COARSE-LOAMY mixed, super, mesic HAPLUSTOLL	3. Date: 9-12-06	4. By: BC	5. Photo. No.	6. Stop No.: 1YR9A	7. USGS Quad: ALTON
8. Location: Sec. ___ T. ___ R. ___						
9. Area: 1 YEAR MINE	10. Forest: 3 MILES SOUTH OF ALTON PRIVATE LAND	11. Ranger District			12. State: UTAH	13. County: KANE
14. Parent Material: MIXED ALLUVIUM	15. Bedrock Name: ALLUVIUM FRM STRAIGHT CLIFFS	16. Elevation		17. Erosion: a. Kind: None b. Class		
18. Landform: FAN SLOPE BASIN	19. Slope: a. % 4 b. Shape CONCAVE c. Length 75' d. Aspect 315°	20. Drainage Class: WD → SPD		21. Surface Stone and Rock: a. GR 0 b. CB 0 c. ST 0 d. BY 0		
22. Potential Natural Vegetation: GRASS + SEDGES w/ FEW SAGEBRUSH		23. Annual Precipitation: 15-17		24. Measured Soil Temperature	25. Water Table (Depth): > 7 FEET	

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d) %C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
Oe	1½-0	ROOT	MAT			2					GR - 0 CB - 0 ST - 0			SL		
A	0-12	10YR 3/3	10YR 5/3		SANDY LOAM 8 SL 20	2M-F GR	SO	FR	SO/PO		GR - 0 CB - 0 ST - 0	3VF 2F	3VF IN	SE	9.1	C,S
Bw	12-24	10YR 4/3	10YR 6/3		SANDY LOAM 10 22	2M-F SBK	HA	FI	SS/PS		GR - 0 CB - 0 ST - 0	2VF 2F	2VF IN 1F-M TU	SE	9.6	C,S
Bwk	24-42	10YR 5/4	10YR 7/3		SANDY LOAM 10	2M-C SBK	HA	VFI	SS/PS		GR - 0 CB - 0 ST - 0	2VF 1F	2VF, 1M 2F TU	SE	9.6	C,S
BK ~~Bg1~~	42-70	10YR 5/4 10YR 5/6	10YR 7/4 (80) 10YR 7/6 (20)	FEW FAINT T.STR 4/6	SANDY LOAM 10	MASSIVE	HA	FI	SO/PO		GR - 0 CB - 0 ST - 0	1VF, 1F	1VF-F TU	SE	9.4	A,S
2Cg 2	70-100	2.5Y 5/2	2.5Y 6/1	COMMON DISTINCT 10YR 6/6	CLAY LOAM 39	MASSIVE	SH	FR	SO/PO		GR - 0 CB - 0 ST - 0	1VF	1VF TU	NE	8.5	A,S
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth: 10-40"	b. Average Clay %: 10	c. Average Rock Fragment Content: 0	27. Depth to Lithic or Paralithic Contact: > 8 FEET
28. Diagnostic Horizons	a. Surface: MOLLIC	b. Subsurface: CAMBIC		29. Moist Control Section Depth: 10-30"

calcic based on lab data

SOIL DESCRIPTION

(Refer to NSSH 2509.18)

USDA - Forest Service: ~~Fine-Loamy~~ Mixed Superactive Calciaquoll

UTM 4 714

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
6	~~Fine-Loamy~~ ~~Calciaquoll~~ mixed superactive frigid	9-12-06	BC	2 PITS	PR 9B	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COPI HOLLOW MINE YEAR 1	3 MI SE ALTON PRIVATE LAND		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM	TROPIC + MIXED SEDS	68	NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
BASIN - FANSCAPE	1	CONCAVE	75'	190	SPD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
GRASSY MEADOW W/ SAGE + RABBIT BRUSH	15-17"		57" 56 (1 WK LATE)

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	COLOR (c) Dry (2)	COLOR (c) Mottling (3)	TEXTURE (d) LAB	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	CONSISTENCE (f) Moist (2)	CONSISTENCE (f) Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
Ag1	0-6	2.5Y 4/1	2.5Y 4/2	/	SiL 24 22	1M GR	SO	FR	SS PS	/	CR-0 CB-0 ST-0	3c 2VF 2M 2F	3VF tu	SE	8.0	CS
Ag2 (AB9)	6-17	2.5Y 4/2	2.5Y 5/2	Few Faint Prom.	SaCLy L 23 27	2M-C GR	SH	FI	SS PS	/	CR-0 CB-0 ST-0	3M 2F 2VF	2VF tu	SE	8.2	AS
Bg1 (BC9)	14-28	2.5Y 4/1	2.5Y 4/2	Common Prominent	SaClLm SiCL 14	2M-F SBK	HA	FI	SS PS	/	CR-0 CB-0 ST-0	1VF 1F,M	2VF TU	ST SE	8.5	AS
Bg2 (BC9)	28-48	2.5Y 5/3	2.5Y 7/2	Many Prominent	SaLm SiC 16	WET	HA	FI	SS/PS	/	CR-0 CB-0 ST-0	1F,M	1VF TU	ST NE	8.3	AS
BC9				Many Prominent		WET					CR-0 CB-0 ST-0	1VF		NE		AS
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
		lab 16%		

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
		calcic	

USDA - Forest Service

SOIL DESCRIPTION

(Refer SII 2509.18) 5 (k)

0370865 UTM 4139873

Aridic ~~Ustic~~ Calciustoll

1. Map Unit	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
4	fine-loamy, mixed (or ~~USF Fluvent~~) ~~FINESILTY~~ MX,	9/18/06	BC	18-P	1YR-10	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
YR 1 COALMINE	super, mesic		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM + COLLUVIUM	MIXED SEDIMENTARY		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock a. GR	b. CB	c. ST	d. BY
FANSLOPE	4	CONVEX	120'		WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
JUNIPER - PINYON / BIG SAGEBRUSH	15-17"		>

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (k) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-2" / 0-7"	CHEMICAL 10YR 3/3 10YR 9/3	CRUST 1 10YR 6/3 10YR 5/3	/	SL LOAM 26	2M-FPL 2M-F GR	SO	VFR	S/P	/	GR-0 CB-0 ST-0	3VF 2F 1M-C	3VF IN	SE	7.8	C, S
Btk	7-13	10YR 4/3	10YR 5/2	/	LOAMY SIL LOAM 26	2M-C SBK	SO	FR	S/P	1MHPF	GR-0 CB-0 ST-0	3VF 2F 1M,C	2VF IN 1F TU	SE	7.7	C, S
Bw2 (Bt2)	13-26	10YR 4/3	10YR 6/3	/	SIC 34 23	1M-C SBK	SH	FR	SS/PS	1MPF 2MPO	GR-0 CB-0 ST-0	2VF 1F	2VF IN 1F TU	ST	7.9	C, W
Bk	26-44	10YR 5/3 10YR 5/6	10YR 7/3 (TS) 10YR 7/6 (ES)	/	CLAY LOAM SIL 34 28	2M-C SBK	HA	FI	SS/PS	/	GR-0 CB-0 ST-0	1VF	1VF-F TU	ST	8.3	C, S
Bw2 (2C)	44-68	10YR 5/3 10YR 5/6	10YR 7/3 10YR 7/4	?	SILTY CLAY SIL 32 26	MASSIVE LAMINAR	VH	FI	SS/PS	/	GR-0 CB-0 ST-0	1VF	1VF-F TU	ST	8.5	C, S
2Ck (2C2)	68-84+	10YR 5/4 10YR 6/8	10YR 7/3 10YR 7/6	MOIST SILT LAYERS	SANDY LOAM 10 7	MASSIVE LAMINAR	SO	VFR	SO/PO	/	GR-0 CB-0 ST-0	/	1VF TU	ST	8.4	
											GR- CB- ST-					
											GR- CB- ST-					
											GR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	27	0	>8 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	~~OCHRIC~~ MOLLIC	~~ARGILLIC~~ CAMBIC, CALCIC	10-30"

Previous edition obsolete.

FS-2500-1 (2/86)

USDA - Forest Service

Aridic Calciustoll

SOIL DESCRIPTION

(Refer ... 2509.18)

UTM 413...

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
4	CO-LOAMY ~~TYPIC~~ ~~HAPLOSTOLL~~ HAPLOBOROLL	9/13/04	BC	PIT 22-23 LANDSCAPE	1YR-11	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW SURVEY	mixed, super, mesic	24	UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM / RESIDUUM?	ALLUVIUM / DAKOTA FM		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
ALLUVIAL FAN	4	SL. CONVEX	100'	280°	MWD - WD	2	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBROCH - JUNIPER -	15-17"		> 8 1/2 FEET

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	%	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A11	0-5	10YR 3/2	10YR 5/2	/	SC	9 / 12	1MPL → 1FGR	LO	FR	SO/PO	/	GR - 2, CB - 2, ST - 0	2F-M 1VF	3VF IN	NE	8.0	C, W
A12	5-16	10YR 3/3	10YR 5/3	/	SANDY LOAM FSC	14 / 15	1F SBK → 1M GR	SO	FR	SO/PO	/	GR - 1, CB - 0, ST - 2	2F 1M, VF	2VF IN 2F TU	NE	8.2	G, W
Bwk1	16-32	10YR 4/3	10YR 6/3	/	SANDY LOAM	10	2M-F SBK	SH	FI	SO/PO	/	GR - 2, CB - 0, ST - 0	1VF-F	2VF, 1F TU	SE	8.3	G, W
Bwk2	32-48	10YR 5/3	10YR 6/3	/	LOAMY SAND	8	MASSIVE	HA	FI	SS/PO	/	GR - 0, CB - 0, ST - 0	1VF	2VF, 1F TU	SE	8.3	G, W
BK	48-72	10YR 4/4	10YR 6/4	/	LOAMY SAND	8	MASSIVE	HA	FI	SS/PO	/	GR - 3, CB - 1, ST - 0	1VF	2VF TU	ST	8.6	C, S
C	72-90	10YR 5/4	10YR 7/4	/	SAND	4	MASSIVE	SH	FI	SS/PO	/	GR - 4, CB - 1, ST - 0	1VF	3VF IN	ST	8.7	
												GR - , CB - , ST -					
												GR - , CB - , ST -					
												GR - , CB - , ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	13	2	>90"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC	CAMBIC, CALCIC	10-30"

USDA - Forest Service

Aridic Calciustept

SOIL DESCRIPTION (Refer FSH 2509.18) 63-64(K) UTM

1. Map Unit	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
23	FINE, ~~SMECTITIC~~, TYPIC ~~US FORTHERN~~	9-19-06	BC	21 (P)	1YR-12	ATTN	

9. Area	10. Forest	11. Ranger District	12. State	13. County
MINE YEAR 1 COAL HOLLOW SOIL SURVEY	mixed, super MODERATELY DEEP mesic		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
RESIDUM / COLLUVIUM	DAKOTA SS w/ TROPIC SHALE		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
KNOLL, ERODED	8	SLIGHT CONCAVE	75'	90°	WD	2	2	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
LOW SAGEBRUSH w/ DWARF UTAH JUNIPER + GRASSES			NONE TO 4½ FEET

HORIZON DESIGNATION (a)	DEPTH (b) INCHES	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) LAB %C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-5	10YR 3/3	10YR 5/3	/	CLAY LOAM 22	1MPL → FGR	SO	FR	S/P	/	GR - 0 CB - 0 ST - 0	2VF-F 2M 1C	3VF IN 1VF TU	NE → SE	7.8	CS
Bw ~~C1~~	5-10	10YR 4/3	10YR 6/3	/	CLAY LOAM SICL 32	3M-F ABK	HA	FI	VS/VP	/	GR - 5 CB - 3 ST - 0	2VF-F 1M 1C	2VF : 1F TU	SE	7.8	C,W
Bwk ~~C2~~	10-26	2.5Y 5/3	2.5Y 7/2	/	SILTICLAY SICL 44	3M-C ABK	EH	EF	VS/VP	/	GR - 0 CB - 5 ST - 10	1VF-F	2VF TU	SE	8.4	G,W
CP	26-44	TROPIC SHALE BEDROCK		/	SICL	3CPR MASSIVE	EH	EF	VS/VP	/	GR - 0 CB - 0 ST - 10	1VF	1VF TU	SE	8.3	C,S
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-26"	37	11	26"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	/ calcic	10-26"

Previous edition ... lete.

based on lab data

FS-2500-1 (2/86)

USDA - Forest Service

Aridic Calciustept (Refer - FSH 2509.18) 56-57(w) WTM 4139915

1. Map Unit	2. Family or Series	3. Dat	4. By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location:
3	Fi-loamy ? ~~Mollic~~ mixed, super, mesic ~~USTI FLUVENT~~	9-18-06	BC	49 (P)	DR-13	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
SETTLING POND YEAR 1 MINE			UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
ALLUVIUM	MIXED SEDIMENTARY	68	a. Kind NONE b. Class

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
FANSLOPE	a. % 2 b. Shape CONCAVE c. Length 125' d. Aspect Z 70°	WD	a. GR 0 b. CB 0 c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBRUSH - RABBITBRUSH	15-17		NONE TO 8 Ft

	HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d) %C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
	A	0-6	10YR 4/3	10YR 5/3	/	SANDY LOAM 21	2M-F GR	SO	VFR	SO/PO	/	GR-0 CB-0 ST-0	3VF 2F 1M	3VF IN 1F TU	SE	8.5	A.S
BK	AC1	6-12	10YR 5/3 10YR 6/6	10YR 6/3 (80) 10YR 6/4 (20)	/	SILT LOAM 26	2M-F SBK	SH	FI	SS/PO	/	GR-0 CB-0 ST-0	3VF 2F 1M	2VF IN 2F-M TU	SE	8.2	A.S
2BK	2C2	12-24	10YR 5/3 10YR 5/6	10YR 6/3 (85) 10YR 6/6 (15)	/	SILTY CLAY 42	3F SBK	HA		S/P	/	GR-0 CB-0 ST-0	2VF 1F 1M	1VF-F-M TU	ST	8.4	A.S
2BK3	2C3	24-48	7.5YR 5/4 7.5YR 5/8	10YR 7/3 (75) 7.5YR 6/8 (25)	/	CLAY LOAM S.C.L. 32	2M-CPR → 2ABK	VH		S/P	/	GR-0 CB-0 ST-0	1F 1VF	1F-M TU	ST	8.5	A.S
2BK4	2C4 3C4	48-60	7.5YR 5/3 7.5YR 5/4	10YR 6/4 (75) 7.5YR 6/4 (25)	/	CLAY LOAM S.C.L. 28	2M-C ABK	VH		S/P	/	GR-0 CB-0 ST-0	1VF	1VF-F TU	ST	8.8	A.S
C1	4C5	60-72	10YR 4/3 10YR 4/6	10YR 5/4 (80) 10YR 5/6 (20)	/	SANDY CLAY 24	MASSIVE	VH		S/P	/	GR-0 CB-0 ST-0	/	1VF-F TU	ST	8.9	A.S
C2	C6	72-84 84+	10YR 5/3 10YR 5/6	10YR 7/3 (60) 10YR 6/6 (40)	/	LOAM 20 8	MASSIVE	SO	FR	SO/PO	/	GR-0 CB-0 ST-0	/	2VF IN	ST	8.7	
												GR- CB- ST-					
												GR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	33	0	> 8 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	/	10-30'

Previous edition ... lete.

FS-2500-1 (2/86)

USDA - Forest Service

Aquic Calciustept

SOIL DESCRIPTION

(Refer SII 2509.18)

UTM 4139772

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
6	~~AQUIC USTIFLUVENT~~ ~~AQUOLL~~ FI-LOMMY	9-13-00	BC	PLY 25-27	SP14	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW	mixed, super, frigid		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM	ALLUVIUM / RESIDUUM		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
BASIN	1	CONCAVE	100'	350°	SPD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
GRASS + SEDGES	15-17"		90-100"

HORIZON DESIGNATION (a)	DEPTH (inches) (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	%	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	WB' FIELD pH (i)	BOUNDARY (j)
A1	0-6	10YR 3/2	10YR 5/3	NO	SILT CLAY	44	2M-F GR	SO	FR	SS/P	/	CR-0 CB-0 ST-0	3VF 3F 1M	3VF IN	NE	8.7	C,S
Bwk A2	6-13	7.5YR 4/4	7.5YR 5/4	NO	SILTY CLAY	44	1F SBK	VH	VFI	SS/P	/	CR-0 CB-0 ST-0	2VF 2F 1M	2VF TU	SE	7.8	C,W
2Bwk 2KT	13-28	10YR 6/4	10YR 7/3	begins at 24"	CLAY LOAM SICL	27	2M-F SBK	HA	FI	SS/PS	/	CR-0 CB-0 ST-0	1VF	1VF TU	SE	8.1	G,W
2Bwk 2C2	28-48	10YR 7/2	10YR 6/3	YES	LOAM	17	2F SBK	HA	VFI	SO/PO	/	CR-0 CB-0 ST-2	1VF	1VF TU	ES	8.7	G,S
3Cg 1	48-70	10YR 5/3 10YR 6/6	10YR 7/2 (60) 10YR 7/6 (40)	FAINT INDISTINCT YES	SICLOAM	39	MASSIVE	HA	VFI	SO/PO	/	CR-0 CB-0 ST-0	/	1VF-1F TU	ES	8.8	A,S
3Cg 2	70-90	10YR 5/4	10YR 6/3	MANY DISTINCT YES 10YR 6/8	SICLAY LOAM	32	MASSIVE	VH	VFI	S/P	/	CR-4 CB-0 ST-0	/	1VF TU	SE	8.5	
												CR- CB- ST-					
												CR- CB- ST-					
												CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	24"	3	>90"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	—	10-30"

lab data shows calcic

6 SAMPLES COARSE-LOAMY ~~FLUVENTIC HAPLOSTOLL~~ (Reference FSH 2509.18) 61-62 (K) | UTM

1. Map Unit	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
6	~~FINE-SILTY~~ mix, super, mesic ~~HAPLOSTOLL~~	9-19-00	BC	21 P	SP-15	ALTON	Sec. ____ T. ____ R. ____

9. Area	10. Forest	11. Ranger District	12. State	13. County
SETTLING PONDS COAL HOLLOW SOILS SURVEY			UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM / RESIDUUM	MIXED SEDIMENTARY		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock a. GR	b. CB	c. ST	d. BY
BASIN	2	CONCAVE	75'	260°	WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
GRASS - SEDGES w/ LOW SAGEBRUSH	15-17 INCHES		NONE TO 8½ FEET

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	COLOR (c) Dry (2)	COLOR (c) Mottling (3)	LAB TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	CONSISTENCE (f) Moist (2)	CONSISTENCE (f) Wet (3)	SPECIAL FEATURES (k) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
OE	1-0	DENSE ROOT MAT										CR - CB - ST -			NE		A, S
A	0-8	10YR 3/3	10YR 5/3	/	SILT ~~LOAM~~ SANDY LOAM	16 21	2M-C GR	SO	FR	SS/PO	/	CR - 0 CB - 0 ST - 0	3VF 3F,M	2VF IN	SE/NE	8.0	A, S
Bw	8-20	10YR 4/4	10YR 6/3	/	SIL LOAM	18 26	2M-F SBK	HA	FI	S/P	/	CR - 0 CB - 0 ST - 0	2VF-F 1M	3VF IN 2F TN	~~NE~~ → ~~SE~~ ST	8.5	A, W
BK1	20-37	10YR5/3 10YR5/6	10YR7/3 10YR7/4	/	FSL → SIL LOAM	15 26	3M-C SBK	VH	VFI	S/P	/	CR - 0 CB - 0 ST - 0	2VF 1F,M	1VF-1F TN	ST ~~SE~~	8.7	A, S
BK2	37-58	10YR 5/4	10YR 7/3	ORGANIC MATTER	LOAM SIL.	18 23	2M-C SBK	SH	FI	S/P	/	CR - 0 CB - 0 ST - 0	1VF-1F	1VF-TN	ST ~~SE~~	8.6	A, W
CK1	58-73	10YR5/4 10YR5/8	10YR6/4 10YR6/6	COMMON PROMINENT	SL	8 15	MASSIVE	SO	VFR	SO/PO		CR - 0 CB - 0 ST - 0	1VF 1F	/	VE ~~NE~~	8.4	A S
CK2	73-~~96~~	10YR5/4 10YR5/8	10YR7/3 10YR7/6	COMMON PROMINENT	SL	14	MASSIVE	SO	FR	SO/PO	/	CR - 0 CB - 0 ST - 0	/	/	VE ~~NE~~	8.3	
												CR - CB - ST -					
												CR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	16	0	> 9 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC	CAMBIC CALCIC	10-30"

Previous edition obsolete. FS-2500-1 (2/86)

USDA - Forest Service

FINE-LOAMY ~~TYPIC CALCIAQUOLL~~ Aquic Calciustoll SOIL DESCRIPTION (Reference FSH 2509.18) 59-60 K

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
6	~~FI SILTY~~ (OR FI-LD) mixed, super, mesic ~~HAPLUSTOLL~~	9-19-06	BC	20-P	SP-16	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
SETTLING PONDS COAL HOLLOW			UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM / RESIDUUM	ALLUVIUM MIXED SEDIMENTARY		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
BASIN	1-2	CONCAVE	160°	310	WD	2	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
GRASS + SEDGES	5-17"		> 8 FEET

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d) %C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
Oe	1½-0	DENSE ROOT MAT.								/	GR - 0 CB - 0 ST - 0			NE		A.W
A1	0-8	10YR 3/2	10YR 4/2		SILTY CLAY LOAM 36	3M-F GR	SO	FR	S/P	/	GR - 0 CB - 0 ST - 0	3VF 3F 3M	3VF 3F 3M	NE	8.3	C.S
BW A2	8-18	7.5YR 5/6	10YR 6/3	/	SILT 44 CLAY 28	2F SBK → <gr	SH	FR	S/P	/	GR - 0 CB - 0 ST - 0	2VF-F 2M 1C	2VF-F 2M 1C	NE	8.2	C.S
BW1	18-36	7.5YR 5/4	7.5YR 7/3	/	CLAY LOAM 28 SIL 27	3M-F ABK	VH	VFI	S/P		GR - 0 CB - 0 ST - 0	2VF 2F	2VF 2F	SE	8.7	A.S
BW2	36-56	7.5YR 5/4	7.5YR 7/4	FEW FAINT 7.5YR 5/6	SILTY CLAY SIL 28 29	2M-C SBK	HA	FI	S/P	/	GR - 0 CB - 0 ST - 0	2F 1VF	2VF 1VF	SE	9.0	A.S
2Cg 1	56-68	7.5YR 5/4 7.5YR 5/6	7.5YR 7/3 7.5YR 7/4	FEW FAINT 7.5YR 4/6	LOAM SIL 14 27	MASSIVE	HA	FI	S/P	/	GR - 0 CB - 0 ST - 0	1VF-F	1VF-F	SE → NE	8.9	A.S
2Cg 2	68-96	2.5Y 5/2	2.5Y 6/2	COMMON PRAMIN 5YR 5/6	SCL → SIL 28 30	MASSIVE	HA	VFI	SS/PS	/	GR - 0 CB - 0 ST - 0	1F 1VF	1F 1VF	NE	8.9	
					CLAY LOAM						GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	31	0	> 8 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC	CAMBIC calcic	10-30"

FS-2500-1 (2/86)

Previous edition ... Note.

does not make Aquic Calciustoll because mottles are deeper than 30"

USDA - Forest Service

SOIL DESCRIPTION

(Refer FSH 2509.18) 16-17(P)

Aridic ~~Type~~ Calciustoll

UTM 41404 0371420

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
4	Fine-Loamy ~~Arg~~ Calciustoll	9-18-06	BC	53-54 (V)	WRD-17	Alton	

9. Area	10. Forest	11. Ranger District	12. State	13. County
Waste Rock Dump Coal Hollow Survey	2½ mi. SE of Alton		Utah	Kane

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
Alluvium + Colluvium	Mixed Sedimentary		None	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
Fanslope	3	Planar	200'	210°	WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Wyo Big Sagebrush - Rabbitbrush w/ P-J.	15-17"		None to

Horizon Designation (a)	Depth (b)	Color (c) Moist (1)	Dry (2)	Mottling (3)	Texture (d) (LAB)	Structure (e)	Consistence (f) Dry (1)	Moist (2)	Wet (3)	Special Features (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	Effer. Class (h)	Field pH (i) (LAB)	Boundary (j)
A	0-9	10YR 3/3	10YR 5/3	/	Clay Loam Sicl 36 28	3 M-cpl FGR	SO	FR	S/P	/	GR - 1 CB - 0 ST - 0	3VF 2F, M 1C	3VF 1N 1F TU	SE	7.8	C, S
BW ~~BE~~	9-18	10YR 4/3	10YR 6/3	/	Clay Loam Sicl 32 30	2 M-F ABK	VH	VF	S/P	2 MK PF, 1 NPO	GR - 2 CB - 0 ST - 0	2VF 1F 1M 1C	1VF-F TU	SE	8.0	C, S
~~BE~~ BK1	18-30	10YR 4/3 10YR 5/8	10YR 6/4 (70) 10YR 6/6 (30)	/	Loam or Sicl 22	3 M-F ABK	VH	VF1	S/P	2 MK PF 1 NPO	GR - 2 CB - 0 ST - 0	1VF 1F, M	1VF-F TU	SE	8.0	C, W
~~BK2~~ BK2	30-45	10YR 4/4	10YR 6/3	/	Clay Loam Sicl 27	3 M-F ABK	VHA	VF1	S/P	2 NPO 1 NPF	GR - 2 CB - 0 ST - 0	1F, VF	1F-M TU	4VF CAM ST	8.1	G, W
BK	45-60	10YR 5/4 7.5YR 5/6	10YR 7/3 7.5YR 6/6	Blue colors from	Clay Loam Sicl 32	3 M-C SBK	SH	F1	S/P	/	GR - 2 CB - 0 ST - 0	1VF	1VF-F TU	8VF CAM ST	8.2	G, W
BK	60-80+	7.5YR 5/4 7.5YR 5/6	10YR 7/4	LMS	Silty Clay 40						GR - 0 CB - 0 ST - 0	/	2VF-1F TU	ST 6VF CAM	8.0	
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	26	2	> 7 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	~~Argillic~~ + Calcic	10-30"

Previous edition ... lete.

FS-2500-1 (2/86)

USDA - Forest Service

SOIL DESCRIPTION

(Ref. SII 2509.18)

UTM 0371878 4140230

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
E7	FINE-LOAMY ~~FINE-SILTY~~ Typic Argiaquoll mixed, super, frigid ~~TYPIC CALCI AQUOLL~~	9/14/06	BC	32-33 (K)	WRD 48A	ALTON	Sec. ____ T. ____ R. ____

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW STUDY AREA	PRIVATE LANDS 2 MILE SE OF ALTON		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM / RESIDUUM	ALLUVIUM + TRIASSIC SILTSTONE		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock a. GR	b. CB	c. ST	d. BY
FANSLOPE	4	CONCAVE	250'	250°	SPD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
GRASS + SEDGE FEW ARTR ROCKY MTN IRIS	15-17"		51" (53 IWU)

HORIZON DESIGNATION (a)	DEPTH (inches) (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) (LAB %C)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-7	10YR 3/2	10YR 5/2	/	SIL LOAM 26	1FSBK → MG	SO	FR	SS/PS	/	CR-0 CB-0 ST-0	3VF 3F 3M	3VF IN	SE	7.7	A.S
Bw	7-15	10YR 4/3	10YR 6/3	~~COMMON FAINT~~	SIL LOAM 24	2FTM SBK	SO	FR	SS/PS	/	CR-0 CB-0 ST-0	2M-F 3VF	2VF-1F IN	me ~~SE~~	8.0	A.S
BKl ~~ACq~~	15-30	2.5Y 5/3	2.5Y 7/3	COMMON FAINT	FSL 17 SIL 47	2M-F SBK	12A	FR	SS/PO	/	CR-0 CB-0 ST-0	2M 1F 1VF	1VF TN	ST ~~SE~~	8.1	A.S
2Btk ACq2	30-45	2.5Y 5/2	2.5Y 6/2	~~MANY PROMINENT~~	CLAY LOAM SIL 35	2FSBK → MGR	SH	FI	SS/PS	35 CLF PF /	CR-0 CB-0 ST-0	2M 1F 1VF	1VF TN	ST ~~SE~~	8.0	A.BW
2Cg ~~A~~	45-60	5Y 5/2	5Y 6/2	GLEYED	SANDY CLAY SIL 20	MASSIVE				/	CR-0 CB-0 ST-0	1M 1F	1F TN	VE UNDER WATER	7.9	A
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	27	0	>60"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC	CALCIC	10-30

FS 2500 1 (2/86)

USDA - Forest Service

SOIL DESCRIPTION

(Refer to FSH 2509.18)

UTM 4140300

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
4	Typic Argiaquoll ~~Fluventic Haplustoll~~ Fi-loamy, Mix, Super, frigid ~~Argic~~ Calcinstoll	9-14-06	BC	34-35	WRO-18B	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
Coal Hollow Soil Survey	Approx 2 mile SE of Alton		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
Colluvium / Alluvium	Mixed Sedimentary		None	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
Alluvial Fans Lope	3	Convex	150'	220°	WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Wyo Big Sagebrush - Rabbitbrush	15-17"		>8 Feet

Horizon Designation (a)	Depth (b)	Color (c) Moist (1)	Color (c) Dry (2)	Color (c) Mottling (3)	Texture (d)	% C	Structure (e)	Consistence (f) Dry (1)	Consistence (f) Moist (2)	Consistence (f) Wet (3)	Special Features (g) Cutans (1)	Special Features (g) % of Rock Fragments (2)	Special Features (g) Roots (3)	Special Features (g) Pores (4)	Effer. Class (h)	Field pH (i)	Boundary (j)
A	0-9	10YR 3/4	10YR 5/4	/	Sil Loam	26	2M-F SBK	SO	FR			GR-0 CB-0 ST-0	2M 2C 1VF, F	3VF IN	SE	8.2	C, S
Bt1 ~~Bw~~	9-19	10YR 4/3	10YR 6/3	/	Sil Loam	20	2M-C SBK	SH	FI		/	GR-1 CB- ST-	1F, M 1VF, C	2VF-1F IN	SE	8.3	C, W
Btk1	19-34	10YR 5/4	10YR 7/3	/	Loam Sil	18	2M-F SBK	VH	VFI	S/P	1 ~~Lmpf~~ 2 APO	GR-2 CB- ST-	1VF, F	1VF-1F TU	SE	8.5	C, W
Btk2	34-54	10YR 5/4	10YR 6/3	/	Clay Loam Sil	32	2M-C ABK	VH	VFI	S/P	~~1 Lmpf~~ ~~1 APO~~	GR-2 CB- ST-	1VF	1VF TU	SE	8.7	G, W
Ck	54-72	10YR 4/4	10YR 6/4	/	Clay Loam Sil	34	Massive	VH	VFI	S/P	/	GR-1 CB- ST-	V, VF	1VF TU	SE	8.6	G, W
C	72-96	10YR 5/4	10YR 6/3	/	Loam	20	Massive	EH	EFI	S/P	/	GR-1 CB- ST-	/	2VF TU	VS	8.6	
												GR- CB- ST-	/		~~VS~~		
												GR- CB- ST-					
												GR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	25	0	>8 Feet

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	~~Argillic~~ / Calcic	10-30

FS 2509.1 (2/86)

USDA - Forest Service

SOIL DESCRIPTION (Reference FSH 2509.18) Photos. 39-40-41 UTM 4130048

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
4	Typic Arginstoll mixed, super, mesic Fi-Loamy ~~Typic Argiborolls~~	9/14/06	BC	39, 40	WRD-19	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
Coal Hollow Soil Survey	Weather Station to East & 9/17/06		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
Colluvium / Residuum	Dakota Formation	700	a. Kind None b. Class

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
Fanslope	a. % 5 b. Shape convex c. Length 250' d. Aspect 260'	WD → SPD	a. GR 0 b. CB 0 c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Big Sagebrush - Rabbitbrush Scattered Juniper	15-17"		None

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	%	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-6	10YR 3/2	10YR 5/2	/	Loam SCL	24 27	2M GR	SO	FR	SS/PS	/	GR - 0 CB - 0 ST - 0	3VF 1F, M 1C	3VF IN	SE	8.0	C, S
Bt1	6-12	10YR 4/2	10YR 5/3	/	Clay Loam SCL	32 29	2M-F SBK	HA	FI	SS/PS	1 Apo	GR - 0 CB - 0 ST - 0	1VF-F	1VF-1F TU	SE	8.2	C, W
Bt2	12-24	10YR 4/4	10YR 6/3	/	Clay Loam SCL	30 32	2F-M SBK	VH	VFI	S/P	2 MKPF 1 Apo	GR - 0 CB - 0 ST - 0	1VF-F	1VF-1F TU	4VFCAM ~~SE~~ ST	8.3	C, W
Bt3	24-37	10YR 4/3	10YR 6/3	/	Loam CL	22 34	3F-M SBK	HA	VFI	S/P	1 n pf/po	GR - 0 CB - 0 ST - 0	1F	1VF-1F TU	8FCAM ~~SE~~ ST	8.5	C, W
Bk1	37-51	10YR 4/4	10YR 6/4	/	Fine SL	14 19	2M-C SBK	HA	VFI	SS/PO	/	GR - 0 CB - 0 ST - 0	1F, 1M	1VF TU	ST ~~SE~~ 4FCAM	8.4	C, S
Bk2	51-68	10YR 5/4	10YR 6/3	/	Sandy Loam	12 17	MA	HA	FI	SO/PO	/	GR - 0 CB - 0 ST - 0	1F, 1M	2VF 1F TU	VE ~~SE~~ 6FCAM	8.5	C, W
Bk3	68-90	10YR 5/4	7.5YR 6/4		Sandy Loam	10	MA	LO	LO	SO/PO	/	GR - CB - ST -	/	3VF IN	ST 6FCAM	8.7	
												GR - CB - ST -					
												GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	12-32"	31	0	> 6 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	Argillic calcic	1030"

FS 2509.1 (2/06)

USDA - Forest Service Co-loamy, Aridic Calciustoll Mollic Usteflvent

SOIL DESCRIPTION

(Refer to FSH 2509.18) 44-46 K UTM 037990 4140910

1. Map Unit Symbol	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. T. R.
8	Co-loamy, mix, super, mesic	9-17-06	BC	6-7 (P)	WPD 20	[illegible]	

9. Area	10. Forest	11. Ranger District	12. State	13. County
WHITE RIVER SIMULATION OAK HOLDING SITE	Sanpete	1 MI. NW. LANDS 2 MI SE OF ALTON	UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
Colluvium	Mixed - sedimentary	70	None	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
Alluvial Fansloped	3	convex	75'	190°	WD				

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Oak - Snowberry w/ [illegible] Pinyon Juniper	17-19		> 6 ft

HORIZON DESIGNATION (a)	DEPTH (b) (Inches)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) LAB % C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i) LAB	BOUNDARY (j)
A	0-6	10YR 3/3	10YR 5/3	/	LOAM 24	2M-F GR	SO	FR	SS PS		GR - CB - ST -	3-F 2F 2M, C	3VF IN	SE	7.9	C, S
Bw	6-13	10YR 4/4	10YR 6/4	/	CL 30 CLAY LOAM 22	2M-F SBK	HR	FI	SS PS	/	GR TR CB [illegible] ST O	2M-C 2F 1VF	2VF-1F TU	SE	7.8	C, S
BK	13-28	10YR 5/4	10YR 6/3	/	SANDY LOAM CL 10 17	3M-C SBK	VH	FI	SO PO	/	GR - CB - ST -	2M-C 1F, VF	1VF-1F TU	ST	8.1	A, S
CK 2C	28-54	10YR 5/4	10YR 7/4	/	LOAMY SAND LS 7 12	1CSBK → SG	SO	VFR	SO PO	—	GR 10 CB 37 ST -	2VF 1F, M 1C	1VF TU	ST	8.0	A, S
3C1	54-72	7.5YR 5/6	7.5YR 6/4	/	LOAM CL 26 31	MASSIVE	SH	FI	SS PS	/	GR O CB - ST -	1F-M	1VF-1F TH	ST	8.1	C, bd
OE	3-1½	OAK LEAVES TWIGS, BRANCHES									GR - CB - ST -					
O1	7½-0	SLIGHTLY DECOMPOSED LITTER FOREST									GR - CB - ST -					
3C2	72-96	10YR 4/3	10YR 6/3	/	LOAMY SAND 5	MASSIVE	LO	LO	SO/PO	/	GR - CB - ST -	1VF	1VF IN	SE	8.2	
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	13	0-2%	> 96 inches

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Ochric	~~Argillic~~ Calcic	10-30"

Previous edition Obsolete

+ Lense of Gravelly Alluvium 35-40"

FS 2500-1 (2/86)

USDA - Forest

Aridic Calcinstept ~~Mollic~~ USTIFLUVENT

SOIL DESCRIPTION (Refer: 2509.18) 47-48 (K)

UTM 4140354

1. Map Unit Symbol	2. Family or Series	3. Date	By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location:
8	~~Fr-loamy~~ mix, super, mesic ~~HAPLUSTALF.~~	9-18-06	BC	8-9 (P)	WRD-21	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
Waste Rock Dump			UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
Alluvium	Mixed sedimentary	70	None	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock a. GR	b. CB	c. ST	d. BY
Fanscape	2	Planar	100'	191°	WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Big sagebrush opening in oak grove	17-18"		None

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) LAB	%	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
A	0-8	7.5YR 4/4	7.5YR 6/4	/	Sandy clay	28 19	2m-c SBK→PL	So	VFR	So Po	/	CR-0 CB-0 ST-0	3VF 2F,M 1C	2VF-2F IN	VS→ EO	8.4	C,S
BwK1	8-18	7.5YR 4/3	7.5YR 6/3	/	Sandy clay SiCL	38 28	2m-F SBK	VHA	VFI	S PS	/	CR-0 CB-0 ST-0	2VF-F 1M,C	1VF-F, 1M TU	ST	8.1	C,W
BwK2	18-36	7.5YR 4/4	7.5YR 6/3	/	Sandy loam SCL	21	2M-F SBK	SH	FI	SS PS	/	CR-5 CB-1 ST-0	1M,F 2VF	1VF TU	ST	8.4	C,W
K Bw3	36-50	7.5YR 5/4	7.5YR 6/3	/	SL	8 16	3 m-c SBK	SH	VFR	SO PO	/	CR-0 CB-Tr ST-0	1VF	1VF TU	SE	8.7	C,S
2C1	50-62	10YR 4/4	10YR 6/3	1F /	SL	8 14	Massive	HA	FI	SO PO	/	CR-0 CB-0 ST-0	/	1VF-F TU	SE	8.7	C,S
2C2	62-46+	10YR 5/4	10YR 7/3	2 common distinct 7.5YR 4/6	Loamy sand	12 6	SG	LO	LO	SO PO	/	CR- CB- ST-	/	3VF 1F TU	SE	8.7	C,W
												CR- CB- ST-					
												CR- CB- ST-					
												CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	8-18	15	2	>8 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHIC	~~ARGILLIC~~ Calcic CAMBIC	10-30"

USDA - P...

SOIL DESCRIPTION

(Refer... 11 2509.18)

WRD-22 UTM

0372353...
4142382

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
8	mixed, super, mesic FILLOAMY TYPIC HAPLUSTALF	9-14-06	BC	36-37	WRD-22	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
GOAL HOLLOW SOIL SURVEY	~ 2½ mi SE OF ALTON		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
COLLUVIUM OVER RESIDUUM	TROPIC / DAKOTA RESIDUUM		a. Kind NONE b. Class

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
TOESLOPE	a. % 8 b. Shape CONVEX c. Length 75 d. Aspect 220°	WD	a. GR 0 b. CB 0 c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
OAK, SNOWBERRY, GRASSES, FORBS			7 FEET

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) LAB	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i) LAB	BOUNDARY (j)
OE	7-4	OAK LEAVES, DUFF, TWIGS									GR - CB - ST -					
O1	4-0	PARTIALLY DECOMPOSED OAK LEAF LITTER									GR - CB - ST -					A, S
A	0-6	10YR 5/4	10YR 6/3	/	SANDY CLAY SIL 14	2M-F SBK	SH	VFR	SO/PO	/	GR - 0 CB - 0 ST - 0	2M 2F 1VF	1VF-F 1N	SE	7.7	A, S
Bt1	6-15	10YR 4/3	10YR 6/4	/	SILTY CLAY SICL 34	2M-C SBK	HA	FI	S/P	1MKPF	GR - 0 CB - 0 ST - 0	2M 2F 1C 1VF	1VF-F TU	SE	7.7	C, S
Btk	15-28	10YR 4/4	10YR 6/4	FEW FAINT ROOT CHANNELS	SANDY CLAY SICL 26	2M-F SBK	HA	FI	SS/PS	2MPO	GR - 0 CB - 0 ST - 0	1F 1M 1C	1VF TU	SE	8.0	C, S
Bk1	28-48	10YR 5/4	10YR 7/4	FEW PROMIN	SANDY LOAM 14	3M-C SBK	HA	FI	SO/PO	/	GR - 0 CB - 0 ST - 0	1F 1M 1C	1VF-F TU	SE	8.0	C, W
Bk2	48-60	10YR 5/4	10YR 6/3	COMMON PROMINENT	SANDY LOAM 14	MASSIVE	SH	FR	SO/PO	/	GR - 0 CB - 0 ST -	1M 1F 1C	2VF TU	SE	8.0	C, W
2C3	60-84	10YR 5/4	10YR 7/3	MANY PROMINENT	SANDY LOAM 8	MASSIVE	SH	FR	SO/PO	/	GR - CB - ST -	1VF-F 1M, C	3VF 1N	SE	8.2	
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	6-28	25	0	84" +

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	ARGILLIC	10-30"

** Redox mottles not present in box sample. **

SOIL DESCRIPTION

USDA - Forest Service

Aridic ~~Pyric~~ Calciustoll (Reference 11 2509.18) 42, 43 Kodak

DTM 41405

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
#4	FINE-LOAMY mix, super, mesic ARGIUSTOLL	9-17-06	BC	45 (P)	WRD-23	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW SOIL SURVEY	NE EDGE OF SURVEY AREA		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
SEDIMENTARY	MIXED COLLUVIUM		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
FANSLOPE	3	CONCAVE	130	200	WD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
BIG SAGEBRUSH, SCATTERED JUNIPER, GRASSES	15-17"		NONE

HORIZON DESIGNATION (a)	DEPTH (b) INCHES	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) LAB	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i) LAB	BOUNDARY (j)
A	0-6	10YR 3/2	10YR 5/2	/	CLAY LOAM SIL 31	2MGR	SO	FR	SO PO	/	GR - CB - ST -	3VF 2F, M 1C	3VF IN	SE	7.7	C, S
AB	6-12	10YR 4/3	10YR 6/4	/	SICL 31 27	3M-F SBK	HA	FI	S PS	/	GR - CB - ST -	2VF 1F 1M, C	2VF IN 1F TU	SE	7.9	C, W
BK1	12-22	10YR 5/4	10YR 6/3	/	CLAY LOAM CL 28 30	2F SBK	HA	FI	S PS	/	GR - CB - ST -	2VF 1F, M	3VF-1F TU	ST	7.9	C, S
BK2	22-40	10YR 5/4	10YR 6/3	1 FAINT 10YR 4/6	LOAM SCL 19 20	2M-C SBK	HA	VFI	SS PO	/	GR - CB - ST -	1VF-1F	1VF-F TU	ST	8.0	C, W
CK	40-62	7.5YR 5/4 7.5	10YR 7/4	7 FAN- 10YR 4/6	LOAM SCL 25 22	2M-C SBK	HA	VFI	SS PS	/	GR - CB - ST -	/	2VF TU	ST	8.2	GW
2C2	62+80	7.5YR 5/4 7.5YR 6/8	7.5YR 7/3 7.5YR 6/4	3 PAM. 7.5YR 4/4	SILTY CLAY 41	MASSIVE AUGERED	VH	VFI	S/P	/	GR - CB - ST -	/	2VF TU	ST	8.1	
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	6-22	28	0	> 8 FEET

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC	ARGILLIC, CALCIC	10-30"

USDA - Forest Service

SOIL DESCRIPTION (Ref FSH 2509.18)

DAH-24 UTM 4139690

Aridic (Lithic) Ustorthent

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
SA 5	Fine, mixed, super, mesic	9-13-06	BC	28-29	DAH-24	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW SURVEY	MODERATELY DEEP		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
COLLUVIUM / RESIDUUM	DAKOTA FM / UP TRIASSIC	68	NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
HILLSLOPE	13	CONVEX	50'	20°	PD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
PINYON-JUNIPER W/ BLACK SAGEBRUSH	15-17"		NONE

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	COLOR (c) Dry (2)	Mottling (3)	LAB TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	Cutans (1)	SPECIAL FEATURES (g) % of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB/FIELD pH (i)	BOUNDARY (j)
A	0-5	2.5Y 4/2	2.5Y 4/3	/	CLAY 41	1FSBK → MGR	SO	VFR	S/VP	/	CR-0 CB-0 ST-0	2VF 1F,M,C	2VF-1F IN	NE	7.6	C,W
Bw1 B1	5-17	2.5Y 4/3	2.5Y 4/2	/	CLAY 44	2M-F SBK	EH	EF	VS/VP	/	CR- CB- ST-	1VF 1F	1VF TU	NE	7.7	C,W
Bw2 C2	17-32	5Y 5/3	5Y 5/4 5Y 6/2	/	CLAY 45	3C-M ABK	EH	EF	VS/VP	/	CR- CB- ST-	1VF	1VF TU	NE	8.1	A,W
Cr	32-60	GREY SHALE / SANDSTONE BEDROCK									CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					
											CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-32	50+	0	32" TO SOFT SHALE

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	—	10-32"

SOIL DESCRIPTION (Refer FSH 2509.18) LABORATORY 31 PTY 413952

USDA - Forest Ke

fine mx super Aridic ~~Calciustept~~

1. Map Unit Symbol	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. T R
~~56~~ 5	~~CLAY SKEL~~ mesic ~~TYPIC~~ ~~USTOCHREPT~~	9/13/06	BC	30	DAH-25	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
CORAL HOLLOW SOIL SURVEY	MODERATELY DEEP		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
RESIDUUM	DAKOTA FM - HARD SANDSTONE	69	SLIGHT SHEET	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
HILLSIDE	19	CONVEX	50'	140°	SPD	20	15	2	TR

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
PINYON-JUNIPER WITH FEW SAGEBRUSH	15-17"		NONE

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	LAB TEXTURE (d)	%	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	LAB FIELD pH (i)	BOUNDARY (j)
O1	1/2-0	NEEDLES, DISCONTINUOUS		~~NONE~~			~~2F SBK~~	~~HA~~	~~FI~~	S/P	—	CR-25 CB-15 ST-0	VVF 4F 2M,VC		NE		
A	0-5	7.5YR 3/3 7.5YR 4/4	7.5YR 5/2 7.5YR 6/4	NONE	CLAY	40	2M-F SBK	HA	FI	S/P	—	CR-15 CB-15 ST-0	1F 1M 1C	2VF IN 1F TU	NE	~~6.4~~	C,S
BK1 C1	5-13	7.5YR 4/2	7.5YR 5/2	NONE	CLAY	47	2M SBK	HA	FI	VS/VP	—	CR-20 CB-10 ST-0	1VF,F 1M	1VF-F TU	NE	7.0	C,W
BK2 C2	13-20	10YR 3/4 7.5YR 5/6	10YR 4/3	NONE	SANDY CLAY	46	2M SBK	HA	FI	VS/VP	—	CR-0 CB-10 ST-10	1VF	1VF TU	NE	7.2	G,W
C3	20-32	10YR 4/4	10YR 5/4	/	SANDY CLAY	33	3M-F ABK	VH	FI	VS/VP	—	CR- CB- ST-	1VF	2VF TU	SE	7.7	G,S
R	32+	HARD SANDSTONE BEDROCK										CR- CB- ST-					
												CR- CB- ST-					
												CR- CB- ST-					
												CR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-32"	45	>35%	32" HARD SANDSTONE

28 Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	—	10-30"

FS 2509.18 (2/86)

BK based on lab data - but no effervescence in box sample

USDA - FSA - NRCS

SOIL DESCRIPTION

(Alternate to FS 2509.10)

Aquic Calciustoll 0371545 4190492

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. T. R.
~~2~~ 1	mixed, super, frigid FINE ~~SMECTITIC~~ TYPIC HAPLUSTOLL	9-15-05	BC		26		

9. Area	10. Forest	11. Ranger District	12. State	13. County
			UT	Kane

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
Alluvium	Tropic Shale			

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
Fan	2	Convex	125	260	SPD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
JUNIPER w/SAGEBRUSH	15-16		

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	COLOR (c) Dry (2)	COLOR (c) Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	CONSISTENCE (f) Moist (2)	CONSISTENCE (f) Wet (3)	SPECIAL FEATURES (h) Cutans (1)	SPECIAL FEATURES (h) % of Rock Fragments (2)	SPECIAL FEATURES (h) Roots (3)	SPECIAL FEATURES (h) Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-8	10YR 3/3	10YR 5/3	/	SiCL	1MPL → FGR	SO	FR	SS/PO	/	GR: CB: ST:	2VF 1F M	3VF IN	SE		CS
Bw C1	8-20	2.5Y 4/3	2.5Y 6/3	/	SiCL	2c-M ABK	HA	VFI	VS/VP	/	GR: CB: ST:	1F, M 1VF	1VF-F TU	SE		CS
Bwk C2	20-50	2.5Y 4/3	2.5Y 6/2	2fm 7.5YR 6/6	SiC	3m MSBK	EH	VFI	VS/VP	/	GR: CB: ST:	1VF 1F	1VF-F TU	SE		CS
Bwk C3	50-80	2.5Y 5/2 10YR 6/6	2.5Y 6/3 (80) 10YR 7/6 (20)	2f 7.5YR 6/6	SiC	3m MSBK	EH	VFI	VS/VP	/	GR: CB: ST:	/	1VF TU	SE		CS
2BK1 2C4	80-105	2.5Y 5/2	2.5Y 6/2	1f 7.5YR 6/6	CL			EFI	VS/VP	/	GR: CB: ST:	/	2VF TU			
2BK2 2C5	105-125	10YR 5/3 10YR 5/6	10YR 6/3 10YR 6/6	3fm 7.5YR 6/6	LOAM			FR	SS/PS	/	GR: CB: ST:	/	2VF IN 1F TU			
											GR: CB: ST:					
											GR: CB: ST:					
											GR: CB: ST:					

28. Particle Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	>35	3	>125"

26. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	MOLLIC	CALCIC	10-30"

Previous edition Note:

FS 2500-1 (2/86)

USDA - Forest Service

Aridic ~~[illegible]~~ ~~[illegible]~~ (or ~~[illegible]~~) Ustalthent

SOIL DESCRIPTION

(Refer FSH 2509.18)

0371387 4140122

1. Map Unit	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
1	mixed, super, mesic Fine ~~Smectitic~~ ~~[illegible]~~	11/3/04	BC		27		Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
Apple Road Coal Hollow Soil	Survey		Utah	Kane

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
Alluvium	Backhoe Pit		a. Kind None b. Class

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
Seldom - Furrowed Concave Mid Fan Slope	a. % 3 b. Shape Concave c. Length 250' d. Aspect 270°	WD	a. GR 0 b. CB 0 c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Sagebrush - Rabbitbrush Grasses			None

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-8	10YR 4/2	10YR 5/2	/	SiCL	2M-F SBK	HA	FI	SS/PS	/	GR: 0 CB: 0 ST: 0	1VF, 2F, 2M	2VF IN 2F TU	SE		G, S
BW	8-17	2.5Y 5/3	2.5Y 6/2	/	CL	2M-SBK	VH	VFI	S/VP	/	GR: 0 CB: 0 ST: 0	1VF 1M 2F	1VF-F TU	SE		G, W
BWK	17-38	2.5Y 4/3	2.5Y 6/3	/	CLSY	2C-M ABK	VH	EFI	VS/VP	/	GR: 0 CB: 0 ST: 0	1F 1M 1VF	1VF TU	ST		G, S
BWK	38-65	2.5Y 5/3	2.5Y 6/2	/	CLSY	3CPR → [illegible]	VH	EFI	VS/VP	/	GR: 0 CB: 0 ST: 0	1VF, F 1M	1VF TU	ST		C, S
2BK1	65-90	10YR 5/3 10YR 5/6	10YR 6/2 10YR 6/4	(70) (30)	LOM	MASSIVE	HA	VFI	SS/P	/	GR: 0 CB: 0 ST: 0	1VF	2VF-1F TU	ST		A, S
2BK2	90-115	10YR 5/4	10YR 7/3	FEW FAINT	LS	MASSIVE	HA	FR	SO/PO	/	GR: 0 CB: 0 ST: 0	/	3VF IN	SE		Mottled Moist
3BK3	115-140	7.5YR 5/4	7.5YR 6/4	35% DISTINCT	LFS	SG	SH	FR	SO/PO		GR: 0 CB: 0 ST: 0	/	3VF IN	SE		Mottled Moist
		5YR		YES							GR: CB: ST:			VE		
											GR: CB: ST:					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	>35	0	>140"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Ochric	Calcic	10-30"

Previous edition Note.

FS 2500-1 (2/86)

USDA - Forest Service

SOIL DESCRIPTION

(Reference 509.18) UTM 0371447 4140522 (1560) (0212)

Aridic Calciustept

1. Map Unit Symbol	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
11	Fine mixed, super, mesic Typic Ustorthent	11/15/06	BC		28		Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
[illegible]	Bacuhoe		UT	Kane

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
[illegible]	Tropic Shale		a. Kind None b. Class

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
Pinhole	a. % 5 b. Shape Concave c. Length 300 d. Aspect 200	SPO	a. GR 0 b. CB 0 c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Grass - Rabbitbrush (Seeded)	15-16		None

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-8	10YR 4/2	2.5Y 5/3	/	SiC	2m-f GR	HA	FI	S/P	/	GR 0 CB 0 ST 0	2VF 1F	2VF IN 1F TU	ST		C,S
BW C1	8-24	2.5Y 5/2	2.5Y 6/1	/	CLAY	2m-c SBK	VH	VFI	VS/VP	/	GR 0 CB 0 ST 0	1VF 1F	1VF-F TU	ST		C,W
BWK C2	24-48	2.5Y 5/3	2.5Y 6/1	/	CLAY	3c PR → 3 ABK	VH	VFI	VS/VP	/	GR 2 CB 0 ST 0	/	1VF-F TU	2fCAM ST		G,W
BK1 C3	48-72	2.5Y 5/3	2.5Y 6/2	/	SiC	MASSIVE	VH	VFI	VS/VP	/	GR 3 CB 0 ST 0	/	1VF TU	2fmCAM ST		
BK2 C4	72-102	2.5Y 5/2	2.5Y 6/2		SiC	MASSIVE	EH	EFI	VS/VP	/	GR CB ST		1VF TU	1fm CAM ST		
											GR CB ST					
											GR CB ST					
											GR CB ST					
											GR CB ST					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	>35"	2	>100"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Ochric	Calcic	10-30"

Previous edition [illegible] Note.

FS 2500-1 (2/86)

USDA - Forest Service

SOIL DESCRIPTION

(Refer to FSH 2509.18) 0371280 4140210

Aridic Calciustoll

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
9	Fine ~~Smectitic~~ ~~Mixed~~ Mixed Super Haplustoll	11/15/86	DC	2F173	29		

9. Area	10. Forest	11. Ranger District	12. State	13. County
Colorado Plateau Hosp Rock	Bachhoe Pit		UT	Wayne

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
Alluvium	Mancos Shale		Sheet	Sheet

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
Hillslope	2	Convex	70'	290°	SPD	0			

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
PJ w/ Sagebrush			None

HORIZON DESIGNATION (a)	DEPTH (inches) (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (k) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-6	10YR 3/4	10YR 5/3	/	LOAM 27	2MF SBK		FR	SS/PL	/	GR CB ST	2VF IN 2F TU	2F IN 1VF	2E		
A2	6-12	10YR 4/3	10YR 6/3	/	LOAM 29			FI	SS/PS	/	GR CB ST	2VF IN 1F TU	2F 2M 2VF	2E		C,S
BwK1 C1	12-36	2.5Y 5/3	2.5Y 6/2	/	SiC 39	3MPR		VFI	VS/VP	/	GR CB ST	1VF-F TU	1VF 1F	3-5% fCAM		CW
BwK2 C2	36-60	2.5Y 5/2	2.5Y 7/2	/	SiC 42			VFI	VS/VP	/	GR CB ST	1F TU	VVF	5-8% fmCAM		CW
C3 BK1	60-115	2.5Y 5/2 10YR 5/3	2.5Y 6/3 10YR 6/4	(60) 10YR 6/4 (40) mottles	CLAY 44	MASSIVE		VFI	VS/VP	/	GR CB ST	1VF TU	/	5-8 fmCAM		
BK2 C4	115-138	2.5Y 5/1 2.5Y 5/3	2.5Y 6/2 2.5Y 6/1	10YR 6/4 gcm mottles	CLAY 45			EFI	VS/VP	/	GR CB ST	1VF-F TU	/	ST		
											GR CB ST					
											GR CB ST					
											GR CB ST					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	>35"	3%	>138"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	Calcic	10-30"

Previous edition obsolete.

FS 2500-1 (2/86)

USDA - Forest Service

Aridic Calciustept

SOIL DESCRIPTION

(Refer to FSH 2509.18)

Canon Digital 4440 (0522) 0371566 4140212

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
1	mixed ~~Type~~ Super, mesic	11-15-06	BC	1 PIT LANDSCAPE	30		

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW KAIBAB ROAD			UT	LEANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM	TRAPIC SHALE		NONE	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
FAN LANDSCAPE	4	PLANAR	150	280	SPD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
SAGEBRUSH GRASSES (SEEDED)	16-17"		NONE

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-6	2.5Y 4/3	2.5Y 5/2	/	SiC 32	2MF SBK	SO	FR	SS/PS	/	GR - 0 CB - 0 ST - 0	1VF 1F	3VF IN 1F TN	SE		C,S
AC	6-12	2.5Y 4/2	2.5Y 6/2	/	CLAY 42	3MC SBK	HA	FI	VS/VP	/	GR - 0 CB - 0 ST - 0	1VF 1F	1VF-F TN	SE		C,W
BW	12-36	10YR 4/3	10YR 6/3	/	CLAY 43	[illegible]	VH	VFI	VS/VP	/	GR - 0 CB - 0 ST - 0	VL VF	1VF-F TN	SE		G,W
BWK1 CK1	36-60	10YR 5/3	2.5Y 6/1	6f 10YR 7/6 /	CLAY 43	[illegible]	VH	EFI	VS/VP	/	GR - TR CB - 0 ST - 0	/	1VF TN	4f CAM ST		G,W
BWK2 CK2	60-105	10YR 5/3	10YR 6/2	CARBONATE 12f m NODULES 10YR 7/6	SiC 40	[illegible]	EH	EFI	VS/VP	/	GR - 2 CB - 0 ST - 0	/	1VF TN	4f CAM ST		G,W
C	105-120	AUGERED		20f m NOT IN 10YR 7/6	BOX					/	GR - 4 CB - 0 ST - 0	/		VE		
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	>40"	2	>120"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	OCHRIC	CALCIC	10-30"

FS 2500-1 (2/86)

Previous edition [illegible] Date.

FLUVENTIC HAPLUSTOLL (Reference FSH 2509.18)

1. Map Unit Sy: 3	2. Family or Series: FINE-LOAMY ARGIUSTOLL	3. Date: 11/14/	By: BC	5. Photo. No.	6. Stop No. 3	7. USGS Quad	8. Location: Sec ___ T ___ R ___	
9. Area: HAWK CREEK	10. Forest: mix, super, mesic	11. Range District					12. State	13. County
14. Parent Material: Alluvium	15. Bedrock Name: Mixed Alluvium	16. Elevation		17. Erosion: a. Kind: Moderate	b. Class			
18. Landform: Floodplain Terrace	19. Slope: a. % 1 b. Shape: Convex c. Length: 50' d. Aspect: 270°	20. Drainage Class: WD		21. Surface Stone and Rock: a. GR ___ b. CB ___ c. ST ___ d. BY ___				
22. Potential Natural Vegetation: Aspen, Douglas Fir, Ponderosa Pine, Snowberry, Chokecherry, Bluebunch Wheatgrass		23. Annual Precipitation		24. Measured Soil Temperature		25. Water Table (Depth): None		

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-7	10YR 3/3	10YR 4/2		SiCL	GR	SO	FR	SS/PS		CR 0 CB 0 ST 0	3vf M	3vf IN	NE		CS
BW1	7-17	10YR 4/4	10YR 6/4		SiCL	SBK	SH	FI	SS/P	70CLF PF/PO	CR 0 CB 0 ST 0	2vf 3f IN	2vf-f TU	SE		CS
BW2	17-38	7.5YR 4/3	7.5YR 5/3		SiCL	SBK	SH	FI	SS/P	50CLF PF/PO	CR 0 CB 0 ST 0	1vf 1f IN	1vf-f TU	ST		CW
BK2	38-52	2.5Y 5/3	2.5Y 6/2		SiCL	MA		EFI	VS/VP	70CL PF/PO	CR 0 CB 0 ST 0	1f 1vf	1vf-f TU	ST		AS
2C	52-75	10YR 5/3	10YR 7/3		SiCL	MASSIVE	SH	VFI	SS/PO		CR 0 CB 0 ST 0	1vf 1f	2vf 1f TU	VE		AS
2Ab	75-90	7.5YR 5/4	7.5YR 7/4		SiCL	SG	LO	LO	SO/PO		CR 0 CB 0 ST 0	1f 1vf	3vf IN	SE		AS
2Bg	90-100	NOT	SAMPLED		SiCL	SG	LO	LO	SO/PO		CR 0 CB 0 ST 0			SE		
											CR CB ST					
											CR CB ST					
											CR CB ST					

26. Partial Size Control Section: a. Depth: 17-37" b. Average Clay %: 18-35 c. Average Rock Fragment Content: 0

27. Depth to Lithic or Paralithic Contact: >90"

28. Diagnostic Horizons: a. Surface: MOLLIC (w/ MIXING) b. Subsurface: CALCIC

29. Moist Control Section Depth: 10-30

USDA Forest

SOIL DESCRIPTION

(Reference: FSH 2509.18)

Calcidic Argiustoll — Typic Calciustoll

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
B1	Fine loamy mix superactive mesic	11/14/00	BL		32		

9. Area	10. Forest	11. Ranger District	12. State	13. County
Sunday			UT	Kane

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
Alluvium	Alluvium-Mixed			

18. Landform	19. Slope: a. % 2 b. Shape convex c. Length 150' d. Aspect 280	20. Drainage Class	21. Surface Stone and Rock: a. GR 0 b. CB 0 c. ST 0 d. BY 0
Alluvial Fan		VWD	

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Fallow Field, Mid-Lost Aspen			None, moist sand @ 10 ft

HORIZON DESIGNATION (a)	DEPTH (b) (inches)	COLOR (c) Moist (1)	COLOR (c) Dry (2)	COLOR (c) Mottling (3)	TEXTURE (d)	% Rock Frag.	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	CONSISTENCE (f) Moist (2)	CONSISTENCE (f) Wet (3)	SPECIAL FEATURES (g) Cutans (1)	SPECIAL FEATURES (g) % of Rock Fragments (2)	SPECIAL FEATURES (g) Roots (3)	SPECIAL FEATURES (g) Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-8	10YR 3/2	10YR 5/3		Loam	24	2M-F GR	SO	FR	SS/PS		CR 0 CB 0 ST 0	2VF 1VF 1M	3VF IN 1F TU	NE		C,S
†	8-17	10YR 4/3	10YR 6/3		Clay Loam	31	2F M SBK	HA	F1	S/PS	2MK PF	CR 0 CB 0 ST 0	1F 1VF	1VF-F TU			C,W
†K1	17-31	10YR 4/4	10YR 6/4		Clay Loam	34	2M MK	VH	VF1	S/PS	2MK PF	CR 0 CB 0 ST 0	1VF	1VF-F TU			C,W
B1	31-54	7.5YR 4/3	7.5YR 6/4		SiC	34	3CM MK	EH	EF1	VS/VP	1MPF	CR 0 CB 0 ST 0	1F	1VF-F TU			C,S
K3	54-72	7.5YR 5/3 7.5YR 5/2	7.5YR 7/2 7.5YR 6/4	(70) (30)	Loam	23	3CM SBK	EH	VF1	S/P		CR 0 CB 0 ST 0		1VF-F TU			A,S
C1	72-90	7.5YR 5/3	7.5YR 7/4		SiL	18	MSG MK	HA	FR	SS/PO		CR 0 CB 0 ST 0		1VF-F TU			A,S
2C1	90-115	2.5Y 4/3	2.5Y 6/3	Bright Tan	SiC	43	MSG MK	LO	EF	S/P		CR 0 CB 0 ST 0		1VF TU	VF		A,S
2C2	115-142	7.5YR 5/4	7.5YR 7/3	7.5YR 5/6	Coarse Sand	6	SG	LO	LO	SO/PO		CR 0 CB 0 ST 0		3VF IN	MR		Abrupt Smooth
												CR CB ST					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	33	0	>140"

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	Calcic	10-30"

USDA - Forest Service

SOIL DESCRIPTION

(Reference FSM 2509.18)

Aridic Calciustell

UTM 0271150 4140241

1. Map Unit Sym.	2. Family or Series	3. Date	By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
1	mixed ~~[illegible]~~ super, mesic	11/15/[illegible]	BC		33		

9. Area	10. Forest	11. Ranger District	12. State	13. County
[illegible]			UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind ___ b. Class ___
[illegible]	[illegible]		

18. Landform	19. Slope: a. % 2 b. Shape PLANAR c. Length 200 d. Aspect 280	20. Drainage Class	21. Surface Stone and Rock: a. GR 0 b. CB 0 c. ST 0 d. BY 0
FINSLOPE		[illegible]	

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
FALLOWED FIELD IN NE CORNER	15-16		[illegible]

HORIZON DESIGNATION (a)	DEPTH (b) inches	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-10	7.5YR 3/3	7.5YR 5/3		[illegible]	2M-C [illegible]	SH	FR	SS/PS		GR 0 CB 0 ST 0	3VF 1F, 1M	3VF 1N 1F TU	[illegible]		C.W
BW	10-24	10YR 4/2	10YR 6/3		[illegible]	3M-C [illegible]	[illegible]	FI	VS/VP		GR 0 CB 0 ST 0	2VF 1F, 1M	2VF-2F TU			G.W
FWK	24-48	2.5Y 4/3	2.5Y 6/3		[illegible]	3C-M [illegible]	VH	EFI	VS/VP		GR 0 CB 0 ST 0	1VF 1F	1VF-F TU	ST		G.W
BK1	48-70	2.5Y 5/4 7.5Y 5/4	2.5Y 6/2 7.5YR 6/3	(80) (20)	[illegible]	[illegible]	[illegible]	VFI	VS/VP		GR 0 CB 0 ST 0		1VF TU	[illegible]		G.W
BK2	70-100	2.5Y 5/3	2.5Y 6/3	CARBONATE CONCENTRATIONS	[illegible]	[illegible]	[illegible]	EFI	VS/VP		GR 0 CB 0 ST 0		1VF TU	[illegible]		
											GR CB ST					
											GR CB ST					
											GR CB ST					
											GR CB ST					

26. Partical Size Control Section	a. Depth: 10-40"	b. Average Clay %: 39	c. Average Rock Fragment Content: 0	27. Depth to Lithic or Paralithic Contact: 70 INCHES
28. Diagnostic Horizons	a. Surface: MOLLIC	b. Subsurface: CALCIC		29. Moist Control Section Depth: 10-30"

Previous edition [illegible] Date.

FS 2500-1 (2/86)

USDA - Forest S[illegible]

SOIL DESCRIPTION

(Reference [illegible] 2509.18)

fine-loamy, mx, super mesic Aridic Calciustoll

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
4	~~[illegible]~~ ~~[illegible]~~ FINE-LOAMY, MIXED	3/7/07	BC		34	ALTON	Sec. ____ T. ____ R. ____

9. Area	10. Forest	11. Ranger District	12. State	13. County
Coal Hollow	(CALC) VIDEO		UT	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
Alluvium + Residuum	Tropic Shale w/ Mixed Alluvium		a. Kind None b. Class ____

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
Fanslope	a. % 2 b. Shape Slightly Convex c. Length 150' d. Aspect ____	WD	a. GR 0 b. CB 0 c. ST Tr d. BY ____

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Disked Field Pubbitbrush Sagebrush	16-18"		

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-4	10YR 3/3	10YR 5/3	/	SiL	24	2M-F SBK	SO	VFR	SS/PO	/	GR - / CB - / ST -	3VF 2F		NE	7.6	C.W
BW	9-17	10YR 4/3	10YR 6/3	/	SiL	27	2M SBK	SH	FR	SS/PO	/	GR - 0 CB - 0 ST - 0	2VF 1F		ST	7.4	C.S
BK1	17-27	10YR 5/4	10YR 7/3	/	SiL	26	2M-C SBK	HA	VFI	SS/PO	/	GR - 0 CB - 0 ST - 0	1VF, F		ST 5F CAM	8.2	C.S.
BK2	27-45	10YR 5/3	10YR 6/3	/	SL	14	2C SBK	HA	VFI	SO/PO	/	GR - 2 CB - 0 ST - 0	1VF		10 fm CAM ST	8.5	G.W
2BK	45-[illegible]	10YR 5/3	10YR 7/3	/	LS	3	MASSIVE	SH	V	SH/PO	/	GR - 3 CB - 2 ST - 0	1VF		15 fm CAM NE	8.6	
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
		19	7-15%	>60

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	CAMBIC	10-30

Previous edition [illegible]ete.

FS-2500-1 (2/8[illegible])

EXISTING VEGETATION

30. (Species) TREES (% Crown Cover)	31. (Species) SHRUBS (% Crown Cover)	32. (Species) FORBS (% Crown Cover)	33. (Species) GRASSES (% Crown Cover)

34. Additional Notes ***(Use and Management):***

LAB CHARACTERIZED TOP 5 SAMPLES

SOIL MICRO MONOLITHS BOX TAKEN

R 1 MINING DISTURBANCE

USDA - Forest Service

Aridic Calciustoll

SOIL DESCRIPTION

(Reference FSH 2509.18)

WITHIN OLD CORRAL HIGH SAGEBRUSH

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
[illegible]	fine-loamy, mix, super, mesic	3-7-07	BC		35	DITON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
[illegible]	[illegible]		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
Alluvium			a. Kind NONE b. Class

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
FAN SLOPE	a. % 3 b. Shape CONCAVE c. Length ___ d. Aspect 220	WD	a. GR 0 b. CB 0 c. ST 2 d. BY 2

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
[illegible] SAGEBRUSH RABBITBRUSH			

HORIZON DESIGNATION (a)	DEPTH (b) INCHES	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) %C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A1		10YR 3/3	10YR 5/2	/	Sil	2F SBK → MGR	SU	FR	SU/PU	/	GR - 0 CB - 0 ST - 0	3F 2F		NE	7.4	G S
A2 ~~BT~~	9 9	10YR 5/4	10YR 6/3	/	[illegible]	2F-M SBK	SH	VFI	SS/PS	1 MKPF 1 PO	GR - 2 CB - 0 ST - 0	VF 1F		VS	7.6	G W
BK	19-30	10YR 5/3	10YR 7/3	/	Loam	2M-F SBK	HA	FI	SS/PS	2M PO	GR - 7 CB - 0 ST - 0	VVF		ST ~~SE~~ 5F CAM	8.4	G W
BK1 ~~CK~~	30-45	10YR 5/3	10YR 7/3		FSL	3C M SBK	HA	VFI	SS/PO	/	GR - 2 CB - 0 ST - 1	/		VE 15 mCAM	8.6	G W
BK2 CK2	45-70	10YR 6/3	10YR 7/2	/	S. Loam	3C M SBK	HA	VFI	SS/PO	/	GR - 3 CB - 1 ST - 0	/		VE 20 mCAM	8.6	G W
2C	70-95	10YR 6/3	10YR 8/3	/	GR [illegible]	MASS WC	SH	FR	SO/PO	/	GR - 25 CB - 5 ST - 2	/		15 fm CAM ST	8.7	
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	9-29	26	<20%	>60

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	[illegible]	[illegible]	10-30"

Previous edition [illegible] Date

FS-2500-1 (2/86)

EXISTING VEGETATION

30. (Species)	S	(% Crown Cover)	31. (Species)	SHRUBS	(% Crown Cover)	(Species)	FORBS	(% Crown Cover)	33. (Species)	GRASSES	(% Crown Cover)

34. Additional Notes *(Use and Management)*:

AUGERED CAST 15" w/ 2C THEN HIT COARSE ALLUVIUM

LNB CHARACTERIZED TOP 5 SAMPLES 0-9"

9-19"

SOIL MICRO-BOX TAKEN

19-30

30-45

45-65

FR 1 COAL MINING DISTURBANCE -

USDA - Forest Service

SOIL DESCRIPTION

(Reference FSH 2509.18)

Aridic

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
4	~~Type~~ CALCIUSTOLL ~~fi~~ FINEAMY, MK super	3/7/06	BC		36	ALTON	Sec. ___ T. ___ R. ___

9. Area	10. Forest	11. Ranger District	12. State	13. County
COAL HOLLOW	mesic		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
MIXED ALLUVIUM	SEDIMENTARY ALLUVIUM		a. Kind NONE b. Class

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
FAN	a. % 4 b. Shape LINEAR c. Length 75' d. Aspect 230		a. GR 0 b. CB 2 c. ST 3 d. BY 1

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
OAK w/ ARTEMA	16-18		NONE

HORIZON DESIGNATION (a)	DEPTH (b) INCHES	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d) %C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	7-9	10YR 3/3	10YR 5/3	/	LOAM	3M-C GR	SO	VFR	SO/PO	/	GR - 0 CB - 0 ST - 0	2VF 1F		NE	7.9	C,S
BW	9-24	10YR 4/3	10YR 6/3	/	~~LOAM~~ SL 12	3M-F SBK	HA	VFI	SS/PO	/	GR - CB - ST -	2F 1VF		SE ~~NE~~ 2VF CAM	8.2	C,S
BWK	24-41	10YR 5/4	10YR 7/3	/	~~LOAM~~ SL 10	3M-C NBK	VHA	VFI	SS/PO	/	GR - CB - ST -	1VF		ST ~~SE~~ 8F CAM	8.4	A,S
BK ~~2~~	41-68	10YR 5/4	10YR 7/3	/	F ~~SL~~ LS	MASS NE	LO	LO	SO/PO	/	GR - CB - ST -	/		ST ~~SE~~ 12F CAM	8.4	A,W
2C	68-85	10YR 5/3	10YR 6/3	/	LS	SG	LO	LO	SO/PO	/	GR - / CB - / ST - /	/		ST ~~SE~~ CAC BRF	8.4	
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
		12%	<5%	

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
		cambic / calcic	

Previous edition is obsolete.

FS-2500-1 (2/86)

EXISTING V[illegible]ATION

30. (Species) [illegible] (% Crown Cover)	31. (Species) SHRUBS (% Crown Cover)	3[illegible] (Species) FORBS (% Crown Cover)	33. (Species) GRASSES ([illegible]n Cover)

34. Additional Notes *(Use and Management)*:

SAMPLED BY AUGER TO 35" FROM TRENCH BOTTOM

[illegible] 4 [illegible] TO 68"
[illegible]TERIZED ONLY

MICRO-SOIL BOX MADE

Microbiotic Crust

Two classes are suggested:

Immature - gray crust of cyanobacteria the sheaths and filaments of which connect soil particles; takes about 5 years to develop

Mature - dark black crust with pedestals; in addition to the bacteria it includes mosses, fungi, and lichens; takes 50 or more years to develop

Quantity definitions for percentage surface cover of microbiotic crusts

- Very few - less than 5% per 10 square feet
- Common - 15 to 50% per 10 square feet
- Few - 5 to 15% per 10 square feet
- Many - more than 50% per 10 square feet

Plasticity

Fld.Code	Class	Description	Fld. Code	Class	Description
PO	Non-plastic	4cm long /6mm thick roll cannot be formed	P	Moderately	4cm long/4mm thick roll will support weiht
PS	Slightly plastic	4cm long/ 6mm thick roll will support weight	VP	Very plastic	4cm long/2mm thick roll will support weight

Stickiness

Fld.Code	Class	Description	Fld.Code	Class	Description
SO	Non-sticky	No material adheres to thumb or forefinger	S	Moderately	Adheres to both digits;stretches slightly
SS	Slightly sticky	Adheres to both digits; does not stretch appreciably	VS	Very sticky	Adheres to both digits;stretches appreciably

Effervescence

Fld. Code	Class	Description	Est. CCE	Fld.Code	Class	Description	Est. CCE
co	Non-effervescent	No bubbles seen	0	es	Strongly effervescent	Bubbles form low foam	15-40
o	Very slightly efferv.	Few bubbles seen	1-3	ev	Violently effervescent	Forms thick foam quickly	40+
em	Slightly effervescent	Bubbles readily seen	3-15				

Pores

Pores are described as a *quantity class, diameter size,* and *shape*

Quantity Class Definitions

Per Unit Area Definitions

- 1 centimeter squared for very fine and fine pores (.40 in^2)
- 1 decimeter squared for medium and coarse pores (4 in^2)
- 1 meter squared for very coarse pores (40 in^2)

Quantity Definitions

- Few - less than 1 per unit area
- Common - 1 to 5 per unit area
- Many - more than 5 per unit area

Diameter Definitions

- Very fine - less than 0.5 mm
- Fine - 1 to 2 mm
- Medium - 2 to 5 mm
- Coarse - 5 to 10 mm
- Very coarse - more than 10 mm

2 common pore shapes are present:

- Tubular - cylindrical or elongated
- Vesicular - spherical or elliptical

Roots

Roots are described as a *quantity class and diameter*

Quantity Class Definitions

Per Unit Area Definitions

- 1 centimeter squared for very fine and fine pores (.40 in^2)
- 1 decimeter squared for medium and coarse pores (4 in^2)
- 1 meter squared for very coarse pores (40 in^2)

Quantity Definitions

- Very few - less than .2 per unit area
- Moderately few - .2 to 1 per unit area
- Few - less than 1 per unit area
- Common - 1 to 5 per unit area
- Many - more than 5 per unit area

Diameter Definitions

- Very fine - less than 1 mm
- Fine - 1 to 2 mm
- Medium - 2 to 5 mm
- Coarse - 5 to 10 mm
- Very coarse - more than 10 mm

Terms for Rock Fragments

Shape and Size	Noun
Spherical, cubelike, or equiaxial:	
2-75 mm diameter	Gravel
75-250 mm diameter	Cobbles
250-600 mm diameter	Stones
>600 mm diameter	Boulders

Shape and Size	Noun
Flat:	
2-150 mm long	Channers
150-380 mm long	Flagstone
380-600 mm long	Stones
>600 mm long	Boulders

Rupture Resistance Classes for Blocklike Specimens

Classes Dry	Moist	Test Description
Loose	Loose	Specimen not obtainable
Soft	Very friable	Fails under very slight force applied slowly between thumb and forefinger
Slightly hard	Friable	Fails under slight force applied slowly between thumb and forefinger
Moderately hard	Firm	Fails under moderate force applied slowly between thumb and forefinger
Hard	Very firm	Fails under strong force applied slowly between thumb and forefinger
Very hard	Extremely firm	Cannot be failed between thumb and forefinger but can be between both hands or by placing on a nonresilent surface and applying gentle force underfoot

SOIL DESCRIPTION

Soil Type [illegible] 4

File No.

Area Coal [illegible] | Date 3-8-07 | Stop No. 37

Classification [illegible] Aridz [illegible] MEX [illegible] PER ACRE, V DEEP

Location: Section T R

N. Veg. [illegible] - SAGEBRUSH, FEW JUNIPER

Parent Material [illegible] | Climate (Precip.) [illegible]

Physiography Valley Floor | Surface Rock Fragments Gravel C

Relief Concave | Drainage [illegible] | Surface Rock Fragments Cobble C

Elevation 6700 | Gr.water — | Surface Rock Fragments Stones C

Slope 4 % | Range | Moisture | Surface Rock Fragments Other

Aspect/Degrees 270° | Root Distr. | % Clay *PSCS

Erosion None | % Coarse fragments*PSCS | % Coarser than V.F.S.*PSCS

Permeability Moderate | Range Site

GPS Latitude N | Microbiotic Crust Class

GPS Longitude W | Rock Formation/Type [illegible] MIXED [illegible]

GPS Elevation | Topo Quad Name Acton

Soil Temp at 20" F | Photo Number

Additional Notes DISKED & SEEDED AREA

* Lab [illegible] 5 [illegible] (TO 58')

SOIL MICRO MONOLITH BOX TAKEN

*Control Section Average

Horizon	Depth (inch)	Color Dry	Color Moist	Texture Clay	Structure	Consistence Dry	Consistence Moist	Consistence Wet	Reaction Effer.	Boundary	Rock Frags	Root	Pore	Ped Surface Features
[illegible]	0-6	10YR 5/3	10YR 3/2	SCL 30	2M-F GR	SO	VFR	SS/PO	NE	C, W	/	3VF 1F		pH 7.2
[illegible]	6-[illegible]	10YR 5/3	10YR 3/3	SICL 31	2M-F GR	SO	FR	SS/PS	NE	C, S	/	2VF 1F		7.2
BWK1	12 [illegible]	10YR 6/3	10YR 4/3	SANDY LOAM → SCL 34	3F-M ABK	HA	FI	S/PS	5f CAM ST	C, S	/	1VF		7.8
BWK2		10YR 7/4	10YR 5/4	LS 5	3M ABK	VH	VFI	SO/PO	15fm CAM ST	C, W	2 [illegible] 2	1VF		8.4
BK1	[illegible] 55	10YR 7/4	10YR 5/4	LFS 6	3C-M SBK	HA	FI	SO/PO	15f cam ST	C S	3 [illegible] 4 [illegible]	/		8.4
RBK1	[illegible] 80	10YR 7/4	10YR 5/4	[illegible] 4	MASS VF	[illegible]	[illegible]	SO/PO	10f vf CAM ST	A, S	10CR [illegible]	/		8.4
RBK2		10YR 7/3	10YR 5/3	SANDY LOAM	SG	LO	LO	SO/PO	VE ~~SE~~ 15f vf CAM		[illegible]	/		8.4

USDA - Forest Service

SOIL DESCRIPTION

(Reference FSH 2509.18)

fine, mx, super frigid Aeric Epiaquept

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
7	~~Calcimorphic Silt~~	8/7/07	BL		38	Alton	

9. Area	10. Forest	11. Ranger District	12. State	13. County
Coal Hollow	Soil Survey		Utah	Kane

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
[illegible]	Mixed Alluvium		None	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock a. GR	b. CB	c. ST	d. BY
Swale in Valley Fill	2	Concave	180	190	PD	0	0	0	0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
ROST [illegible]	16-18"		29 [illegible]

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-6	10YR 4/2	10YR 6/2	No	SiL	3m sbk	sh	vfr	s p	/	GR - CB - ST -	3vf 3f 2m		SE	7.5	
AB	6-12	5/4	10YR 7/3	No	SiL	3m pr	sh	fi	s p	/	GR - CB - ST -	3f 3vf 2m		>T 3f CAM	8.0	
Bk1	12-24	10YR 6/4	10YR 7/2	15% Gleyed	SiL	Massive	h	fi	s p	/	GR - CB - ST -			25fm CAM VE	8.6	
Bk2	24-40	10YR 7/2	10YR 8/1	[illegible]	SiL	m	h	Gleyed fi	s pl	/	GR - CB - ST -			40m CAM VE	8.7	
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					
											GR - CB - ST -					

Sampled here. Take subsoil from fi Bhc horiz. Pit (40")

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:

Previous edition obsolete.

FS-2500-1 (2/86)

EXISTING V[illegible]ATION

30. (Species)	(% Crown Cover)	31. (Species) SHRUBS	(% Crown Cover)	3[illegible] [illegible]cies) FORBS	(% Crown Cover)	33. (Species) GRASSES	([illegible]n Cover)

34. Additional Notes *(Use and Management)*:

SAMPLES HAND / AUGER IN AREA ABOVE PIPELINE 100 YARDS NE OF BACKHOE PIT (SUBMERGED IN WATER

[illegible] ALL 4 [illegible]

SOIL MICRO MONOLITH BOX (W/ #40) COMBINED

USDA - Forest Service

Aridic

SOIL DESCRIPTION

(Reference: FSH 2509.18)

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo No.	6. Stop No.	7. USGS Quad	8. Location:
4	~~Typic~~ Cryic Colony Mx	3-7-05	BC		39	Alvord	Sec. ____ T. ____ R. ____

9. Area	10. Forest	11. Ranger District	12. State	13. County
	Super, mesic → Udep		UT	Kane

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
	Alluvium		None	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock: a. GR	b. CB	c. ST	d. BY
Fan Slope					WD				

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
Juniper Pine area next to meadow			

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
Ap	0-6	10YR 2/2	10YR 5/3	/	SiL		2m-f GR	So	Fr	SS/PS	/	GR-0 CB-0 ST-0	2vf 2f 1m		NE	7.6	G.W
A2	6-12	10YR 2/3	10YR 5/4	/	SiL → LCOS	24	2fSBK → mGR	So	Fr	SS/PS	/	GR-0 CB-0 ST-0	1vf 2f 1m		VS	7.8	G.W
BW1	12-24	10YR 5/4	10YR 6/4	/	SiL	15	3m-c mSBK	Vh	vFi	SO/SO	/	GR-0 CB-0 ST-0	Vvf		ST 8fCAM	8.4	G.W
BW2	24-36	10YR 5/4	10YR 7/3	/	GrSiL	7	3m-c ABK	VH	vFi	SO/PO	/	GR-10 CB-5 ST-0	/		ST 10fCAM	8.4	G.W
2C	36-75+	10YR 5/3	10YR 7/3	/	CBV LSAND		massive	VH	Fi	SO/PO	/	GR-75 CB-30 ST-0	/		ST 15fCAM 1mm CAC BRF	8.2	
												GR- CB- ST-					
												GR- CB- ST-					
												GR- CB- ST-					
												GR- CB- ST-					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	~~25~~ 11%	<35	>60

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:
	Mollic	Cambic	

Previous edition obsolete.

FS 2500-1 (2/86)

EXISTING VEGETATION

30. (Species) TREES	(% Crown Cover)	31. (Species) SHRUBS	(% Crown Cover)	(Species) FORBS	(% Crown Cover)	33. (Species) GRASSES	(% Crown Cover)

34. Additional Notes ***(Use and Management):***

FIRST 4 samples TO 36"

LAB CHARACTERIZATION ONLY ON

SOIL MICRO-PEAK MADE

USDA - Fore[illegible]ice

SOIL [illegible]ERIPTION

Aerie Calciaquoll (Reference FSH 2509.18)

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location:
7	F[illegible]-LOAMY, mixed, super frigid ~~[illegible]~~	7-7-[illegible]7	BL		4[illegible]	[illegible]	Sec. ____ T. ____ R. ____

9. Area	10. Forest	11. Ranger District	12. State	13. County
[illegible] NEAR [illegible]	WATER MONITORING		UTAH	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion:
[illegible]	MIXED SEDIMENTARY ALLUVIUM		a. Kind ____ b. Class ____

18. Landform	19. Slope:	20. Drainage Class	21. Surface Stone and Rock
[illegible] FLOOR	a. % 3 b. Shape [illegible] c. Length 75' d. Aspect 180	[illegible]D	a. GR 0 b. CB 0 c. ST 0 d. BY 0

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
[illegible]	16-18		[illegible]

HORIZON DESIGNATION (a)	DEPTH (b) (inches)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
[illegible]	[illegible]	10YR 3/2	10YR 5/2	/	SIL		2[illegible]	SO	VFR	SS/PO	/	GR - 0 CB - 0 ST -	[illegible]		SE	7.8	[illegible]
[illegible]	[illegible]	10YR 4/3	10YR 6/3	[illegible]	SILT		2[illegible]	SO	VFR	[illegible]	/	GR - CB - ST -	[illegible]		ME	8.2	[illegible]
BK	12-22	10YR 5/4	10YR 7/3	[illegible]	SILT		[illegible]	SO	FR	SS/PO	/	GR - CB - ST -	2 2		ST 12-15 fCAM	8.4	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	24 [illegible]	[illegible]		[illegible]	[illegible]			/	GR - CB - ST -					
[illegible]	[illegible]			GLEYED	SILT		[illegible]					GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
28. Diagnostic Horizons	a. Surface:	b. Subsurface:		29. Moist Control Section Depth:

Previous edition [illegible]ete.

FS 2500-1 (2/86)

EXISTING V[illegible]ATION

30. *(Species)* [illegible]S	*(% Crown Cover)*	31. *(Species)* SHRUBS	*(% Crown Cover)*	[illegible]*pecies)* FORBS	*(% Crown Cover)*	33. *(Species)* GRASSES	*(*[illegible]*n Cover)*

34. Additional Notes *(Use and Management)*:

Oe 3" [illegible] MAT, DECOMPOSED PLANT ROOTS BURN

[illegible]

SOIL MICRO-MORPHOLOGY BOX (COMBINED W/ #38)

USDA - Forest Service

SOIL DESCRIPTION

(Reference FSH 2509.18)

mesic fine mixed super AridicCalciustoll

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ____ T. ____ R. ____
9					41		

9. Area	10. Forest	11. Ranger District	12. State	13. County

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind ____ b. Class ____

18. Landform	19. Slope: a. % ____ b. Shape ____ c. Length ____ d. Aspect ____	20. Drainage Class	21. Surface Stone and Rock a. GR ____ b. CB ____ c. ST ____ d. BY ____

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)

HORIZON DESIGNATION (a)	DEPTH (b)	COLOR (c) Moist (1)	COLOR (c) Dry (2)	COLOR (c) Mottling (3)	TEXTURE (d)	%	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	CONSISTENCE (f) Moist (2)	CONSISTENCE (f) Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	SPECIAL FEATURES (g) Roots (3)	SPECIAL FEATURES (g) Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A1	0-6	10YR 3/3	10YR 5/3	/								CR - CB - ST -			NE	7.9	
A2	6-12	10YR 3/3	10YR 5/3	/	CL	38						CR - CB - ST -			NE	8.0	
Bwk	12-36	10YR 4/3	10YR 6/3	/	C	42						CR - CB - ST -			ST 3-5f CAM	8.2	
Bk1	36-64	10YR 5/4	10YR 7/3	/	CL	32						CR - CB - ST -			VE 12fm CAM	8.2	
Bk2	64-80	10YR 5/4	10YR 7/4	/	SCL	22						CR - CB - ST -			VE 10f CAM	8.6	
												CR - CB - ST -					
												CR - CB - ST -					
												CR - CB - ST -					
												CR - CB - ST -					

26. Partical Size Control Section	a. Depth: 10-40"	b. Average Clay %: 40	c. Average Rock Fragment Content: 0	27. Depth to Lithic or Paralithic Contact: 760"
28. Diagnostic Horizons	a. Surface: Mollic	b. Subsurface: cambic / Calcic		29. Moist Control Section Depth:

30. (Species) TREES (% Crown Cover)	31. (Species) SHRUBS (% Crown Cover)	32. (Species) FORBS (% Crown Cover)	33. (Species) GRASS (% Crown Cover)

34. Additional Notes *(Use and Management)*:

SAMPLED 5 INCREMENTS

2 PERSON PHOTOS, 1 LANDSCAPE

MICRO
SOIL BOX MADE

USDA - Forest Service: W

Aridic Haplustoll following mixed skeletal mesic

SOIL DESCRIPTION

(Reference FSH 2509.18)

1. Map Unit Symbol	2. Family or Series	3. Date	4. By	5. Photo. No.	6. Stop No.	7. USGS Quad	8. Location: Sec. ___ T. ___ R. ___
9	~~[illegible]~~	3/8/87	B[illegible]		42	ALTON	

9. Area	10. Forest	11. Ranger District	12. State	13. County
ROBINSON CREEK CUTBANK			[illegible]	KANE

14. Parent Material	15. Bedrock Name	16. Elevation	17. Erosion: a. Kind	b. Class
ALLUVIUM	MIXED SHALE ALLUVIUM		MUD	

18. Landform	19. Slope: a. %	b. Shape	c. Length	d. Aspect	20. Drainage Class	21. Surface Stone and Rock a. GR ___ b. CB ___ c. ST ___ d. BY ___
STREAM TERRACE	7	WAVE	50	-	WD	

22. Potential Natural Vegetation	23. Annual Precipitation	24. Measured Soil Temperature	25. Water Table (Depth)
JUNIPER / SAGEBRUSH, RABBITBRUSH			

HORIZON DESIGNATION (a)	INCHES DEPTH (b)	COLOR (c) Moist (1)	Dry (2)	Mottling (3)	TEXTURE (d)	%C	STRUCTURE (e)	CONSISTENCE (f) Dry (1)	Moist (2)	Wet (3)	SPECIAL FEATURES (g) Cutans (1)	% of Rock Fragments (2)	Roots (3)	Pores (4)	EFFER. CLASS (h)	FIELD pH (i)	BOUNDARY (j)
A	0-9	[illegible]	10YR 5/3		CB L	20	2m F Col	SW	VFL	SO [illegible]	/	GR - 10 CB - 5 ST - 0	2m 2m 1m		NE	7.8	
2BW	9-[illegible]	10YR 4/3	10YR 6/3		CB C	43	[illegible]	SW	F	[illegible]	/	GR - 10 CB - 5 ST - 0	[illegible]		ST	8.2	[illegible]
2 BWK	24-36	10YR 5/3	10YR 6/3		SCL	21	[illegible]	SW	F	[illegible]	/	GR - 5 CB - 5 ST - 0	1F 1m		ST	8.4	[illegible]
2 BK	36-48	10YR 5/4	10YR 6/4	/	L	22	MASSIVE	HA	F	[illegible]	/	GR - TR CB - [illegible] ST - 0	1F 1F		ST	8.6	
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					
												GR - CB - ST -					

26. Partical Size Control Section	a. Depth:	b. Average Clay %:	c. Average Rock Fragment Content:	27. Depth to Lithic or Paralithic Contact:
	10-40"	31%		

28. Diagnostic Horizons	a. Surface:	b. Subsurface:	29. Moist Control Section Depth:

30. (Species) TREES (% Crown Cover)	31. (Species) SHRUBS (% Crown Cover)	32. (Species) FORBS (% Crown Cover)	33. (Species) GRASS (% Crown Cover)

34. Additional Notes (Use and Management):

SAMPLED 4 INCREMENTS TO 48" 0-9, 9-24 24-36 36-48

PEDON TAKEN : 2 PHOTOS 1 LANDSCAPE OF MU 3

BACKHOE PIT AT EDGE OF ROBINSON ARROYO

NO MICROMONOLITH BOX FOR THIS PROFILE MADE OR PHOTOGRAPHED

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 43

DRAFT 3/2002

Series or Component Name:	Map Unit Symbol: 7	Photo #:	Classification: Typic Argiaquoll fine, mixed, superactive, frigid	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: Apr 5, 2007	Weather: High clouds Temp.: Air: Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum: 1983	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape: Bench	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: SSW 210°	Slope (%): 4	Slope Complexity: Simple
Slope Shape: (Up & Dn / Across) Linear / Linear							

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physic. Area:	Local Physio. Area:

Drainage: Very Poorly	Flooding: —	Ponding: 0c	Soil Moisture Status: Saturated	Permeability: K_{sat}: Very slow	Land Cover / Use: Pasture

Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:

Erosion: Kind: Degree: None	Runoff: mod slow	Surface Frag %: GR: CB: ST: BD: CN: FL: — — — — — — Kind:	Diagnostic Horz. / Prop.: Kind: Depth: Mollic 0-7" Argillic 7-30" Calcic 12-96"

P. S. Control Section: Ave. Clay %: Ave. Rock Frag %:
Depth Range: 7-27" 40 0

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	wild rose	
	Bluegrass	
	Sedges	

MISCELLANEOUS FIELD NOTES / SKETCH:

water flowing in 30-54" layer
& perching on 54-72"

43

Component Name: | Map Unit Symbol: | Date: Apr 5, 2007

	Obser. Method	Depth (in)	Depth (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture mo	Rock Frags Knd %	Rock Frags Rnd	Rock Frags Sz	Structure Grade	Structure Sz	Structure Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles %	Mottles Sz	Mottles Cn	Mottles Col	Mottles Mst	Mottles Sp	Mottles Loc
1	BP	0-7"		A	CS	10YR 5/2	10YR 3/3	L	—			2m	ssk		VH	fr	SS	mP	—						
2		7-17		Bt	CS	10YR 6/2	10YR 3/3	C	—			3mc pr 2fsbk			xH	fi	S	P	20 fm			7.5YR 6/6			
3		17-30		Btk	CS	10YR 7/2	10YR 4/3	CL	—			3mpr 2fsbk			VH	fi	S	P	35 fm			7.5YR 6/4			
4		30-54		Bk	as	10YR 7/2 & 7/3	10YR 4/2	SiL	—			2mpr 1fsbk			VH	fr	SS	mP	45 fm			10YR 5/4			
5		54-72		2Btk1	gs	10YR 7/1	10YR 4/1	C	—			3mpr			xH	vfi	VS	VP	50 m			7.5YR 6/6			
6		72-96"		2Btk2		10YR 8/1	10YR 6/1	SiC	—			2cmpr			xH	vfi	VS	VP	35 mc			10YR 6/8			
7																									
8						mollic	after	mixing	0-7"																
9																									
10																									

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—	—	—	3vff 1m	2vft	8.2	SE	24		
2	—	—	85 CLF PF/PO	3vff 1m	1vft	8.4	SE	42		
3	—	15f CAM	75 CLF PF/PO	2vf 1fm	1vft	8.4	ST	38		
4	—	20fm CAM	—	2vf 1fm	1vft	8.6	ST	26		
5	—	10f CAM	100 CFF PF/PO	1vff	1vft	8.6	VE	50		
6	—	10f CAM	90 CLF PF/PO	1vf	—	8.4	VE	46		
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 44

DRAFT 3/2002

Series or Component Name:	Map Unit Symbol: 7	Photo #:	Classification: Aeric Epiaquept fine, mixed, superactive, frigid	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: Apr 5, 2007	Weather: High clouds Temp.: Air: Soil: Depth:	Latitude: ° ' " N Datum: Longitude: ° ' " W	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:	Transect: ID: Stop #: Interval:	

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: NW 228°	Slope (%): 4-5	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:

Drainage: ~~Very~~ Poorly	Flooding: No	Ponding: Oc	Soil Moisture Status: Wn 0-14" Wa 14-34	Permeability: K_{sat}: Very slow	Land Cover / Use:

Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth: 34+ moist	Lithostrat. Units: Group: Formation: Member:	

Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind: — — — — — —	Diagnostic Horz. / Prop.: Kind: Depth: Calcic 14-96" aquic 7"+

P. S. Control Section: Ave. Clay %: Ave. Rock Frag %:
Depth Range: 10-40"

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	Sedges	
	Bluegrass	

MISCELLANEOUS FIELD NOTES / SKETCH:

water filling pit at 14"

34-96" old decaying roots

44

Component Name: | **Map Unit Symbol:** | **Date:** Apr 5 2007

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc (mottle color)
1	BP	0-7"	A1	cs	10YR 6/2	10YR 4/2	SiL	—	3 m sbk / 2 f sbk	H	Fr	ms	mp	—
2	↓	7-14"	A2	cs	10YR 6/2	10YR 4/2	SiCL	—	2 m cpr / 3 fm sbk	VH	fi	ms	mp	10 f 7.5YR 6/4
3	↓	14-34"	Bwk1	as	10YR 8/1	10YR 6/2	SiCL	—	1 m pr / 2 m sbk	VH	fi	ms	mp	40 fm 7.5YR 6/6
4	↓	34-54"	Bwk2	gs	10YR 8/1	10YR 6/1	C	—	3 m cpr / 2 f sbk	XH	vfi	vs	vp	50 mc 7.5YR 5/8
5	↓	54-72"	Bwk1	gs	10YR 8/1	10YR 6/1	C	—	3 m cpr	XH	vfi	vs	vp	25 mc 10YR 6/6
6		72-96"	BK2		10YR 8/1	10YR 6/1	SiL	—	M	VH	Fr	ms	mp	40 fm 10YR 6/6
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1	—	—	—	3 vff / 2 m	2 vft	8.2	SE	26		
2	—	—	—	3 vff / 2 m	2 vft	8.2	SE	28		
3	—	10 f CAM	—	2 vff / 1 m	2 vft	8.5	ST	26		
4	—	8 f CAM	—	2 vf / 1 f	1 vft	8.4	ST	48		
5	—	15 fm CAM	—	1 vf	—	8.6	VE	52		
6	—	18 fm CAM	—	—	1 vft	8.2	VE	26		
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 45

DRAFT 3/2002

Series or Component Name:	Map Unit Symbol: 7	Photo #:	Classification: Aeric Epiaquept fine, mix, superactive, frigid	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: Apr 5, 2007	Weather: Temp.: Air: Soil: Depth:	Latitude: ° ' " N Datum: Longitude: ° ' " W	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area: Alton	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: 195° SSW	Slope (%): 3-4	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:

Drainage: Poorly	Flooding: No	Ponding: Oc	Soil Moisture Status:	Permeability: K_{sat}:	Land Cover / Use: Pasture

Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:	

Erosion: Kind: sheet Degree: slight	Runoff:	Surface Frag %: GR: — CB: — ST: — BD: — CN: — FL: — Kind:	Diagnostic Horz. / Prop.: Argillic	Kind: Depth: 84"+
P. S. Control Section: Depth Range: 35-48" Ave. Clay %: 36 Ave. Rock Frag %: 0		argillic too deep	Aquic calcic	5"+ 35-48"

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH:

Rapid in-flow of water at 66"

Fluvent

45

Component Name: | Map Unit Symbol: | Date: Apr 05, '07

	Obser. Method	Depth (in)	Depth (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd %	Rock Frags Rnd	Rock Frags Sz	Structure Grade	Structure Sz	Structure Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles %	Mottles Sz	Mottles Cn	Mottles Col	Mottles Mst	Mottles Sp	Mottles Loc
1	BP	0	5"	A1	cs	10YR 6/2	10YR 4/2	L	—			1 m	sbk		sh	vfr	ss	sp	—						
												2 f	gr												
2		5	12"	A2	as	2.5Y 6/2	2.5Y 4/2	L	—			2 m	pr		sh	vfr	ss	sp	3-4%	vf		10YR 6/6			
												3 f	sbk												
3		12	35"	C	as	10YR 7/4	10YR 5/4	SCL	—			1 m	sbk		sh	vfr	ss	sp	50	mc		10YR 6/6			
4		35	48"	2 Bwk	cs	10YR 7/2	10YR 6/4	SiC	—			1 m	pr		h	fr	ms	mp	30	mc		7.5YR 5/4			
												2 m	sbk												
5		48	66"	3C1	gs	10YR 8/2	10YR 6/4	SCL	—			m			h	vfr	ss	sp	50	mc		10YR 7/6			
6		66	84"	3C2	as	10YR 8/3	10YR 6/4	SCL	—			m			vh	vfr	ss	sp	60	mc		10YR 7/6			
7		84	100"	4Btk		10YR 7/4	10YR 6/4	SiC	—			3 m	pr		VH	fi	s	p	5	f		7.5YR 7/6			
												2 m	sbk												
8																									
9																									
10																									

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—	disseminated	—	3 vff	2 vf+	8.4	ST	26		sm
				2 m						
2	—	disseminated	—	3 vf	2 vf+	8.2	ST	26		sm
				2 f lm						
3	—	disseminated	—	2 vf	2 vf+	8.4	ST	35		wn
				1 fm						
4	—	12 f CAM disseminated	—	1 vff	1 vf+	8.4	VE	42		ws
5	—	8 f CAM disseminated	—	1 vff	1 vf+	8.4	ST	30		wn
6	—	4 f CAM disseminated	—	1 vff	1 vf+	8.3	ST	30		ws
7	—	8 f CAM disseminated	05 CLF PF/PO	1 vff	—	8.3	VE	40		moist
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 46

DRAFT 3/2002

Series or Component Name:	Map Unit Symbol: 7	Photo #:	Classification: Typic Argiaquoll fine-loamy mixed, superactive frigid	Soil Moist. Regime (Tax.): Ustic
Describer(s): Bob Long	Date: Apr 5, 2002	Weather: Temp.: Air: Soil: Depth:	Latitude: 0° ' " N Datum: Longitude: ° ' " W	Location: Sec. T. R.
UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU: Transect: ID: Stop #: Interval:

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: 195° SSW	Slope (%): 3-4	Slope Complexity:	Slope Shape: (Up & Dn / Across)
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage: Somewhat Poorly-	Flooding: —	Ponding: Ra	Soil Moisture Status:	Permeability: K_{sat}:	Land Cover / Use: Pasture
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind: — — — — — —		Diagnostic Horz. / Prop.: Kind: Depth: Aquic 24"+ Mollic 0-7" Argillic 12-44" Calcic 44-92	
P. S. Control Section : Depth Range: 12-32"	Ave. Clay %: 27.2	Ave. Rock Frag %: 14%			

VEGETATION :

SYMBOL	COMMON NAME	% GD COVER
	Grasses	

MISCELLANEOUS FIELD NOTES / SKETCH :

water flowing in at 44"

severe caving of sidewalls

	Component Name:			Map Unit Symbol:										Date: Apr 5, 2007
	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	BP	0-6"	A1	cs	10YR 5/3	10YR 3/3	SL	—	1msbk 2fgr	sh	vfr	so	po	—
2	↓	6-12"	A2	gs	10YR 6/3	10YR 4/4	SCL	—	1mpr 2fsbk	sh	vfr	ss	sp	—
3	↓	12-17"	Bt1	cs	10YR 6/3	10YR 5/4	SCL	—	1mpr 2fsbk	sh	vfr	ss	sp	—
4	↓	17-24"	Bt2	cs	10YR 6/3	10YR 4/4	GRV SCL	Gr 30 CB 10	2mpr 3fmsbk	sh	vfr	ss	sp	—
5	↓	24-44"	2Bt	cs	10YR 6/4	2.5Y 4/4	CL	—	3mpr 2fmsbk	vh	fr	s	p	5-8f faint 10YR 6/6
6	↓	44-68"	2Bk1	gs	10YR 8/2	10YR 5/4	SL	—	m	vh	vfr	ss	po	25 mc strong 7.5YR 5/6
7	↓	68-92"	2Bk2	gs	2.5Y 6/2	10YR 5/1	SL	—	m	xh	vfr	so	po	45 mc strong 10YR 6/6
8	↓	92-120"	2C		10YR 6/2	10YR 5/1	SL	—	m	xh	vfr	so	po	65 vc strong 10YR 6/6
9														
0							mollic by mixing 0-7"							

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth) Effer (agent) Clay % CCE	Notes
1	/	disseminated	—	2vff1m	2vfti	8.4 em 16	
2	/	↓	—	2vff1m	2vft	8.5 em 18	
3	/	↓	30 clf PF/BR	2vff1m	2vft	8.4 em 22	
4	/	↓	25 clf PF/BR	2vf1f	2vfti	8.3 em 22	moist
5	/	↓	65 clf PF/BR	1vff	4vft	7.8 se 35	WS
6	/	2f CAM disseminated	—	1vf	2vfi	8.5 ST 15	WS
7	/	8f CAM disseminated	—	—	2vfi	ST 12	WS
8	/	4f CAM disseminated	—	—	2vfi	ST 12	WS
9							
10							

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 47

DRAFT 3/2002

Series or Component Name:	Map Unit Symbol: 8	Photo #:	Classification: Calcic Haplustalf fine-loamy, mixed, superactive, frigid	Soil Moist. Regime (Tax.): Ustic
Describer(s): Bob Long	Date: Apr 5, 2007	Weather: High clouds Temp.: Air: 55 Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum: 1983	Location: Sec. T. R.
UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area: Alton	MLRA / LRU:
Transect: ID: Stop #: Interval:				

Landscape: Valley	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: SSW 200	Slope (%): 6	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) convex / convex
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage: Somewhat Poorly	Flooding: No	Ponding: No	Soil Moisture Status: moist	Permeability: K_{sat}: mod / slow	Land Cover / Use: Range
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: Flow patterns Degree: slight	Runoff: mod slow	Surface Frag %: GR: 5 CB: — ST: — BD: — CN: — FL: — Kind:		Diagnostic Horz. / Prop.: Argillic Calcic Aquic	Kind: 11-20" 20-84" 32"+ Depth:
P. S. Control Section: Depth Range: 11-20"	Ave. Clay %: 30	Ave. Rock Frag %: 0			

VEGETATION :

SYMBOL	COMMON NAME	% GD COVER
	Big sage	
	Rabbitbrush	
	Ut serviceberry	
	Rabbitbrush	
	Poa	

MISCELLANEOUS FIELD NOTES / SKETCH :

water running into pit at 80"

Component Name: | Map Unit Symbol: | Date: Apr 5, 2007

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	BP	0-3"	A	cs	10YR 5/3	10YR 3/3	L	GR 5	2 mc sbk	sh	vfr	ss	sp	—
2		3-11"	2A	as	10YR 6/4	10YR 5/3	SL	—	1 m sbk	h	fr	so	sp	—
3		11-20"	2Bt	cw	10YR 5/3	10YR 3/3	CL	—	2 m pr / 3 f vf sbk	vh	fi	ms	mp	—
4		20-32"	2Bk	cs	10YR 6/4	10YR 4/6	SCL	—	2 m pr / 2 f m sbk	xh	fr	ss	sp	—
5		32-52"	3Btk	cs	10YR 6/4	10YR 3/4	Clay	—	3 c pr / 2 m sbk	xh	vfi	vs	vp	10 ff 10YR 6/6
6		52-84"	3Bk		10YR 7/4	10YR 5/6	SCL	—	m	vh	vfr	ss	sp	40 mc strong 10YR 7/8
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1		disseminated	—	3 vf 2 f 1 m	2 vf fi	7.6	em	24		SM
2			—	2 vf f 1 m	2 vf i	7.7	em	15		SM
3			60 CLF PF/PO	2 vf 1 f m	1 vf t	7.8	em	30		moist
4		6 vf f CAM	90 CLF PF/PO	2 vf 1 f	2 vf i t	8.3	st	23		moist
5		10 f CAM	—	2 vf 1 f	—	8.3	em/st	50		moist
6		8 f CAM	—	1 vf	2 vf i t	8.5	es	20		moist
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 48

DRAFT 3/2002

Series or Component Name: 1	Map Unit Symbol: 1	Photo #:	Classification: Aridic Haplustalf fine, mixed, superactive, frigid	Soil Moist. Regime (Tax.): Ustic
Describer(s): Bob Long	Date: Apr 5, 2007	Weather: Temp.: Air: Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum:	Location: Sec. T. R.
UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:
Transect: ID: Stop #: Interval:				

Landscape: Valley Bottom	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: ENE 80	Slope (%): 4-5	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage:	Flooding: No	Ponding: No	Soil Moisture Status:	Permeability: K_{sat}: Very slow	Land Cover / Use: Range
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: Degree: None	Runoff: mod slow	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind: 1-2 — — — — —		Diagnostic Horz. / Prop.: Kind: Depth: Argillic 3-84" Calcic 48-84" Gypsic 30-84"	
P. S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range: 62% (lab)					

VEGETATION :

SYMBOL	COMMON NAME	% GD COVER
	ARTRW	
widely scattered Juniper + Pinyon		
	Brome	

MISCELLANEOUS FIELD NOTES / SKETCH :

clay too hard to dig below 72"

mollic episaturation

48

Component Name:		Map Unit Symbol: 1	Date: Apr 5, 2007

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	BP	0-3"	A	CS	10YR5/2	10YR3/2	CL	—	2 m sbk / 2 m gr	H	fr	ms	mp	—
2		3-12"	Bt1	CS	10YR6/2	10YR4/2	clay	—	2 m pr / 3 m sbk	VH	fi	s	p	—
3		12-30"	Bt2	gs	10YR6/2	10YR4/2	clay	—	3 mc pr / 2 m sbk	VH	fi	s	p	—
4		30-48	Bt3	CS	2.5Y6/2	2.5Y4/2	clay	—	3 m pr / 2 m sbk	XH	vfi	vs	vp	16 fm distinct 7.5YR 5/6
5		48-84	Btk		2.5Y6/2	2.5Y4/2	clay	—	3 m pr / 3 m sbk	XH	xfi	vs	vp	7 f distinct 7.5YR 6/6
6														
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—	—	—	2vffm	2vfft	7.8	e	30		
2	—	—	35 CLF PF/PO	2vff 1m	1vft	8.2	e	40		
3	—	—	85 CLF PF/PO	1vff	—	8.3	e	50		
4	—	3 vff CAM disseminated	90 CLF PF/PO	—	—	8.6	me	55		
5	—	10 f CAM 2f Gyp Masses	95 CLF PF/PO	—	—	7.8	mg/st	60		
6										
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 49

DRAFT 3/2002

Series or Component Name:	Map Unit Symbol: 5	Photo #:	Classification: Lithic Ustorthent loamy, mix, super, calc, mesic	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: Apr 5, 2006	Weather: High clouds	Temp.: Air: 60 Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W	Datum: 1983	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #: 07 UT KA 49	Soil Survey Area:	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape: Ridge	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: 5	Slope (%): 8-12	Slope Complexity: complex	Slope Shape: (Up & Dn / Across) convex / convex

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:

Drainage: Well	Flooding: No	Ponding: No	Soil Moisture Status: S.M.	Permeability: K_{sat}: Mod	Land Cover / Use: PJ / Range

Parent Material: Residuum	Bedrock: Kind: Fract.: Hard.: Depth: sandstone	Lithostrat. Units: Group: Formation: Member:

Erosion: Kind: sheet Degree: Mod.	Runoff: mod rapid	Surface Frag %: GR: 25 CB: 3 ST: 1 BD: 1 CN: FL: Kind:	Diagnostic Horz. / Prop.: Lithic Kind: Depth: 10"+
P. S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range:			Ochric

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	Pinyon	
	UT Juniper	
	Black sage	
	Indian Ricegrass	

MISCELLANEOUS FIELD NOTES / SKETCH:

10% soils shallow to shallow
10% mod deep to sandstone

sandstone underlain by shale

Component Name: Hideout | Map Unit Symbol: | Date: Apr 5, 2007

	Obser. Method	Depth (in)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	SS	0-3"	A	cs	2.5Y 6/4	2.5Y 5/4	GR SCL	GR 30	1fm sbk 2Fgr	sh	vfr	ss	sp	—
2	SS	3-10"	C	as	2.5Y 5/4	2.5Y 4/4	GR CL	GR 25	M	sh	vfr	ss	sp	—
3	SS	10"+	R		sandstone									
4														
5														
6														
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—	—	—	2vf 1fmc	2vfit	7.6	ST	28		
2	—	—	—	2vf 1fmc	1vft	8.2	ST	32		
3										
4										
5										
6										
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: 50

DRAFT 3/2002

Series or Component Name:	Map Unit Symbol: 10	Photo #:	Classification: Aridic Ustorthent clayey, mectitic, super	Soil Moist. Regime (Tax.): Ustic Aridic
Describer(s): Bob Long	Date: Apr 5, '07	Weather: High cloudy	Temp.: Air: 52° Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W
Datum:	Location: Sec. T. R.			
UTM: Zone: mE: mN:	Topo Quad:	Site ID: Yr: State: County: Pedon #: 07 UT KA 50	Soil Survey Area:	MLRA / LRU:
Transect: ID: Stop #: Interval:				
Landscape: Scarp	Landform:	Microfeature:	Anthro:	Elevation:
Aspect: WNW 292	Slope (%): 16	Slope Complexity: complex	Slope Shape: (Up & Dn / Across) Convex / Convex	
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:
Physio. Section:	State Physio. Area:	Local Physio. Area:		
Drainage: Somewhat Well	Flooding: NO	Ponding: NO	Soil Moisture Status: S.M.	Permeability: K_{sat}: Mod slow
Land Cover / Use: Range				
Parent Material: Residuum	Bedrock: Kind: Shale Fract.: Hard.: Depth:		Lithostrat. Units: Tropic	Group: Formation: / Member:
Erosion: Kind: Flow Pattern Degree: Mod	Runoff: Mod Rapid	Surface Frag %: GR: — CB: — ST: — BD: — CN: — FL: — Kind:	Diagnostic Horz. / Prop.: Paralithic Ochric	Kind: Depth: 19"
P. S. Control Section: Depth Range: 10-19"	Ave. Clay %: 55% (lab)	Ave. Rock Frag %: 0		

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	Ut Juniper	
	Pinyon Pine	
	Black sage	
	Indian Ricegrass	

MISCELLANEOUS FIELD NOTES / SKETCH:

Component Name:	Cannonville	Map Unit Symbol:		Date:	Apr 5, 2007

	Obser. Method	Depth (in)	Depth (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd %	Rock Frags Rnd	Rock Frags Sz	Structure Grade	Structure Sz	Structure Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles %	Mottles Sz	Mottles Cn	Mottles Col	Mottles Mst	Mottles Sp	Mottles Loc
1	SS	0-4		A	CS	2.5Y 6/2	2.5Y 4/2	C	—			1 m	sbk	2 fgr	sh	vfr	s	s	—						
2	↓	4-11		C1	CS	2.5Y 6/2	2.5Y 4/2	C	—			m			H	fr	s	s	—						
3		11-19		C2	CS	2.5Y 6/2	2.5Y 4/2	C	—			m	(shale structure)		H	fr	s	p	—						
4		19+		Cr																					
6																									
7																									
8																									
9																									
0																									

	Redoximorphic Features %	Sz	Cn	Hd	Sp	Kd	Loc	Bd	Col	Concentrations %	Sz	Cn	Hd	Sp	Kd	Loc	Bd	Col	Ped / V. Surface Features %	Dst	Cont	Kd	Loc	Col	Roots Qty	Sz	Loc	Pores Qty	Sz	Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—									—									—						2vf	1fm		2vfit			7.8	ST	95		
2	—									—									—						2vf	1fm		1vft			8.0	ST	55		
3	—									—									—						1vff			1vft			8.4	we	50		
4																																			
5																																			
6																																			
7																																			
8																																			
9																																			
10																																			

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PEDON DESCRIPTION

Pedon ID # : 51 | Draft | Mar-02

Series or Component Name: L	Map Unit Symbol:	Photo #:	Classification: Calcidic Haplustalf fine-loamy, mix, super, mesic	Soil Moist. Regime (Tax.):
Describer(s): Bob Long	Date: 9-24-07	Weather: Clear	Temp.: Air: 45° Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum: 10
Location: Sec. T. R.	UTM: Zone: mE: mN:	Topo Quad.: Alton	Site ID: YR: State: County: Pedon #:	Soil Survey Area:
MLRA / LRU:	Transect: ID: Stop #: Interval:			

Landscape: BS	Landform: Valley	Microfeature:	Anthro:	Elevation:	Aspect: S	Slope (%): 2-3	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear
Hillslope Profile Position:	Geom. Component: TR	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage: Well	Flooding: No	Ponding: No	Soil Moisture Status:	Permeability: Ksat: Mod slow
Land Cover / Use: Pasture	Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: Degree: No	Runoff: Slow	Surface Frag %: GR: — CB: — ST: — BD: — CN: — FL: — Kind:	Diagnostic Horz. / Prop.: Kind: Depth: Argillic Calcic	
P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range:				

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	Pasture grass	

MISCELLANEOUS FIELD NOTES / SKETCH :

100 feet of fence near #47

Component Name:		Map Unit Symbol:		Date: 9-24-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	SS	0-3"	A	cs		10YR 4/2	CL	—	1 m s sz 2 fm gr	sh	fr	ss	mp	—
2	SS	3-11"	Bt	as		10YR 4/2	CL	—	2 m sbk	h	fr	ms	mp	—
3	Aug	11-24	BtK	gs		10YR 5/3	CL	—	2 fm sbk	h	fr	ms	mp	—
4	Aug	24-38	BK	as		10YR 5/4	SCL	—	2 f sbk	h	fr	ss	sp	—
5	Aug	38-54	2BtK1	gs		10YR 5/3	CL	—	3 fm sbk	vh	fi	ms	mp	—
6	Aug	54-64	2BtK2			10YR 5/4	CL	—	2 fm sbk			ms	mp	—
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1		—	—	3vf 2f	2vft	8.2	VS	28		
2		—	65 CLF PF/PO	3vf 2f	2vft	8.2	VS	34		
3		DIS TOT	35 CLF PF/PO	2vf 1f	1vft	8.4	ST	32		
4		12 f CAM	—	2vf 1f	2vft	8.4	VE	22		
5		15 fm CAM	45 CLF PF/PO	1vff	1vft	8.2	ST/VE	35		
6		10-12 f CAM TH	35 CLF PF/PO	1vf	1vft	8.4	VE	32		
7										
8										
9										
10										

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PEDON DESCRIPTION

Pedon ID # : 52 | Draft | Mar-02

Series or Component Name: E/O	Map Unit Symbol:	Photo #:	Classification: Aquic Calciustept fine-loamy, mixed, superactive, frigid	Soil Moist. Regime (Tax.):
Describer(s): Bob Long	Date: 9-24-07	Weather: Temp.: Air: Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum: 1983	Location: Sec. T. R.
UTM: Zone: 12 mE: mN:	Topo Quad.: Alton	Site ID: YR: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU: Transect: ID: Stop #: Interval:

Landscape: BS	Landform: Valley	Microfeature:	Anthro:	Elevation:	Aspect: SSW	Slope (%): 2-3	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear
Hillslope Profile Position:	Geom. Component: TR	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage: well	Flooding: No	Ponding: No	Soil Moisture Status: SM/Dry / moist	Permeability: Ksat: mod slow	Land Cover / Use: Range / Grazing
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: — Degree: —	Runoff: very slow	Surface Frag %: GR: — CB: — ST: — BD: — CN: — FL: — Kind:		Diagnostic Horz. / Prop.: Kind: Depth: calcic 12-24" aquic 24-62"	
P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range: 10-40" 29% 0%					

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	grass	
	wild Rose	

MISCELLANEOUS FIELD NOTES / SKETCH :

Alkaline area

Component Name:		Map Unit Symbol:		Date: 9-24-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	SS	0-4"	A1	gs	2.5Y 6/1	2.5Y 4/4	L	—	2fmsbk 2fgr	sh	vfr	ss	sp	—
2	SS	4-12"	A2	cs	2.5Y 5/2	2.5Y 4/2	L	—	2msbk	h	fr	ss	sp	—
3	SS	12-24"	Bk	gs	10YR 7/4	10YR 5/4	SCL	—	2msbk	h	vfr	ss	sp	—
4	aug	24-32"	BKz	cs		10YR 5/4	CL	—	1fmsbk	h	fr	ss	sp	18-20% f 5YR 6/8
5	aug	32-38"	C1	gs		10YR 5/4	C	—	2fmsbk	h	fr	s	p	15-18% f 5YR 6/8
6	aug	38-54	C2g	gs		5Y 4/1	SiCL	—	2fsbk	h	fr	ms	mp	8% vf Gley1 6/10Y
7	aug	54-62	C?			2.5Y 4/2	SiCL	—	2fmsbk	h	fr	ms	mp	15 vff 2.5YR 7/6
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1	—	2% vf visible salt	—	2vf 1fm	2vfit		ST	24		slightly moist
2	—	3 salts visible	—	2vff 1m	2vft		ST	24		slightly moist
3	—	8 vf-f CaM	—	2vf 1fm	1vft		ST	24		dry
4	—	—	—	2vf 1fm	1vft		ST	28		dry
5	—	—	—	1vf	1vft		SL	40		slightly mois
6	—	—	—	1vf	1vft		SL	30		moist
7	—	—	—	1vf	1vft		SL	34		moist
8										
9										
10										

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PEDON DESCRIPTION

Pedon ID # : 53 | Draft | Mar-02

Series or Component Name: Disturbed soil	Map Unit Symbol:	Photo #:	Classification: Aeric Epiaquept co-loamy, mixed, super, frigid	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: 9-24-07	Weather: clear Temp.: Air: 55°F Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum: 1983	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad.:	Site ID: YR: State: County: Pedon #:	Soil Survey Area: ACD	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape:	Landform: Valley	Microfeature:	Anthro:	Elevation:	Aspect: SSW	Slope (%): 1	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:

Drainage: Somewhat ~~to~~ poorly	Flooding: Oc	Ponding: Oc	Soil Moisture Status: 0-27" SM 27+ Wm	Permeability: Ksat: med	Land Cover / Use: Range / Grazing

Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:	

Erosion: Kind: Degree: None	Runoff: Very slow	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:

P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range: 10-40" 16% 0%	

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	grass	
	wild rose	
	daisys	

MISCELLANEOUS FIELD NOTES / SKETCH :

Soil profile appears to be the result of organic layers developing around a spring.

Upper 27" could be result of local deposition or land leveling by man

Vegetation indicates disturbance

Component Name:		Map Unit Symbol:		Date: 9-24-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	SS	1/2-0" 0-4"	Oi A	as as	decomposing 10YR 5/2	10YR 3/2	L	—	lfsbk	sh	vfr	ss	ps	—
2	SS	4-9"	E	as	2.5Y 8/2	2.5Y 7/2	GRV SL	45 GR traverting gravel	SG	10	10	so	po	—
3	SS	9-22	C	as	2.5Y 7/1	2.5Y 6/1	SL	—	SG	10	10	so	po	5 vff 10YR 7/4
4	any	22-27"	2Oi/A	gs	2.5Y 6/2 Peat + soil	2.5Y 4/2	PT SL	—	m	sh	vfr	so	po	—
5	any	27-38"	2Oe/E	cs	2.5Y 8/2 decomposing	2.5Y 6/2	PT SL peat	—	m	sh	vfr	so	po	—
6	any	38-60	2Cg		2.5Y 6/2	2.5Y 4/2	SiL	—	m	vh	fi	ss	sp	5 vff 10YR 6/6
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1	—	—	—	3vf 2f 1m	2vfi	8.0	SL	23		slightly mois
2	—	—	—	2vff 1m	2vfi	8.2	ST	16		traverting gravels slightly moist
3	—	10 vff CAM	—	2vff 1m	2vfi	8.2	ST	16		slightly moist
4	—	—	—	2vff	3vfi	—	—	16		moist
5	—	—	—	2vff	3vfi	—	—	16		moist
6	—	—	—	1vf	1vft	7.8	VS	24		WN
7										
8		OiA 40% mineral soil								
9		OeE 40% mineral soil								
10										

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PEDON DESCRIPTION

Pedon ID # : 54 | Draft | Mar-02

Series or Component Name: fine-loamy phase of "O"	Map Unit Symbol:	Photo #:	Classification: Fluvaquentic Epiaquept fine-loamy, mix, super, frigid	Soil Moist. Regime (Tax.):
Describer(s): Bob Long	Date: 9-24-07	Weather: Clear	Temp.: Air: 65 Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum:
Location: Sec. T. R.				
UTM: Zone: mE: mN:	Topo Quad.: Alton	Site ID: YR: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:
Transect: ID: Stop #: Interval:				

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect: 5	Slope (%): 3	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage: poorly	Flooding: No	Ponding: 0	Soil Moisture Status: Slightly	Permeability: Ksat: Slow	Land Cover / Use: Range / Grazing
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: Degree: No	Runoff: Slow	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:		Diagnostic Horz. / Prop.: Kind: Depth:	
P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range: 10-40" 29% 0%					

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	wild rose	
	Arctic Rush	
	Mtn Brome	
	Daisy	

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:	five-loamy "O"	Map Unit Symbol:		Date:	9-24-07

	Obser. Method	Depth (In)	Depth (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	SS	0-3"		AO	CS	10YR 5/3	10YR 3/3	Peaty CL	—	2 f gr	sh	vfr	ms	mp	—
2	SS	3-11"		A	CS	2.5Y 6/1	2.5Y 4/1	CL	—	2 f sbk	h	fr	ms	mp	—
3	SS/Aug	11-19"		Bw	CS	2.5Y 6/2	2.5Y 4/2	CL	—	3 fm sbk	h	fr	ms	mp	—
4	Aug	19-38		BK1	gs	2.5Y 7/3	2.5Y 5/3	SiL	—	2 fm sbk	h	fr	ss	sp	8% f vf 7.5YR 7/6
5	Aug	32-38		Bk2	CS	2.5Y 6/3	2.5Y 5/3	CL	—	2 fm sbk	h	fr	ms	mp	18% f 7.5YR 7/6
6	Aug	38-48		2Bt	gs	2.5Y 6/1	2.5Y 4/1	C	—	2 m sbk	vh	vfi	vs	vp	28% f vf 7.5YR 6/6
7	Aug	48-64		2BK		2.5Y 8/2	2.5Y 7/1	C	—	m	vh	fi	s	p	35 fm 7.5YR 6/6
8															
9															
10															

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col.	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1	—	—	—	3vff 1m	2vfi		ST	30		
2	—	—	—	2vff 1m	1vft		ST	32		
3	—	—	45 CLF PD/PF	2vff 2m	1vft		ST	34		
4	—	15 f CAM	—	2vff 2m	1vft		VE	26		
5	—	15 f CAM	—	2vff 2m	1vft		VE	34		
6	—	—	70 CLF PF/PD	1vffm	1vft		me	50		
7	—	15 fm CAM	—	1vf	1vft		ST	42		
8										
9										
10										

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PEDON DESCRIPTION

Pedon ID # : 55 | Draft | Mar-02

Series or Component Name: E	Map Unit Symbol:	Photo #:	Classification: Aridic Calciustept fine-loamy, mix, super, mesic	Soil Moist. Regime (Tax.): ustic
Describer(s): Bob Long	Date: 9-24-07	Weather: Temp.: Air: Soil: Depth:	Latitude: ° ' " N Datum: Longitude: ° ' " W	Location: Sec. T. R.
UTM: Zone: 12 mE: mN:	Topo Quad.: Alton	Site ID: YR: 07 State: UT County: KA Pedon #: 55	Soil Survey Area:	MLRA / LRU: Transect: ID: Stop #: Interval:

Landscape:	Landform: Valley	Microfeature:	Anthro:	Elevation:	Aspect: N	Slope (%): 4	Slope Complexity:	Slope Shape: (Up & Dn / Across)
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage:	Flooding: No	Ponding: Ra	Soil Moisture Status:	Permeability: Ksat:	Land Cover / Use: Range / Grazing
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: sheet Degree: SL	Runoff:	Surface Frag %: GR: — CB: — ST: — BD: — CN: — FL: — Kind:		Diagnostic Horz. / Prop.: Kind: cambic Depth: 3-12"	
P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range: 10-40" 34% 0%				calcic 30-62"	

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	field bindweed	
	Rabbitbrush	

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:		Map Unit Symbol:		Date: 9-24-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	SS	0-3"	A	CS	10YR 5/2	10YR 4/3	L	—	1f sbk / 2f gr	sh	vfr	ms	mp	—
2	SS	3-12"	BW	CS	10YR 6/3	10YR 4/2	CL	—	2 m sbk / 3 f sbk	vh	fi	s	p	—
3	aug	12-30	BK1	gs	10YR 7/4	10YR 6/4	CL	—	2 f m sbk	h	fr	ms	p	—
4	aug	30-41	BK2	CS	10YR 7/4	10YR 6/4	CL	—	2 f m sbk	h	fr	ms	mp	—
5	aug	41-53	BK3	gs	10YR 6/4	10YR 5/4	CL	—	2 f m sbk	h	fr	ms	mp	20 f 7.5YR 7/6
6	aug	53-62	BK4		10YR 7/4	10YR 5/4	SCL	—	2 m sbk	h	fr	ms	mp	35 f 10YR 7/6
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1	—	—	—	2vf 1fm	2vfi	7.8	me	27		
2	—	—	—	2vf 1fm	1vf+	7.9	me	38		
3	—	8-10f CAM	—	2vf 1fm	1vf+	8.2	ST	36		
4	—	15f CAM	—	2vf 1fm	1vf+	8.4	VE	34		
5	—	12-15f CAM	—	1vff	1vf+	8.4	VE	33		
6	—	12-15f CAM	—	1vf	1vf+	8.4	VE	30		
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # : 56 | Draft | Mar-02

Series or Component Name: J	Map Unit Symbol:	Photo #:	Classification: Calcidic Argiustoll fine-loamy, mixed, super, mesic	Soil Moist. Regime (Tax.): Ustic
Describer(s): Bob Long	Date: 9-25-07	Weather: clear Temp.: Air: 40° Soil: Depth:	Latitude: ° ' " N Datum: Longitude: ° ' " W	Location: Sec. T. R.
UTM: Zone: mE: mN:	Topo Quad.:	Site ID: YR: State: County: Pedon #:	Soil Survey Area: ACD MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape:	Landform: Valley	Microfeature:	Anthro:	Elevation:	Aspect: SE 160°	Slope (%): 5	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Convex
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage: Well	Flooding: No	Ponding: No	Soil Moisture Status: SM 0-10" Dry 10"+	Permeability: Ksat: Mod	Land Cover / Use: Range / Grazing
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: Degree: None	Runoff: mod slow	Surface Frag %: GR: CB: ST: BD: CN: FL: — — — — — — Kind:		Diagnostic Horz. / Prop.: Kind: Depth: Argillic 4-32" Calcic 10-96"	
P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range: 4-24 3%					

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	ARTRW	
	Galletta grass	
	Cheatgrass	
	Serviceberry	
	Thistle	

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:	J	Map Unit Symbol:		Date:	9-25-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	Pit	0-4"	A	cs		10YR3/2	SCL	—	1 m sbk / 2 f gr	sh	vfr	ss	sp	—
2	Pit	4-10"	Bt	cs		10YR3/2	SCL	—	2 fm sbk	sh	vfr	ss	sp	—
3	Pit	10-32"	Btk	cs	10YR6/3	10YR4/3	CL	—	2 m sbk	h	fr	ms	mp	—
4	Pit	32-64"	Bk1	gs	10YR7/3	10YR5/4	SCL	—	2 m sbk	vh	fi	ms	mp	—
5	Pit	64-96"	Bk2		10YR7/4	10YR6/4	SL	—	2 m sbk	sh				
6														
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1		—	—	3vf 2f 1mc	2vf 1f	8.2	vs	24		
2		—	25 CLF PF/BR	2vff 1mc	2vft	8.3	vs	28		
3		4-5% vff CAM	20 CLF PF/BR	2vff 1m	1vft	8.4	st	32		
4		18-20% f-m CAM	—	1vff	1vft	8.6	ve	30		
5		18-20% f-m CAM	—	1vf	1vft	8.6	ve	15		
6										
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # : 57 | Draft | Mar-02

Series or Component Name: E	Map Unit Symbol:	Photo #:	Classification: Aridic Calciustept fine-loamy, mixed, super, mesic	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: 9-25-07	Weather: Clear	Temp.: Air: 50°F Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W	Datum: 1983	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad.: Alton	Site ID: YR: State: County: Pedon #:	Soil Survey Area: ALD	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape:	Landform: Valley	Microfeature:	Anthro:	Elevation:	Aspect: NW 315°	Slope (%): 2-3	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Concave / Linear

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:

Drainage: Well to 88"	Flooding: No	Ponding: Ra	Soil Moisture Status:	Permeability: Ksat: mod	Land Cover / Use: Range / Grazing

Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:	

Erosion: Kind: sheet Degree: SL	Runoff: slow	Surface Frag %: GR: — CB: — ST: — BD: — CN: — FL: — Kind:	Diagnostic Horz. / Prop.: Kind: cambic Depth: 4-10" calcic

P.S. Control Section: Ave. Clay %: 26% Ave. Rock Frag %: 0% Depth Range: 10-40"	

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	Arctic Rush	
	Poa	

MISCELLANEOUS FIELD NOTES / SKETCH :

Buried soil at 24"

fine-loamy Calciustept over co-loamy Calciustept

Component Name:		Map Unit Symbol:		Date: 9-25-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	Pit	0-4"	A	cs		10YR 4/2	CL	—	1 fm sbk 2 fgr	sh	vfr	ms	mp	—
2	Pit	4-10"	Bw	cs		10YR 4/3	CL	—	2 fm sbk	sh	vfr	ms	mp	—
3	Pit	10-24"	BK	as		7.5YR 6/4	SCL	—	2 m sbk	h	fr	ms	mp	—
4	Pit	24-34	2A	cw		10YR 4/2	L	—	3 m sbk	vh	fr	ss	sp	—
5	Pit	34-52"	2 BK1	gs		10YR 5/4	SL	—	2 m sbk	vh	fr	so	sp	—
6	Pit	52-88"	2BK2	cs		10YR 5/4	SL	—	2 mc sbk	h	fr	so	po	—
7	Pit	88-100"	2Cg			2.5Y 6/4	SCL	—	m	h	fr	ss	sp	35 fm 2.5Y 7/1
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1	—	—	—	3vf 2f 1m	2vfi	8.3	ST	32		moist
2	—	—	—	2vff 1m	2vft	8.4	SL	32		moist
3	—	40 f CAM	—	2vff 1m	1vft	8.4	me	30		dry
4	—	—	—	2vff 1m	1vft	8.2	VS	24		dry
5	—	15-18 fm CAM	—	2vff	1vft	8.2	VE	18		dry
6	—	6f CAM	—	1vf	1vft		ST	15		moist
7	—	—	—	1vf	1vft		me	25		moist
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # : 58 | Draft | Mar-02

Series or Component Name: 5	Map Unit Symbol:	Photo #:	Classification: Aridic Haplustalf fine, mixed, super, mesic	Soil Moist. Regime (Tax.): Ustic

Describer(s): Bob Long	Date: 9-25-07	Weather: Clear Temp.: Air: 52 Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum:	Location: Sec. T. R.

UTM: Zone: mE: mN:	Topo Quad.: Alton	Site ID: YR: State: County: Pedon #:	Soil Survey Area: ACD	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape:	Landform: Valley Sideslope	Microfeature:	Anthro:	Elevation:	Aspect: ENE 75°	Slope (%): 7	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear / Linear	
Hillslope Profile Position: Backslope	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:		

Drainage: Well	Flooding: No	Ponding: No	Soil Moisture Status:	Permeability: Ksat: Very slow	Land Cover / Use: Range / Grazing

Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:	

Erosion: Kind: Degree: Sheet mod	Runoff: Mod Rapid	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind: — — — — — —	Diagnostic Horz. / Prop.: Kind: Depth: argillic

P.S. Control Section: Ave. Clay %:	Ave. Rock Frag %:	
Depth Range: 4-24"	47%	0%

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	Black sage	
	Indian Ricegrass	

MISCELLANEOUS FIELD NOTES / SKETCH :

Profile very similar to #48.

No bulk samples collected.

Component Name:		Map Unit Symbol:		Date: 9-25-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	Pit	0-4"	A	CS	2.5Y 6/2	2.5Y 5/2	CL	—	1 m pl 2 fgr	h	fi	s	p	—
2	Pit	4-14"	Bt	CW		2.5Y 4/2	C	—	2 m pr 3 m abk	vh	vfi	vs	vp	—
3	Pit	14-32"	Btk	CW		2.5Y 5/2	C	—	2 m pr 3 m abk	xh	xfi	vs	vp	—
4	Pit	32-52"	Btyl	CW		2.5Y 5/3	C	—	3 m abk	xh	xfi	vs	vp	—
5	Pit	52-64"	Btyz			2.5Y 5/3	C	—	2 m abk	xh	xfi	vs	vp	—
6														
7														
8														
9														
10														

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1	—	—		2vf 1fm	2vft	7.8	SL	35		
2	—	—	90 CLF PF/PO	2vff 1m	1vft	8.0	VS	44		
3	—	35 fm CAM	95 CLF PF/PO	2vf 1f 1m	—	6.9	ST	50+		
4	—	1f gyp crystals PF	95 CLF PF/PO	1vf	—	8.4	VS	50+		
5	—	3 fm gyp masses on PF	95 CLF PF/PO	—	—	8.4	SL	50+		
6										
7										
8										
9										
10										

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # : 59 | Draft | Mar-02

Series or Component Name: A	Map Unit Symbol:	Photo #:	Classification: Aridic Calciustept Fine, mixed, super, mesic	Soil Moist. Regime (Tax.): Ustic
Describer(s): Bob Long	Date: 9-25-07	Weather: Clear	Temp.: Air: 55 Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W Datum:
Location: Sec. T. R.	UTM: Zone: mE: mN:	Topo Quad.: Alton	Site ID: YR: State: County: Pedon #:	Soil Survey Area: ACD
MLRA / LRU:	Transect: ID: Stop #: Interval:			

Landscape:	Landform: Valley	Microfeature:	Anthro:	Elevation:	Aspect: SSW	Slope (%): 1-2	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) Linear Linear
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:	

Drainage: Well to 62" poorly >62"	Flooding: No	Ponding: Oc	Soil Moisture Status:	Permeability: Ksat: slow	Land Cover / Use: Range / Grazing
Parent Material: Alluvium	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member:	
Erosion: Kind: Degree: None	Runoff: Very slow	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind: — — — — — —		Diagnostic Horz. / Prop.: Kind: Depth: Cambic 3-10" Calcic 10-45"	
P.S. Control Section: Ave. Clay %: Ave. Rock Frag %: Depth Range: 10-40" 37% 0%					

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER
	grasses (grazed short)	
	no shrubs	

MISCELLANEOUS FIELD NOTES / SKETCH :

This area appears white on aerial photo.

Component Name:		Map Unit Symbol:		Date: 9-25-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frag Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1	Pit	0-3"	A	cs	10YR6/2	10YR3/3	L	—	2fgr	sh	vfr	ss	sp	—
2	Pit	3-10"	2Bw	cs	10YR5/2	10YR3/2	CL	—	2msbk	sh	vfr	ms	mp	—
3	Pit	10-21"	2BK1	gs	10YR6/4	10YR5/4	CL	—	2mpr 2fsbk	h	fr	ms	mp	—
4	Pit	21-45"	2BK2	as	10YR7/3	10YR6/3	C	—	3msbk	vh	fi	s	p	—
5	Pit	45-53"	3A	cw	2.5Y6/2	2.5Y4/2	CL	—	2msbk	h	fr	ms	mp	—
6	Pit	53-62"	3Cy	cs	10YR7/3	10YR6/3	SCL	—	2msbk	vh	fi	ss	sp	—
7	Pit	62-76"	3Cg		2.5Y7/4	2.5Y6/4	SCL	—	m	h	fr	ss	sp	40 mc 7.5YR6/6
8														
9														
10					free water accumulating @ 75"									

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Field ECe mmhos/cm	Notes
1	—	—	—	3vfzf	2vfi		me	27		0.39	
2	—	—	—	2vff	2vfi		me	30		0.96	
3	—	8-10 fm CAM	—	2vf1f	1vft		VE	32		1.30	
4	—	12 fm CAM	—	2vf 1fk	1vft		ST	40		0.73	
5	—	—	—	1vff	1vft		SL	34		0.65	
6	—	1vf gyp crystals	—	1vf	2vfi		ST	26		0.60	
7	35f 2.5Y 7/1	—	—	—	2vfi		me	22		0.85	
8											
9											
10											

USDA PEDON DESCRIPTION — PEDON ID #: 60 — 3/2002

Series or Component Name: S	Map Unit Symbol:	Photo #:	Classification: Aridic Haplustalf fine, mixed, superactive,		Soil Moisture Regime (Tax.): ustic
Describer(s): Bob Long	Date: 9-25-07	Weather:	Temp.: Air: Soil: Depth:	Latitude: ° ' " N Longitude: ° ' " W	Datum: Location: Sec. T. R.
UTM: Zone: mE: mN:	Topo Quad: Alton	Site ID: Yr: State: County: Pedon #:	Soil Survey Area:	MLRA / LRU:	Transect: ID: Stop #: Interval:

Landscape:	Landform:	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity:	Slope Shape: (Up & Dn / Across)
	Valley side slope				E 100	4-6	Simple	convex / Linear

Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division:	Physio. Province:	Physio. Section:	State Physio. Area:	Local Physio. Area:
Backslope							

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability:	Land Cover / Use:
Well	No	No	5m to 26"	K_{sat}: Very slow	

Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member:

Erosion: Kind:	Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:
sheet	mod		— — — — — —	argillic

P. S. Control Section: Ave. Clay %: Ave. Rock Frag %:
Depth Range:

VEGETATION:

SYMBOL	COMMON NAME	% GD COVER
	Utah Juniper	60%
	Pinyon Pine	40%
	Black sage	
	no grasses	

MISCELLANEOUS FIELD NOTES / SKETCH:

correlate with #48 and 58

60

Component Name: | **Map Unit Symbol:** | **Date:** 9-25-07

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd %	Rock Frags Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Lc
1	Pit	0-3"	A	CS			CL	—		1 m sbk / 2 f gr	h	fr	ms	mp	—
2	Pit	3-12"	Bt1	CS			C	—		2 m pn / 3 fm sbk	vh	fi	s	p	—
3	Pit	12-26"	Bt2	CS			C	—		2 m pn / 3 m sbk	xh	vfi	vs	vp	—
4	Pit	26-48"	BtK	CS			C	—		3 m sbk	xh	vfi	vs	vp	—
5		48" +	Cr		black shale										
6					stopped at 48" because profile is similar to pits										
7					48 & 58; and very difficult to move any										
8					more soil among trees										
9															
10															

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	—	—	—	2vf 1fmc	2vfit		vs	35		
2	—	—	85 CLF PF/PO	2vff 1mc	1vft		vs	42		
3	—	—	95 CLF PF/PO	2vff 1mc	1vft		sl	50+		
4	—	30 fm CAM	95 CLF PF/PO	2vf 1f 1mc	1vft		st	50+		
5										
6										
7										
8										
9										
10										

Table C-1. Summary of laboratory analysis of soil samples for Coal Hollow soil survey, year 1.

Sample ID	pH (Sat Paste)	E.C. @25°C	SAR	Sand	Silt	Clay	USDA Texture Class[1]	Very Fine Sand	Saturation Percent	Available Water Capacity[2]	Organic Matter	Organic Carbon (calculated)[3]	Erodibility Factor (K-Factor)[4]	$CaCO_3$	Boron (soluble)	Se (Hot H_2O sol)	Calcium, soluble (Sat. Paste)	Magnesium, soluble (Sat. Paste)	Sodium, soluble (Sat. Paste)	Potassium, soluble (Sat. Paste)	Nitrogen-Nitrate	Phosphorus	Alkalinity
	units	dS/m	unitless	%	%	%		%	%	in/in	%	%	unitless	%	mg/Kg	mg/Kg	meq/L	meq/L	meq/L	meq/L	mg/Kg	mg/Kg	meq/L
1YR-9A 0-12"	9.0	0.91	0.30	60	32	8	SL	26.6	47.0	0.12	4.7	2.5	0.11	26.1	†	†	0.98	7.93	0.62	0.65	4.23	10.0	6.90
1YR-9A 12-24"	9.1	0.83	0.23	68	22	10	SL	22.2	32.8	0.12	1.4	0.7	0.17	22.0	†	†	0.44	7.78	0.46	0.71	0.21	2.02	7.94
1YR-9A 24-42"	9.6	1.26	3.71	68	22	10	SL	20.4	26.4	0.12	0.3	0.2	0.18	23.6	†	†	0.76	6.48	7.06	0.34	0.13	2.22	10.6
1YR-9A 42-70"	9.4	0.90	3.19	69	21	10	SL	26.7	27.7	0.12	0.3	0.2	0.17	23.5	†	†	0.63	3.77	4.73	0.16	0.26	1.88	5.22
1YR-9A 70-100"	8.5	1.31	1.48	30	31	39	CL	27.3	68.6	0.19	0.5	0.3	0.22	9.8	†	†	1.72	8.32	3.31	0.19	0.29	0.82	2.82
1YR-9B 0-6"	8.0	0.62	0.07	44	32	24	L	14.5	63.0	0.16	6.1	3.2	0.09	18.6	†	†	2.19	3.21	0.12	0.74	1.73	1.44	4.49
1YR-9B 6-14"	8.2	0.34	0.21	52	25	23	SCL	18.1	42.4	0.17	3.4	1.8	0.22	15.3	†	†	1.17	1.67	0.25	0.30	0.91	<0.01	2.30
1YR-9B 14-28"	8.5	0.88	0.57	64	22	14	SL	9.7	35.7	0.12	0.9	0.5	0.17	21.2	†	†	1.16	5.71	1.06	0.72	0.50	<0.01	3.03
1YR-9B 28-48"	8.3	0.76	0.70	54	30	16	SL	16.0	31.0	0.12	0.4	0.2	0.22	26.4	†	†	1.49	4.64	1.23	0.37	0.48	<0.01	2.40
1YR-10 0-7"	7.8	0.46	0.05	36	38	26	L	17.9	46.4	0.16	3.9	2.1	0.15	19.2	0.29	<0.02	3.39	0.89	0.08	0.30	3.15	7.45	4.18
1YR-10 7-13"	7.7	0.40	0.06	26	48	26	L	12.3	44.4	0.16	2.4	1.3	0.29	13.9	0.31	<0.02	2.58	0.80	0.08	0.24	0.46	0.67	3.13
1YR-10 13-26"	7.9	0.34	0.07	14	52	34	SiCL	9.4	41.7	0.18	1.6	0.8	0.37	27.8	0.20	<0.02	2.00	0.95	0.09	0.21	0.44	0.37	3.03
1YR-10 26-44"	8.3	0.36	0.16	30	36	34	CL	29.1	45.4	0.19	1.0	0.5	0.25	35.5	0.37	<0.02	0.83	2.50	0.20	0.08	0.15	<0.01	3.55
1YR-10 44-68"	8.5	0.34	0.49	14	54	32	SiCL	7.0	46.0	0.18	0.5	0.3	0.42	34.4	0.24	<0.02	0.71	2.07	0.58	0.05	0.19	<0.01	2.51
1YR-10 68-84"	8.4	0.46	0.48	60	30	10	SL	24.5	28.0	0.12	0.2	0.1	0.24	26.4	0.07	<0.02	0.77	2.96	0.66	0.05	0.32	0.67	2.93
1YR-11 0-5"	8.0	0.48	0.19	72	19	9	SL	19.9	36.3	0.12	2.4	1.3	0.07	1.4	†	†	2.44	1.84	0.28	0.39	1.58	8.21	3.76
1YR-11 5-16"	8.2	0.50	0.28	69	17	14	SL	20.0	31.3	0.12	1.7	0.9	0.13	4.2	†	†	2.76	1.42	0.40	0.36	0.13	0.82	3.55
1YR-11 16-32"	8.3	0.38	0.22	72	18	10	SL	16.1	27.9	0.12	0.9	0.5	0.15	14.4	†	†	1.89	0.87	0.26	0.37	0.20	1.53	3.13
1YR-11 32-48"	8.3	0.41	0.26	79	13	8	LS	17.1	27.3	0.08	0.5	0.3	0.12	19.6	†	†	1.90	1.06	0.32	0.29	0.23	0.44	2.93
1YR-11 48-72"	8.6	0.33	0.24	78	14	8	LS	18.4	28.1	0.08	0.3	0.2	0.13	21.7	†	†	1.44	0.96	0.27	0.12	0.12	2.20	2.82
1YR-11 72-90"	8.7	0.29	0.35	89	7	4	S	14.1	23.9	0.05	0.2	0.1	0.08	18.2	†	†	1.37	1.15	0.39	0.13	0.10	4.93	2.19
1YR-12 0-5"	7.8	0.38	0.13	32	40	28	CL	28.9	46.8	0.19	2.3	1.2	0.20	0.1	†	†	2.66	0.91	0.17	0.20	0.87	7.33	3.03
1YR-12 5-10"	7.8	0.29	0.59	29	39	32	CL	22.2	50.6	0.19	1.9	1.0	0.26	9.3	†	†	1.79	0.69	0.66	0.08	0.67	0.22	2.51
1YR-12 10-26"	8.4	0.21	2.20	16	40	44	SiC	13.8	58.6	0.20	0.7	0.4	0.30	18.8	†	†	0.50	0.24	1.34	0.04	0.94	<0.01	1.99
1YR-12 26-44"	8.3	0.86	6.84	46	19	35	SC	45.0	93.0	0.19	0.7	0.4	0.19	11.9	†	†	0.91	0.57	5.89	0.08	0.20	<0.01	1.67
SP-13 0-6"	8.5	0.72	0.17	59	23	18	SL	15.8	34.1	0.12	2.7	1.4	0.08	19.7	†	†	4.77	2.10	0.31	0.90	3.78	39.5	5.64
SP-13 6-12"	8.2	0.52	0.22	23	51	26	SiL	12.7	43.3	0.18	1.7	0.9	0.32	27.9	†	†	2.64	1.72	0.33	0.41	0.18	3.83	3.87
SP-13 12-24"	8.4	0.55	0.23	14	44	42	SiC	9.1	62.3	0.20	2.9	1.5	0.29	26.9	†	†	1.67	3.09	0.35	0.26	0.50	0.70	3.87
SP-13 24-48"	8.5	0.47	0.29	22	46	32	CL	9.5	46.3	0.19	1.2	0.6	0.31	32.2	†	†	0.91	3.26	0.42	0.12	0.46	0.44	3.55
SP-13 48-60"	8.8	0.31	0.51	33	39	28	CL	13.4	46.1	0.19	1.8	0.9	0.27	29.2	†	†	0.53	3.00	0.67	0.10	0.17	<0.01	1.67
SP-13 60-72"	8.9	1.46	2.20	62	14	24	SCL	19.2	35.6	0.17	1.2	0.6	0.18	20.6	†	†	1.64	8.30	4.90	0.14	0.23	0.99	7.00
SP-13 72-84"	8.7	2.20	2.36	44	36	20	L	18.5	33.5	0.16	0.5	0.3	0.25	28.7	†	†	2.07	15.5	7.00	0.20	0.29	0.73	3.03
SP-14 0-6"	8.7	0.54	0.14	8	48	44	SiC	5.3	58.6	0.20	4.0	2.1	0.21	7.5	†	†	2.34	2.42	0.22	0.35	0.38	8.92	4.81
SP-14 6-13"	7.8	0.36	0.22	8	48	44	SiC	5.7	62.4	0.20	2.1	1.1	0.31	19.9	†	†	1.08	2.05	0.27	0.17	0.58	2.94	2.61
SP-14 13-28"	8.1	0.53	0.49	23	50	27	CL	21.4	50.7	0.19	0.7	0.4	0.36	44.0	†	†	0.41	3.76	0.70	0.14	0.17	4.40	4.28
SP-14 28-48"	8.7	0.77	1.35	40	43	17	L	33.6	43.7	0.16	0.4	0.2	0.34	39.3	†	†	0.49	5.04	2.24	0.10	0.21	2.67	3.55
SP-14 48-70"	8.8	0.80	1.60	21	40	39	CL	5.6	41.7	0.19	0.4	0.2	0.24	30.9	†	†	0.54	4.79	2.61	0.11	0.41	3.54	5.12
SP-14 70-90"	8.5	0.89	1.28	21	47	32	CL	17.7	55.0	0.19	0.6	0.3	0.32	31.5	†	†	0.74	3.87	1.94	0.11	0.64	0.31	2.61

Table C-1. Summary of laboratory analysis of soil samples for Coal Hollow soil survey, year 1.

Sample ID	pH (Sat Paste)	E.C. @25°C	SAR	Sand	Silt	Clay	USDA Texture Class[1]	Very Fine Sand	Saturation Percent	Available Water Capacity[2]	Organic Matter	Organic Carbon (calculated)[3]	Erodibility Factor (K-Factor)[4]	$CaCO_3$	Boron (soluble)	Se (Hot H_2O sol)	Calcium, soluble (Sat. Paste)	Magnesium, soluble (Sat. Paste)	Sodium, soluble (Sat. Paste)	Potassium, soluble (Sat. Paste)	Nitrogen-Nitrate	Phosphorus	Alkalinity
	units	dS/m	unitless	%	%	%		%	%	in/in	%	%	unitless	%	mg/Kg	mg/Kg	meq/L	meq/L	meq/L	meq/L	mg/Kg	mg/Kg	meq/L
LOF-1 0-6"	7.3	1.56	0.23	25	39	36	CL	20.1	50.2	0.19	3.6	1.9	0.16	22.6	†	†	9.03	2.09	0.55	2.20	1.99	2.86	3.76
LOF-1 6-12"	8.3	0.52	1.15	26	38	36	CL	24.3	54.4	0.19	1.8	0.9	0.25	27.1	†	†	2.63	1.09	1.57	0.18	<0.02	0.18	3.45
LOF-1 12-24"	8.5	0.42	2.91	18	40	42	SiC	16.5	54.8	0.20	1.6	0.8	0.29	26.6	†	†	1.07	0.59	2.65	0.07	0.23	0.93	2.72
LOF-1 24-42"	8.7	0.90	4.02	13	41	46	SiC	11.3	60.8	0.20	1.5	0.8	0.28	27.1	†	†	1.61	0.87	4.47	0.14	0.34	<0.01	4.08
LOF-1 42-60"	8.4	4.75	12.3	19	39	42	C	17.1	65.4	0.19	1.1	0.6	0.29	28.3	†	†	6.45	7.65	32.7	0.45	0.21	0.07	1.67
LOF-2 0-7"	7.6	0.47	0.16	32	37	31	CL	14.9	43.3	0.19	2.7	1.4	0.17	18.6	0.27	<0.02	4.93	1.26	0.29	0.65	1.58	9.55	3.13
LOF-2 7-12"	7.7	0.31	0.19	34	34	32	CL	22.3	44.8	0.19	2.4	1.3	0.23	20.1	0.24	<0.02	2.07	0.68	0.22	0.19	0.55	0.40	2.19
LOF-2 12-24"	7.8	0.25	0.62	14	40	46	SiC	12.4	60.2	0.20	1.8	0.9	0.28	26.7	0.30	<0.02	1.29	0.57	0.59	0.09	0.31	<0.01	2.19
LOF-2 24-48"	8.0	0.32	2.12	22	37	41	C	20.2	67.7	0.19	1.7	0.9	0.23	26.9	0.45	<0.02	0.77	0.53	1.71	0.07	0.88	0.04	1.88
LOF-2 48-72"	7.8	7.38	7.27	14	43	43	SiC	11.3	66.7	0.20	1.1	0.6	0.30	27.5	1.08	0.09	23.8	24.9	35.8	0.50	1.07	0.40	1.25
LOF-2 72-96"	7.8	7.17	7.75	18	35	47	C	13.0	62.9	0.19	1.1	0.6	0.26	21.0	0.61	0.12	21.6	26.3	37.9	0.47	13.1	0.76	0.94
LOF-3 0-4"	8.1	0.82	0.27	32	42	26	L	17.5	47.7	0.16	3.9	2.1	0.16	20.3	†	†	5.98	1.58	0.53	1.02	10.6	<0.01	5.64
LOF-3 4-11"	8.3	0.43	0.25	24	48	28	CL	15.9	51.8	0.19	2.9	1.5	0.30	20.4	†	†	3.19	0.73	0.36	0.27	1.07	0.90	3.55
LOF-3 11-19"	8.1	0.41	0.32	16	50	34	SiCL	14.0	42.7	0.18	2.3	1.2	0.35	24.2	†	†	2.86	0.88	0.44	0.22	0.43	0.56	2.51
LOF-3 19-33"	8.4	0.71	4.05	17	43	40	SiC	16.1	53.5	0.20	2.2	1.2	0.30	27.2	†	†	1.67	0.89	4.58	0.15	0.32	0.07	3.87
LOF-4 0-5"	7.8	0.62	0.29	12	46	42	SiC	9.1	52.6	0.20	3.5	1.8	0.22	22.5	†	†	4.54	1.04	0.49	0.26	4.16	0.79	3.03
LOF-4 5-10"	7.7	0.31	0.26	14	46	40	SiC	11.0	53.0	0.20	2.8	1.5	0.30	24.4	†	†	2.28	0.63	0.32	0.08	0.66	9.76	2.72
LOF-4 10-19"	7.8	0.33	0.60	12	43	45	SiC	10.5	53.9	0.20	2.1	1.1	0.29	25.3	†	†	2.00	0.78	0.71	0.08	0.53	0.64	2.40
LOF-4 19-31"	7.9	0.29	1.16	13	43	44	SiC	11.3	53.6	0.20	1.8	0.9	0.29	25.3	†	†	1.12	0.52	1.05	0.06	0.40	0.67	1.88
LOF-4 31-50"	7.8	4.06	5.43	19	39	42	C	16.3	59.8	0.19	1.1	0.6	0.29	27.6	†	†	16.3	12.4	20.5	0.51	1.06	0.43	1.46
RDV-5 0-5"	8.1	0.54	0.27	38	44	18	L	22.6	42.7	0.16	3.6	1.9	0.20	25.7	†	†	3.72	0.90	0.41	0.36	6.14	10.4	3.97
RDV-5 5-10"	8.1	0.50	0.19	33	47	20	L	18.9	39.3	0.16	3.0	1.6	0.29	26.4	†	†	3.98	0.95	0.30	0.23	<0.02	1.82	4.08
RDV-5 10-25"	8.4	0.37	0.31	54	32	14	SL	19.0	32.3	0.12	1.1	0.6	0.23	31.1	†	†	2.37	0.89	0.40	0.22	0.22	16.4	2.72
RDV-5 25-48"	8.8	0.72	7.45	16	72	12	SiL	13.4	56.0	0.18	1.7	0.9	#N/A	28.0	†	†	0.84	0.60	6.33	0.11	0.16	1.48	4.91
RDV-5 48-60"	9.0	3.37	24.0	31	47	22	L	26.6	83.6	0.16	1.3	0.7	0.32	26.5	†	†	1.26	1.76	29.5	0.20	0.22	1.62	6.06
RDV-6 0-6"	8.1	0.52	0.34	82	12	6	LS	21.0	27.9	0.08	1.1	0.6	0.04	18.4	†	†	2.99	1.06	0.48	0.77	1.68	9.41	3.97
RDV-6 6-12"	8.3	0.31	0.25	80	14	6	LS	18.5	29.9	0.08	0.7	0.4	0.13	20.6	†	†	2.13	0.47	0.28	0.14	0.24	0.67	2.51
RDV-6 12-24"	8.0	0.64	0.20	45	37	18	L	17.8	35.4	0.16	2.6	1.4	0.25	28.9	†	†	4.52	1.68	0.36	0.33	<0.02	0.56	4.18
RDV-6 24-34"	8.3	0.40	0.30	69	23	8	SL	35.5	29.7	0.12	0.7	0.4	0.19	29.2	†	†	2.43	1.35	0.41	0.18	0.07	0.56	2.93
RDV-6 34-60"	8.5	0.83	3.43	19	41	40	SiC	15.5	52.9	0.20	1.8	0.9	0.30	25.9	†	†	1.83	2.24	4.89	0.19	0.03	<0.01	5.96
RDV-7 0-6"	7.5	0.58	0.13	26	38	36	CL	20.4	62.9	0.19	4.4	2.3	0.14	10.6	†	†	3.93	1.17	0.20	0.28	2.19	12.5	3.76
RDV-7 6-12"	7.6	0.36	0.22	18	38	44	C	11.9	57.1	0.19	3.0	1.6	0.26	13.2	†	†	2.37	0.78	0.27	0.09	0.28	7.78	2.82
RDV-7 12-24"	8.0	0.24	1.30	16	37	47	C	13.6	55.3	0.19	1.8	0.9	0.26	21.2	†	†	0.82	0.44	1.04	0.04	0.40	0.73	2.09
RDV-7 24-60"	8.0	1.40	5.18	22	34	44	C	20.8	63.8	0.19	1.4	0.7	0.26	23.4	†	†	2.65	2.00	7.90	0.11	0.30	0.46	1.78
1YR-8 0-8"	8.0	0.68	0.18	36	34	30	CL	19.7	51.5	0.19	5.8	3.1	0.12	5.1	†	†	3.68	2.81	0.33	0.45	3.82	10.9	5.54
1YR-8 8-14"	8.1	0.53	0.18	38	32	30	CL	17.2	43.1	0.19	2.1	1.1	0.23	16.3	†	†	3.22	1.63	0.29	0.34	0.05	0.07	2.93
1YR-8 14-22"	8.5	0.40	0.43	48	30	22	L	19.5	35.8	0.16	1.1	0.6	0.22	27.3	†	†	1.77	1.31	0.53	0.37	0.17	0.21	2.30
1YR-8 22-45"	8.9	0.44	0.28	42	42	16	L	23.9	37.6	0.16	0.7	0.4	0.33	30.8	†	†	0.71	3.05	0.39	0.45	0.50	2.51	3.55
1YR-8 45-65"	9.0	0.49	0.28	79	13	8	LS	19.8	27.4	0.08	0.4	0.2	0.12	19.3	†	†	0.70	3.46	0.40	0.41	0.27	0.18	3.66
1YR-8 65-85"	8.9	0.56	0.65	80	12	8	LS	17.9	25.9	0.08	0.3	0.2	0.11	20.4	†	†	1.24	3.81	1.03	0.19	0.20	0.10	4.18

Table C-1. Summary of laboratory analysis of soil samples for Coal Hollow soil survey, year 1.

Sample ID	pH (Sat Paste)	E.C. @25°C	SAR	Sand	Silt	Clay	USDA Texture Class[1]	Very Fine Sand	Saturation Percent	Available Water Capacity[2]	Organic Matter	Organic Carbon (calculated)[3]	Erodibility Factor (K-Factor)[4]	$CaCO_3$	Boron (soluble)	Se (Hot H_2O sol)	Calcium, soluble (Sat. Paste)	Magnesium, soluble (Sat. Paste)	Sodium, soluble (Sat. Paste)	Potassium, soluble (Sat. Paste)	Nitrogen-Nitrate	Phosphorus	Alkalinity
	units	dS/m	unitless	%	%	%		%	%	in/in	%	%	unitless	%	mg/Kg	mg/Kg	meq/L	meq/L	meq/L	meq/L	mg/Kg	mg/Kg	meq/L
SP-15 0-8"	8.0	0.54	0.08	52	32	16	SL	24.2	46.5	0.12	3.5	1.8	0.16	10.8	†	†	2.01	2.43	0.12	0.41	0.68	4.82	4.70
SP-15 8-20"	8.5	0.50	0.11	50	32	18	L	24.3	35.2	0.16	0.8	0.4	0.21	27.6	†	†	0.70	3.80	0.17	0.31	0.16	1.80	4.60
SP-15 20-37"	8.7	0.78	0.72	51	34	15	L	23.7	30.7	0.16	0.5	0.3	0.27	31.9	†	†	0.64	5.91	1.30	0.21	0.58	1.56	4.08
SP-15 37-58"	8.6	1.56	1.81	39	43	18	L	22.7	36.9	0.16	0.4	0.2	0.33	33.4	†	†	0.90	12.0	4.60	0.18	0.32	1.20	3.03
SP-15 58-73"	8.4	3.35	1.92	74	18	8	SL	19.2	27.2	0.12	0.1	0.1	0.15	26.3	†	†	2.52	33.5	8.14	0.26	0.36	0.82	1.99
SP-15 73-96"	8.3	1.77	1.24	52	34	14	SL	25.3	30.2	0.12	0.3	0.2	0.26	28.1	†	†	1.70	12.4	3.30	0.19	0.54	<0.01	2.82
SP-16 0-8"	8.3	0.58	0.31	19	45	36	SiCL	15.1	64.5	0.18	4.8	2.5	0.21	9.6	†	†	3.08	1.84	0.49	0.42	1.19	18.3	4.81
SP-16 8-18"	8.2	0.60	0.25	12	44	44	SiC	10.8	61.9	0.20	1.9	1.0	0.30	24.5	†	†	2.00	2.77	0.39	0.28	0.21	4.70	3.55
SP-16 18-36"	8.7	0.45	0.38	20	52	28	CL	16.2	50.6	0.19	0.6	0.3	0.37	38.8	†	†	0.68	3.12	0.53	0.19	0.24	6.45	4.18
SP-16 36-56"	9.0	0.34	0.56	14	58	28	SiCL	12.4	52.2	0.18	0.6	0.3	0.46	40.1	†	†	0.45	3.38	0.77	0.14	0.23	5.10	3.66
SP-16 56-68"	8.9	0.60	0.78	50	36	14	L	21.6	36.3	0.16	0.3	0.2	0.30	28.1	†	†	0.52	4.30	1.21	0.16	0.30	2.83	4.08
SP-16 68-96"	8.9	0.53	0.81	23	49	28	CL	17.0	55.3	0.19	0.6	0.3	0.36	31.0	†	†	1.00	3.49	1.21	0.18	0.24	1.25	4.81
WRD-17 0-9"	7.8	0.43	0.11	22	42	36	CL	11.0	49.8	0.19	4.6	2.4	0.22	25.4	†	†	1.74	1.11	0.14	0.51	1.09	8.05	3.34
WRD-17 9-18"	8.0	0.24	0.17	34	34	32	CL	16.6	39.6	0.19	2.0	1.1	0.20	25.3	†	†	1.14	0.63	0.16	0.23	0.28	1.26	1.78
WRD-17 18-30"	8.0	0.32	0.11	44	34	22	L	17.3	38.5	0.16	1.6	0.8	0.23	25.3	†	†	0.99	0.69	0.10	0.15	0.85	2.49	2.61
WRD-17 30-45"	8.1	0.28	0.13	36	37	27	CL	17.5	39.3	0.19	0.8	0.4	0.27	29.5	†	†	0.59	0.56	0.10	0.05	0.10	2.82	2.40
WRD-17 45-60"	8.2	0.34	0.22	24	44	32	CL	14.8	40.0	0.19	0.8	0.4	0.31	33.5	†	†	1.17	1.64	0.26	0.07	0.11	0.13	2.19
WRD-17 60-80"	8.0	0.82	0.37	18	40	42	SiC	17.0	61.3	0.20	1.1	0.6	0.30	33.0	†	†	2.86	4.00	0.69	0.14	0.59	0.70	1.88
WRD-18A 0-7"	7.7	0.61	0.10	41	33	26	L	18.3	46.0	0.16	3.9	2.1	0.17	20.2	†	†	3.08	1.36	0.15	0.59	0.57	1.95	3.97
WRD-18A 7-15"	8.0	0.33	0.12	43	33	24	L	20.0	43.4	0.16	2.1	1.1	0.19	24.7	†	†	1.45	1.00	0.13	0.28	0.68	0.61	2.30
WRD-18A 15-30	8.1	0.51	0.29	60	23	17	SL	17.6	31.1	0.12	0.7	0.4	0.15	28.2	†	†	1.97	2.13	0.41	0.09	0.08	2.43	2.30
WRD-18A 30-45	8.0	0.67	0.30	24	41	35	CL	13.8	52.4	0.19	1.5	0.8	0.28	29.3	†	†	2.66	3.06	0.51	0.12	0.13	0.34	1.88
WRD-18A 45-60	7.9	0.44	0.36	57	23	20	SCL	18.4	36.1	0.17	0.7	0.4	0.23	25.8	†	†	1.67	1.63	0.47	0.06	0.16	<0.01	2.09
WRD-18B 0-9"	8.2	0.35	0.18	34	40	26	L	11.4	43.4	0.16	3.6	1.9	0.16	23.8	0.39	<0.02	4.56	1.75	0.31	0.65	3.96	18.6	5.54
WRD-18B 9-19"	8.3	0.61	0.17	50	30	20	L	16.2	41.3	0.16	1.8	0.9	0.22	20.3	0.25	<0.02	3.45	1.56	0.27	0.80	0.31	2.89	4.60
WRD-18B 19-34	8.5	0.52	0.21	44	38	18	L	21.0	35.8	0.16	1.2	0.6	0.28	27.5	0.18	<0.02	2.41	2.17	0.31	0.18	0.09	5.50	3.13
WRD-18B 34-54	8.7	0.38	0.27	21	47	32	CL	13.4	45.5	0.19	1.4	0.7	0.31	29.0	0.33	<0.02	1.63	1.70	0.35	0.12	0.50	0.93	2.61
WRD-18B 54-72	8.6	0.57	0.31	22	44	34	CL	11.8	49.6	0.19	1.1	0.6	0.29	28.3	0.29	<0.02	1.92	2.53	0.46	0.18	0.10	1.19	3.76
WRD-18B 72-96	8.6	1.46	0.56	48	32	20	L	21.2	34.7	0.16	0.5	0.3	0.25	23.1	0.19	<0.02	2.97	11.0	1.48	0.19	0.45	0.21	8.99
WRD-19 0-6"	8.0	0.91	0.15	34	42	24	L	16.5	48.5	0.16	4.9	2.6	0.15	20.1	†	†	4.87	2.07	0.28	1.72	2.77	12.9	6.69
WRD-19 6-12"	8.2	0.65	0.20	32	36	32	CL	13.1	44.1	0.19	3.0	1.6	0.23	17.4	†	†	3.43	1.45	0.30	1.14	1.85	8.32	4.39
WRD-19 12-24"	8.3	0.53	0.23	34	36	30	CL	15.8	40.8	0.19	2.0	1.1	0.25	23.5	†	†	2.85	1.21	0.32	0.87	0.67	1.99	2.51
WRD-19 24-37"	8.5	0.55	0.19	49	29	22	L	24.5	40.8	0.16	1.9	1.0	0.21	24.6	†	†	2.71	1.11	0.26	0.76	0.35	0.99	3.13
WRD-19 37-51"	8.4	0.57	0.18	60	26	14	SL	24.2	34.1	0.12	1.2	0.6	0.19	22.7	†	†	2.94	1.39	0.27	0.59		1.53	2.40
WRD-19 51-68"	8.5	0.48	0.26	66	22	12	SL	17.5	29.1	0.12	0.8	0.4	0.17	19.7	†	†	2.07	1.87	0.36	0.22	0.41	1.71	3.45
WRD-19 68-90"	8.7	0.37	0.30	71	19	10	SL	17.6	26.0	0.12	0.6	0.3	0.16	19.8	†	†	1.11	2.06	0.37	0.10	0.18	1.88	2.93
WRD-20 0-6"	7.9	0.57	0.08	39	37	24	L	15.4	53.3	0.16	6.6	3.5	0.20	18.4	†	†	2.75	1.83	0.12	0.58	0.19	0.94	4.49
WRD-20 6-13"	7.8	0.56	0.10	41	29	30	CL	17.7	47.6	0.19	2.4	1.3	0.16	20.8	†	†	2.47	1.47	0.14	0.67	0.12	1.62	3.13
WRD-20 13-28"	8.1	0.27	0.14	69	21	10	SL	18.6	24.1	0.12	0.6	0.3	0.15	25.4	†	†	1.22	0.63	0.13	0.32	0.07	0.37	2.30
WRD-20 28-54"	8.0	0.32	0.07	79	14	7	LS	15.8	25.4	0.08	0.2	0.1	0.03	21.7	†	†	1.40	0.76	0.07	0.42	0.03	0.94	2.72
WRD-20 54-72"	8.1	0.27	0.23	45	29	26	L	13.9	38.5	0.16	1.1	0.6	0.22	24.3	†	†	1.18	0.87	0.24	0.21	0.53	1.23	2.51
WRD-20 72-96"	8.2	0.32	0.16	82	13	5	LS	17.6	28.3	0.08	0.3	0.2	0.02	16.5	†	†	0.97	1.23	0.16	0.28	0.29	0.28	2.51

Table C-1. Summary of laboratory analysis of soil samples for Coal Hollow soil survey, year 1.

Sample ID	pH (Sat Paste)	E.C. @25°C	SAR	Sand	Silt	Clay	USDA Texture Class[1]	Very Fine Sand	Saturation Percent	Available Water Capacity[2]	Organic Matter	Organic Carbon (calculated)[3]	Erodibility Factor (K-Factor)[4]	$CaCO_3$	Boron (soluble)	Se (Hot H_2O sol)	Calcium, soluble (Sat. Paste)	Magnesium, soluble (Sat. Paste)	Sodium, soluble (Sat. Paste)	Potassium, soluble (Sat. Paste)	Nitrogen-Nitrate	Phosphorus	Alkalinity
	units	dS/m	unitless	%	%	%		%	%	in/in	%	%	unitless	%	mg/Kg	mg/Kg	meq/L	meq/L	meq/L	meq/L	mg/Kg	mg/Kg	meq/L
WRD-21 0-8"	8.4	0.46	0.19	61	11	28	SCL	18.6	30.6	0.17	2.0	1.1	0.16	21.2	†	†	2.94	0.74	0.26	0.48	2.30	7.11	3.76
WRD-21 8-18"	8.1	0.66	0.17	59	11	30	SCL	47.0	46.0	0.17	3.2	1.7	0.15	29.8	†	†	4.12	1.78	0.29	0.20	0.75	0.87	4.08
WRD-21 18-36"	8.4	0.49	0.22	68	18	14	SL	18.2	30.5	0.12	1.2	0.6	0.14	20.3	†	†	2.64	1.61	0.33	0.10	0.26	2.48	2.72
WRD-21 36-50"	8.7	0.48	0.24	67	25	8	SL	14.2	28.6	0.12	0.9	0.5	0.20	21.6	†	†	2.71	1.62	0.36	0.15	0.35	0.79	3.34
WRD-21 50-62"	8.7	0.37	0.25	69	23	8	SL	14.8	27.9	0.12	1.0	0.5	0.18	16.8	†	†	1.91	1.24	0.32	0.12	0.46	2.66	2.51
WRD-21 62-96"	8.7	0.32	0.25	68	20	12	SL	23.7	26.7	0.12	0.7	0.4	0.06	20.7	†	†	1.34	1.60	0.30	0.09	0.17	1.07	2.51
WRD-22 0-6"	7.7	0.40	0.07	63	23	14	SL	25.0	36.6	0.12	1.8	0.9	0.26	20.2	†	†	2.16	0.88	0.08	0.35	1.94	4.52	3.13
WRD-22 6-15"	7.7	0.34	0.13	19	42	39	SiCL	7.0	48.0	0.18	3.7	1.9	0.30	23.8	†	†	1.85	0.83	0.16	0.19	0.76	9.01	2.72
WRD-22 15-28"	8.0	0.29	0.11	47	27	26	SCL	5.6	34.9	0.17	1.2	0.6	0.22	18.9	†	†	1.64	0.80	0.13	0.18	0.80	0.31	2.72
WRD-22 28-48"	8.0	0.25	0.14	65	21	14	SL	13.7	28.0	0.12	0.8	0.4	0.16	17.9	†	†	1.18	0.64	0.13	0.16	0.29	0.13	2.30
WRD-22 48-60"	8.0	0.27	0.10	65	21	14	SL	14.5	30.1	0.12	1.0	0.5	0.16	17.5	†	†	1.34	0.67	0.10	0.16	0.35	0.07	2.30
WRD-22 60-84"	8.2	0.30	0.09	74	18	8	SL	21.8	27.3	0.12	0.5	0.3	0.15	21.0	†	†	1.08	0.96	0.09	0.25	0.57	0.28	2.51
WRD-23 0-6"	7.7	0.60	0.05	31	38	31	CL	12.5	48.4	0.19	4.9	2.6	0.22	21.4	†	†	3.20	1.35	0.07	0.53	1.43	8.26	4.60
WRD-23 6-12"	7.9	0.38	0.13	36	33	31	CL	14.7	44.6	0.19	2.9	1.5	0.19	23.6	†	†	1.97	0.91	0.15	0.30	0.31	1.74	3.34
WRD-23 12-22"	7.9	0.35	0.12	38	34	28	CL	12.5	41.0	0.19	1.8	0.9	0.23	25.6	†	†	1.76	0.92	0.14	0.16	0.29	1.09	3.24
WRD-23 22-40"	8.0	0.24	0.16	51	30	19	L	17.2	33.2	0.16	0.7	0.4	0.22	29.8	†	†	1.12	0.77	0.15	0.06	0.21	1.03	2.30
WRD-23 40-62"	8.2	0.23	0.24	31	44	25	L	20.0	38.6	0.16	0.6	0.3	0.31	35.3	†	†	1.01	0.94	0.24	0.06	0.89	0.28	1.99
WRD-23 62-80"	8.1	0.44	0.48	18	41	41	SiC	14.0	43.9	0.20	0.8	0.4	0.31	30.4	†	†	1.61	1.95	0.64	0.14	0.35	1.65	2.09
DAH-24 0-5"	7.6	0.26	0.53	34	19	47	C	33.0	73.6	0.19	1.3	0.7	0.17	2.9	0.23	<0.02	1.25	0.58	0.50	0.09	4.14	2.25	1.57
DAH-24 5-17"	7.7	0.43	1.32	42	14	44	C	41.4	84.1	0.19	1.2	0.6	0.19	8.7	0.42	<0.02	1.62	0.65	1.40	0.09	0.19	0.16	1.88
DAH-24 17-32"	8.1	7.79	10.0	38	17	45	C	36.5	91.2	0.19	0.9	0.5	0.20	5.0	0.73	<0.02	18.7	30.7	49.9	0.54	0.09	<0.01	1.88
DAH-25 0-5"	6.4	0.21	0.55	32	28	40	C	21.1	58.5	0.19	3.3	1.7	0.25	1.7	†	†	0.98	0.62	0.49	0.08	3.85	6.80	0.52
DAH-25 5-13"	7.0	0.33	0.21	30	23	47	C	21.6	80.6	0.19	2.4	1.3	0.20	30.3	†	†	1.90	0.68	0.23	0.13	0.20	0.19	1.36
DAH-25 13-20"	7.2	0.28	0.23	30	24	46	C	20.7	73.5	0.19	2.1	1.1	0.19	39.4	†	†	1.44	0.44	0.22	0.12	0.29	1.32	1.88
DAH-25 20-32"	7.7	0.26	0.25	48	19	33	SCL	37.6	54.1	0.17	1.2	0.6	0.19	3.8	†	†	1.34	0.52	0.25	0.09	0.15	0.43	1.88
SP-28 0-8"	7.7	0.47	0.65	7	38	55	C		60.2	0.12	2.5	1.3		18.9	†	†	2.8	2.3	1.0	1.00	3.9	<5	†
SP-28 8-24"	8.0	0.48	1.50	9	34	57	C		65.4	0.12	1.4	0.7		17.6	†	†	1.8	2.4	2.2	0.77	1.6	<5	†
SP-28 24-48	8.1	5.94	5.50	4	36	60	C		72.6	0.11	1.0	0.5		18.5	†	†	13	42	29	0.77	2.8	<5	†
SP-35 0-9"	7.7	0.56	0.11	12	44	44	SiC		55.4	0.14	4.3	2.3		16.7	†	†	4.0	2.7	0.20	1.80	5.1	45	†
SP-35 9-19"	7.9	0.44	0.12	16	40	44	SiC		54.6	0.14	1.8	0.9		17.4	†	†	2.4	2.3	0.19	1.60	1.1	25	†
SP-35 19-30"	8.2	0.40	0.22	51	27	22	SCL		31.5	0.12	1.2	0.6		15.0	†	†	1.5	1.8	0.28	1.10	1.1	5	†
SP-35 30-45"	8.4	0.37	0.22	59	27	14	SL		30.5	0.10	0.8	0.4		17.7	†	†	0.98	1.4	0.23	0.70	1.1	<5	†
SP-35 45-70"	8.8	0.46	0.37	42	39	19	L		37.3	0.14	0.9	0.5		18.0	†	†	0.73	1.4	0.37	1.30	1.0	<5	†
SP-37 0-6"	7.8	0.51	0.08	38	30	32	CL		46.7	0.13	4.0	2.1		4.5	†	†	5.1	2.1	0.16	0.83	3.9	10	†
SP-37 6-12"	7.7	0.44	0.09	48	23	29	SCL		45.4	0.12	2.9	1.5		7.5	†	†	4.2	1.8	0.16	0.71	6.5	<5	†
SP-37 12-24"	8.0	0.29	0.13	56	24	20	SL-SCL		38.7	0.11	3.0	1.6		11.1	†	†	2.3	1.4	0.18	0.35	1.9	<5	†
SP-37 24-38"	8.2	0.25	0.14	71	18	11	SL		35.2	0.08	0.7	0.4		15.3	†	†	1.6	1.7	0.18	0.10	2.0	<5	†
SP-37 38-58"	8.2	0.27	0.34	73	18	9	SL		30.3	0.07	0.5	0.2		17.3	†	†	1.5	2.0	0.44	0.07	1.5	<5	†
SP-38 0-6"	8.0	0.47	0.09	12	44	44	SiC		69.9	0.14	6.2	3.3		24.7	†	†	3.2	3.4	0.17	0.74	2.7	8	†
SP-38 6-12"	8.3	0.33	0.15	2	47	51	SiC		81.8	0.13	3.4	1.8		17.8	†	†	1.5	3.4	0.23	0.42	1.6	<5	†
SP-38 12-20"	8.5	0.49	0.39	11	46	43	SiC		71.1	0.15	1.9	1.0		28.3	†	†	1.3	5.2	0.70	0.23	1.4	<5	†
SP-38 20-24"	8.3	0.57	0.44	10	42	48	SiC		71.5	0.14	1.1	0.6		44.5	†	†	1.8	5.6	0.84	0.21	3.0	<5	†

Table C-1. Summary of laboratory analysis of soil samples for Coal Hollow soil survey, year 1.

Sample ID	pH (Sat Paste)	E.C. @25°C	SAR	Sand	Silt	Clay	USDA Texture Class[1]	Very Fine Sand	Saturation Percent	Available Water Capacity[2]	Organic Matter	Organic Carbon (calculated)[3]	Erodibility Factor (K-Factor)[4]	$CaCO_3$	Boron (soluble)	Se (Hot H_2O sol)	Calcium, soluble (Sat. Paste)	Magnesium, soluble (Sat. Paste)	Sodium, soluble (Sat. Paste)	Potassium, soluble (Sat. Paste)	Nitrogen-Nitrate	Phosphorus	Alkalinity
	units	dS/m	unitless	%	%	%		%	%	in/in	%	%	unitless	%	mg/Kg	mg/Kg	meq/L	meq/L	meq/L	meq/L	mg/Kg	mg/Kg	meq/L
SP-39 0-6"	7.8	0.32	0.19	36	33	31	CL		43.7	0.14	2.3	1.2		8.5	†	†	3.1	1.2	0.27	0.45	2.1	6	†
SP-39 6-12"	7.8	0.38	0.21	38	30	32	CL		41.9	0.13	2.4	1.3		7.9	†	†	3.9	1.5	0.34	0.45	1.7	<5	†
SP-39 12-24"	8.0	0.23	0.24	62	20	18	SL		35.3	0.09	1.2	0.6		13.9	†	†	2.2	0.98	0.30	0.17	1.2	<5	†
SP-39 24-36"	7.9	0.20	0.17	75	15	10	SL		32.3	0.06	0.5	0.3		14.4	†	†	1.7	1.0	0.20	0.09	1.2	<5	†
SP-40 0-6"	8.0	0.53	0.47	10	42	48	SiC		85.8	0.13	5.7	3.0		14.4	†	†	2.3	4.6	0.86	1.10	1.5	11	†
SP-40 6-12"	8.4	1.81	1.01	5	44	51	SiC		88.4	0.13	2.9	1.5		18.0	†	†	3.1	20	3.6	0.50	1.1	6	†
SP-40 12-22"	9.0	1.29	1.46	21	44	35	CL		76.1	0.15	1.4	0.7		19.9	†	†	0.51	14	4.1	0.26	1.1	6	†
SP-41 0-6"	8.0	0.46	0.12	46	26	28	SCL		51.3	0.12	3.3	1.7		14.5	†	†	3.9	1.7	0.20	1.10	1.4	8	†
SP-41 6-12"	8.0	0.53	0.15	25	34	41	C		54.9	0.14	3.4	1.8		12.1	†	†	4.4	2.7	0.27	1.50	4.7	6	†
SP-41 12-36"	8.1	0.22	0.15	6	44	50	SiC		69.0	0.13	1.7	0.9		16.6	†	†	1.4	1.6	0.19	0.69	1.1	<5	†
SP-41 36-64"	8.2	0.43	0.40	12	52	36	SiCL		63.9	0.16	1.0	0.5		18.5	†	†	1.4	3.9	0.65	0.41	1.1	<5	†
SP-41 64-80"	8.8	0.66	1.63	54	31	15	SL		31.5	0.12	0.6	0.3		17.3	†	†	0.67	5.7	2.9	0.15	1.2	<5	†
SP-42 0-9"	7.9	0.33	0.10	50	30	20	L		42.8	0.12	2.4	1.3		18.0	†	†	3.7	0.97	0.16	0.42	3.9	5	†
SP-42 9-24"	8.1	0.28	0.19	8	49	43	SiC		60.9	0.15	2.6	1.4		18.5	†	†	2.5	1.3	0.26	0.81	3.5	<5	†
SP-42 24-36"	8.3	0.32	0.20	52	27	21	SCL		44.7	0.12	1.7	0.9		16.0	†	†	2.3	2.9	0.31	0.36	1.5	<5	†
SP-42 36-48"	8.6	0.28	1.14	44	34	22	L		31.4	0.13	0.9	0.5		18.2	†	†	0.94	1.8	1.3	0.43	1.4	<5	†
SP-48 0-3"	7.7	0.52	0.92	7	33	60	C	4.8	85.6	0.10	3.5	1.8	0.22	4.5	†	<0.001	3.60	1.30	1.40	0.19	2.60	10	†
SP-48 3-12"	8.0	0.57	4.68	6	30	64	C	5.3	95.4	0.16	1.9	1.0	0.21	7.2	†	<0.001	1.20	0.55	4.40	0.06	1.10	8	†
SP-48 12-30"	8.2	2.63	11.20	12	28	60	C	11.0	106.0	0.10	1.7	0.9	0.23	7.5	†	<0.001	3.00	1.80	17.00	0.13	1.30	7	†
SP-48 30-48"	8.1	4.65	12.70	10	28	62	C	9.5	81.0	0.11	1.6	0.8	0.23	5.2	†	<0.001	6.50	4.10	29.00	0.23	<1.0	7	†
SP-48 48-84"	7.9	6.20	10.80	7	30	63	C	6.5	87.5	0.11	1.5	0.8	0.22	4.0	†	<0.001	15.00	8.10	37.00	0.35	1.40	9	†
SP-49 0-3"	8.1	0.42	0.05	20	49	31	SiCL	4.8	58.0	0.11	2.0	1.1	0.05	17.8	†	†	2.90	1.50	0.07	0.31	<1.0	7	†
SP-49 3-10"	8.4	0.34	0.06	26	47	27	CL-L	5.3	55.5	0.12	2.3	1.2	0.09	17.7	†	†	2.00	1.50	0.08	0.34	<1.0	8	†
SP-50 0-4"	8.4	0.20	0.13	5	37	58	C	11.0	75.4	0.12	1.4	0.7	0.08	18.5	†	†	1.60	0.36	0.13	0.22	1.40	6	†
SP-50 4-11"	8.1	0.27	0.29	<1.0	39	61	C	9.5	66.2	0.12	1.3	0.7	0.14	18.7	†	†	1.90	0.53	0.32	0.24	1.40	8	†
SP-50 11-19"	8.4	0.30	0.52	6	39	55	C	6.5	72.0	0.12	1.4	0.7	0.14	18.5	†	†	1.90	0.59	0.57	0.18	1.30	9	†

1. Usda soil textures: sand (S); loamy sand (LS); sandy loam (SL); loam (L); clay loam (CL); sandy clay loam (SCL); silty clay loam (SiCL); silty clay (SiC); clay (C).
2. Available water capacity calculated using using *Soil Water Characteristics Model* (Saxton et al., 1986).
3. Organic carbon calculated from percent organic matter.
4.Erodibility factor (K) calculated from lab and field data

Suitability Rating (Table 4. Utah DOGM, 2005): Good Fair Poor Unacceptable

Undable to calculate because referenced calcualtion in Table 7, Footnote # 3 above is invalid for soils with percent silt + fine sand greater than 70 percent.

Inter-Mou[illegible]ain Laboratories, Inc.

Soil Analys[illegible] [illegible]eport
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: S0610[illegible]1

Date: 11/14/2006
Work Order: S0610051

Project: Talon Resources Soil
Date Received: 10/3/2006

Lab ID	Sample ID	Depths In.	pH s.u.	Saturation %	Electrical Conductivity dS/m	Organic Matter %	Calcium meq/L	Magnesium meq/L	Sodium meq/L	Potassium meq/L	SAR
S0610051-001	LOF-2	0-7	7.6	43.3	0.47	2.7	4.93	1.26	0.29	0.65	0.16
S0610051-002	LOF-2	7-12	7.7	44.8	0.31	2.4	2.07	0.68	0.22	0.19	0.19
S0610051-003	LOF-2	12-24	7.8	60.2	0.25	1.8	1.29	0.57	0.59	0.09	0.62
S0610051-004	LOF-2	24-48	8.0	67.7	0.32	1.7	0.77	0.53	1.71	0.07	2.12
S0610051-005	LOF-2	48-72	7.8	66.7	7.38	1.1	23.8	24.9	35.8	0.50	7.27
S0610051-006	LOF-2	72-96	7.8	62.9	7.17	1.1	21.6	26.3	37.9	0.47	7.75
S0610051-007	LOF-4	0-5	7.8	52.6	0.62	3.5	4.54	1.04	0.49	0.26	0.29
S0610051-008	LOF-4	5-10	7.7	53.0	0.31	2.8	2.28	0.63	0.32	0.08	0.26
S0610051-009	LOF-4	10-19	7.8	53.9	0.33	2.1	2.00	0.78	0.71	0.08	0.60
S0610051-010	LOF-4	19-31	7.9	53.6	0.29	1.8	1.12	0.52	1.05	0.06	1.16
S0610051-011	LOF-4	31-50	7.8	59.8	4.06	1.1	16.3	12.4	20.5	0.51	5.43
S0610051-012	RDV-7	0-6	7.5	62.9	0.58	4.4	3.93	1.17	0.20	0.28	0.13
S0610051-013	RDV-7	6-12	7.6	57.1	0.36	3.0	2.37	0.78	0.27	0.09	0.22
S0610051-014	RDV-7	12-24	8.0	55.3	0.24	1.8	0.82	0.44	1.04	0.04	1.30
S0610051-015	RDV-7	24-60	8.0	63.8	1.40	1.4	2.65	2.00	7.90	0.11	5.18
S0610051-016	1YR-9	0-6	8.0	63.0	0.62	6.1	2.19	3.21	0.12	0.74	0.07
S0610051-017	1YR-9	6-14	8.2	42.4	0.34	3.4	1.17	1.67	0.25	0.30	0.21
S0610051-018	1YR-9	14-28	8.5	35.7	0.88	0.9	1.16	5.71	1.06	0.72	0.57
S0610051-019	1YR-9	28-48	8.3	31.0	0.76	0.4	1.49	4.64	1.23	0.37	0.70
S0610051-020	1YR-10	0-7	7.8	46.4	0.46	3.9	3.39	0.89	0.08	0.30	0.05

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil Analysis Report
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: S0 51001

Date: 11/14/2006
Work Order: S0610051

Project: Talon Resources Soil
Date Received: 10/3/2006

Lab ID	Sample ID	Depths In.	Sand %	Silt %	Clay %	Texture	Very Fine Sand %	Boron ppm	Nitrogen Nitrate ppm	Phosphorus ppm	Selenium ppm
S0610051-001	LOF-2	0-7	32.0	37.0	31.0	Clay Loam	14.9	0.27	1.58	9.55	<0.02
S0610051-002	LOF-2	7-12	34.0	34.0	32.0	Clay Loam	22.3	0.24	0.55	0.40	<0.02
S0610051-003	LOF-2	12-24	14.0	40.0	46.0	Silty Clay	12.4	0.30	0.31	<0.01	<0.02
S0610051-004	LOF-2	24-48	22.0	37.0	41.0	Clay	20.2	0.45	0.88	0.04	<0.02
S0610051-005	LOF-2	48-72	14.0	43.0	43.0	Silty Clay	11.3	1.08	1.07	0.40	0.09
S0610051-006	LOF-2	72-96	18.0	35.0	47.0	Clay	13.0	0.61	13.1	0.76	0.12
S0610051-007	LOF-4	0-5	12.0	46.0	42.0	Silty Clay	9.1		4.16	0.79	
S0610051-008	LOF-4	5-10	14.0	46.0	40.0	Silty Clay	11.0		0.66	9.76	
S0610051-009	LOF-4	10-19	12.0	43.0	45.0	Silty Clay	10.5		0.53	0.64	
S0610051-010	LOF-4	19-31	13.0	43.0	44.0	Silty Clay	11.3		0.40	0.67	
S0610051-011	LOF-4	31-50	19.0	39.0	42.0	Clay	16.3		1.06	0.43	
S0610051-012	RDV-7	0-6	26.0	38.0	36.0	Clay Loam	20.4		2.19	12.5	
S0610051-013	RDV-7	6-12	18.0	38.0	44.0	Clay	11.9		0.28	7.78	
S0610051-014	RDV-7	12-24	16.0	37.0	47.0	Clay	13.6		0.40	0.73	
S0610051-015	RDV-7	24-60	22.0	34.0	44.0	Clay	20.8		0.30	0.46	
S0610051-016	1YR-9	0-6	44.0	32.0	24.0	Loam	14.5		1.73	1.44	
S0610051-017	1YR-9	6-14	52.0	25.0	23.0	Sandy Clay Loam	18.1		0.91	<0.01	
S0610051-018	1YR-9	14-28	64.0	22.0	14.0	Sandy Loam	9.7		0.50	<0.01	
S0610051-019	1YR-9	28-48	54.0	30.0	16.0	Sandy Loam	16.0		0.48	<0.01	
S0610051-020	1YR-10	0-7	36.0	38.0	26.0	Loam	17.9	0.29	3.15	7.45	<0.02

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter·M[illegible]tain Laboratories, Inc.

Soil Analy[illegible] Report
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: S061[illegible].001

Date: 11/14/2006
Work Order: S0610051

Project: Talon Resources Soil
Date Received: 10/3/2006

Lab ID	Sample ID	Depths In.	Sand %	Silt %	Clay %	Texture	Very Fine Sand %	Boron ppm	Nitrogen Nitrate ppm	Phosphorus ppm	Selenium ppm
S0610051-021	1YR-10	7-13	26.0	48.0	26.0	Loam	12.3	0.31	0.46	0.67	<0.02
S0610051-022	1YR-10	13-26	14.0	52.0	34.0	Silty Clay Loam	9.4	0.20	0.44	0.37	<0.02
S0610051-023	1YR-10	26-44	30.0	36.0	34.0	Clay Loam	29.1	0.37	0.15	<0.01	<0.02
S0610051-024	1YR-10	44-68	14.0	54.0	32.0	Silty Clay Loam	7.0	0.24	0.19	<0.01	<0.02
S0610051-025	1YR-10	68-84	60.0	30.0	10.0	Sandy Loam	24.5	0.07	0.32	0.67	<0.02
S0610051-026	1YR-12	0-5	32.0	40.0	28.0	Clay Loam	28.9		0.87	7.33	
S0610051-027	1YR-12	5-10	29.0	39.0	32.0	Clay Loam	22.2		0.67	0.22	
S0610051-028	1YR-12	10-26	16.0	40.0	44.0	Silty Clay	13.8		0.94	<0.01	
S0610051-029	1YR-12	26-44	46.0	19.0	35.0	Sandy Clay	45.0		0.20	<0.01	
S0610051-030	SP-14	0-6	8.0	48.0	44.0	Silty Clay	5.3		0.38	8.92	
S0610051-031	SP-14	6-13	8.0	48.0	44.0	Silty Clay	5.7		0.58	2.94	
S0610051-032	SP-14	13-28	23.0	50.0	27.0	Clay Loam	21.4		0.17	4.40	
S0610051-033	SP-14	28-48	40.0	43.0	17.0	Loam	33.6		0.21	2.67	
S0610051-034	SP-14	48-70	21.0	40.0	39.0	Clay Loam	5.6		0.41	3.54	
S0610051-045	SP-14	70-90	21.0	47.0	32.0	Clay Loam	17.7		0.64	0.31	
S0610051-036	DAH-24	0-5	34.0	19.0	47.0	Clay	33.0	0.23	4.14	2.25	<0.02
S0610051-037	DAH-24	5-17	42.0	14.0	44.0	Clay	41.4	0.42	0.19	0.16	<0.02
S0610051-038	DAH-24	17-32	38.0	17.0	45.0	Clay	36.5	0.73	0.09	<0.01	<0.02
S0610051-040	DAH-25	0-5	32.0	28.0	40.0	Clay	21.1		3.85	6.80	
S0610051-041	DAH-25	5-13	30.0	23.0	47.0	Clay	21.6		0.20	0.19	

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter·Mr ntain Laboratories, Inc.

Soil Ana s Report
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: S0E .001

Date: 11/13/2006
Work Order: S0609512

Project: Talon Resources Soil
Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	CO3 %	Alkalinity PE meq/L
S0609512-001	LOF-1	0-6	22.6	3.76
S0609512-002	LOF-1	6-12	27.1	3.45
S0609512-003	LOF-1	12-24	26.6	2.72
S0609512-004	LOF-1	24-42	27.1	4.08
S0609512-005	LOF-1	42-60	28.3	1.67
S0609512-006	LOF-3	0-4	20.3	5.64
S0609512-007	LOF-3	4-11	20.4	3.55
S0609512-008	LOF-3	11-19	24.2	2.51
S0609512-009	LOF-3	19-33	27.2	3.87
S0609512-011	RDV-5	0-5	25.7	3.97
S0609512-012	RDV-5	5-10	26.4	4.08
S0609512-013	RDV-5	10-25	31.1	2.72
S0609512-014	RDV-5	25-48	28.0	4.91
S0609512-015	RDV-5	48-60	26.5	6.06
S0609512-016	RDV-6	0-6	18.4	3.97
S0609512-017	RDV-6	6-12	20.6	2.51
S0609512-018	RDV-6	12-24	28.9	4.18
S0609512-019	RDV-6	24-34	29.2	2.93
S0609512-020	RDV-6	34-60	25.9	5.96
S0609512-021	1YR-8	0-8	5.1	5.54

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter·M[illegible]untain Laboratories, Inc.

Soil [illegible]sis Report

Talon Resources, Inc.

PO Box 1230

Huntington, UT 84528

Report ID: [illegible]12001

Date: 11/13/2006

Work Order: S0609512

Project: Talon Resources Soil

Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	Sand %	Silt %	Clay %	Texture	Very Fine Sand %	Boron ppm	Nitrogen Nitrate ppm	Phosphorus ppm	Selenium ppm
S0609512-022	1YR-8	8-14	38.0	32.0	30.0	Clay Loam	17.2		0.05	0.07	
S0609512-023	1YR-8	14-22	48.0	30.0	22.0	Loam	19.5		0.17	0.21	
S0609512-024	1YR-8	22-45	42.0	42.0	16.0	Loam	23.9		0.50	2.51	
S0609512-025	1YR-8	45-65	79.0	13.0	8.0	Loamy Sand	19.8		0.27	0.18	
S0609512-026	1YR-8	65-85	80.0	12.0	8.0	Loamy Sand	17.9		0.20	0.10	
S0609512-027	1YR-9A	0-12	60.0	32.0	8.0	Sandy Loam	26.6		4.23	10.0	
S0609512-028	1YR-9A	12-24	68.0	22.0	10.0	Sandy Loam	22.2		0.21	2.02	
S0609512-029	1YR-9A	24-42	68.0	22.0	10.0	Sandy Loam	20.4		0.13	2.22	
S0609512-030	1YR-9A	42-70	69.0	21.0	10.0	Sandy Loam	26.7		0.26	1.88	
S0609512-031	1YR-9A	70-100	30.0	31.0	39.0	Clay Loam	27.3		0.29	0.82	
S0609512-032	1YR-11	0-5	72.0	19.0	9.0	Sandy Loam	19.9		1.58	8.21	
S0609512-033	1YR-11	5-16	69.0	17.0	14.0	Sandy Loam	20.0		0.13	0.82	
S0609512-034	1YR-11	16-32	72.0	18.0	10.0	Sandy Loam	16.1		0.20	1.53	
S0609512-035	1YR-11	32-48	79.0	13.0	8.0	Loamy Sand	17.1		0.23	0.44	
S0609512-036	1YR-11	48-72	78.0	14.0	8.0	Loamy Sand	18.4		0.12	2.20	
S0609512-037	1YR-11	72-90	89.0	7.0	4.0	Sand	14.1		0.10	4.93	
S0609512-038	SP-13	0-6	59.0	23.0	18.0	Sandy Loam	15.8		3.78	39.5	
S0609512-039	SP-13	6-12	23.0	51.0	26.0	Silt Loam	12.7		0.18	3.83	
S0609512-040	SP-13	12-24	14.0	44.0	42.0	Silty Clay	9.1		0.50	0.70	
S0609512-041	SP-13	24-48	22.0	46.0	32.0	Clay Loam	9.5		0.46	0.44	

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potentia

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten

Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil Analysis Report
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: S 12001

Date: 11/13/2006
Work Order: S0609512

Project: Talon Resources Soil
Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	CO3 %	Alkalinity PE meq/L
S0609512-022	1YR-8	8-14	16.3	2.93
S0609512-023	1YR-8	14-22	27.3	2.30
S0609512-024	1YR-8	22-45	30.8	3.55
S0609512-025	1YR-8	45-65	19.3	3.66
S0609512-026	1YR-8	65-85	20.4	4.18
S0609512-027	1YR-9A	0-12	26.1	6.90
S0609512-028	1YR-9A	12-24	22.0	7.94
S0609512-029	1YR-9A	24-42	23.6	10.6
S0609512-030	1YR-9A	42-70	23.5	5.22
S0609512-031	1YR-9A	70-100	9.8	2.82
S0609512-032	1YR-11	0-5	1.4	3.76
S0609512-033	1YR-11	5-16	4.2	3.55
S0609512-034	1YR-11	16-32	14.4	3.13
S0609512-035	1YR-11	32-48	19.6	2.93
S0609512-036	1YR-11	48-72	21.7	2.82
S0609512-037	1YR-11	72-90	18.2	2.19
S0609512-038	SP-13	0-6	19.7	5.64
S0609512-039	SP-13	6-12	27.9	3.87
S0609512-040	SP-13	12-24	26.9	3.87
S0609512-041	SP-13	24-48	32.2	3.55

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potentia
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil A .s Report

Talon Resources, Inc.

PO Box 1230

Huntington, UT 84528

Report ID: S .2001

Date: 11/13/2006

Work Order: S0609512

Project: Talon Resources Soil

Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	pH s.u.	Saturation %	Electrical Conductivity dS/m	Organic Matter %	Calcium meq/L	Magnesium meq/L	Sodium meq/L	Potassium meq/L	SAR
S0609512-042	SP-13	48-60	8.8	46.1	0.31	1.8	0.53	3.00	0.67	0.10	0.51
S0609512-043	SP-13	60-72	8.9	35.6	1.46	1.2	1.64	8.30	4.90	0.14	2.20
S0609512-044	SP-13	72-84	8.7	33.5	2.20	0.5	2.07	15.5	7.00	0.20	2.36
S0609512-045	SP-16	0-8	8.3	64.5	0.58	4.8	3.08	1.84	0.49	0.42	0.31
S0609512-046	SP-16	8-18	8.2	61.9	0.60	1.9	2.00	2.77	0.39	0.28	0.25
S0609512-047	SP-16	18-36	8.7	50.6	0.45	0.6	0.68	3.12	0.53	0.19	0.38
S0609512-048	SP-16	36-56	9.0	52.2	0.34	0.6	0.45	3.38	0.77	0.14	0.56
S0609512-049	SP-16	56-68	8.9	36.3	0.60	0.3	0.52	4.30	1.21	0.16	0.78
S0609512-050	SP-16	68-96	8.9	55.3	0.53	0.6	1.00	3.49	1.21	0.18	0.81
S0609512-051	WRD-18	0-9	8.2	43.4	0.35	3.6	4.56	1.75	0.31	0.65	0.18
S0609512-052	WRD-18	9-19	8.3	41.3	0.61	1.8	3.45	1.56	0.27	0.80	0.17
S0609512-053	WRD-18	19-34	8.5	35.8	0.52	1.2	2.41	2.17	0.31	0.18	0.21
S0609512-054	WRD-18	34-54	8.7	45.5	0.38	1.4	1.63	1.70	0.35	0.12	0.27
S0609512-055	WRD-18	54-72	8.6	49.6	0.57	1.1	1.92	2.53	0.46	0.18	0.31
S0609512-056	WRD-18	72-96	8.6	34.7	1.46	0.5	2.97	11.0	1.48	0.19	0.56
S0609512-057	WRD-19	0-6	8.0	48.5	0.91	4.9	4.87	2.07	0.28	1.72	0.15
S0609512-058	WRD-19	6-12	8.2	44.1	0.65	3.0	3.43	1.45	0.30	1.14	0.20
S0609512-059	WRD-19	12-24	8.3	40.8	0.53	2.0	2.85	1.21	0.32	0.87	0.23
S0609512-060	WRD-19	24-37	8.5	40.8	0.55	1.9	2.71	1.11	0.26	0.76	0.19
S0609512-061	WRD-19	37-51	8.4	34.1	0.57	1.2	2.94	1.39	0.27	0.59	0.18

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten

Karen Barten, Soil Lab Supervisor

Soil Ar. .s Report

Talon Resources, Inc.

PO Box 1230

Huntington, UT 84528

Report ID: S0) 2001

Date: 11/13/2006

Work Order: S0609512

Project: Talon Resources Soil

Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	Sand %	Silt %	Clay %	Texture	Very Fine Sand %	Boron ppm	Nitrogen Nitrate ppm	Phosphorus ppm	Selenium ppm
S0609512-042	SP-13	48-60	33.0	39.0	28.0	Clay Loam	13.4		0.17	<0.01	
S0609512-043	SP-13	60-72	62.0	14.0	24.0	Sandy Clay Loam	19.2		0.23	0.99	
S0609512-044	SP-13	72-84	44.0	36.0	20.0	Loam	18.5		0.29	0.73	
S0609512-045	SP-16	0-8	19.0	45.0	36.0	Silty Clay Loam	15.1		1.19	18.3	
S0609512-046	SP-16	8-18	12.0	44.0	44.0	Silty Clay	10.8		0.21	4.70	
S0609512-047	SP-16	18-36	20.0	52.0	28.0	Clay Loam	16.2		0.24	6.45	
S0609512-048	SP-16	36-56	14.0	58.0	28.0	Silty Clay Loam	12.4		0.23	5.10	
S0609512-049	SP-16	56-68	50.0	36.0	14.0	Loam	21.6		0.30	2.83	
S0609512-050	SP-16	68-96	23.0	49.0	28.0	Clay Loam	17.0		0.24	1.25	
S0609512-051	WRD-18	0-9	34.0	40.0	26.0	Loam	11.4	0.39	3.96	18.6	<0.02
S0609512-052	WRD-18	9-19	50.0	30.0	20.0	Loam	16.2	0.25	0.31	2.89	<0.02
S0609512-053	WRD-18	19-34	44.0	38.0	18.0	Loam	21.0	0.18	0.09	5.50	<0.02
S0609512-054	WRD-18	34-54	21.0	47.0	32.0	Clay Loam	13.4	0.33	0.50	0.93	<0.02
S0609512-055	WRD-18	54-72	22.0	44.0	34.0	Clay Loam	11.8	0.29	0.10	1.19	<0.02
S0609512-056	WRD-18	72-96	48.0	32.0	20.0	Loam	21.2	0.19	0.45	0.21	<0.02
S0609512-057	WRD-19	0-6	34.0	42.0	24.0	Loam	16.5		2.77	12.9	
S0609512-058	WRD-19	6-12	32.0	36.0	32.0	Clay Loam	13.1		1.85	8.32	
S0609512-059	WRD-19	12-24	34.0	36.0	30.0	Clay Loam	15.8		0.67	1.99	
S0609512-060	WRD-19	24-37	49.0	29.0	22.0	Loam	24.5		0.35	0.99	
S0609512-061	WRD-19	37-51	60.0	26.0	14.0	Sandy Loam	24.2			1.53	

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten

Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil Analysis Report
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: SL 2001

Date: 11/13/2006
Work Order: S0609512

Project: Talon Resources Soil
Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	CO3 %	Alkalinity PE meq/L
S0609512-042	SP-13	48-60	29.2	1.67
S0609512-043	SP-13	60-72	20.6	7.00
S0609512-044	SP-13	72-84	28.7	3.03
S0609512-045	SP-16	0-8	9.6	4.81
S0609512-046	SP-16	8-18	24.5	3.55
S0609512-047	SP-16	18-36	38.8	4.18
S0609512-048	SP-16	36-56	40.1	3.66
S0609512-049	SP-16	56-68	28.1	4.08
S0609512-050	SP-16	68-96	31.0	4.81
S0609512-051	WRD-18	0-9	23.8	5.54
S0609512-052	WRD-18	9-19	20.3	4.60
S0609512-053	WRD-18	19-34	27.5	3.13
S0609512-054	WRD-18	34-54	29.0	2.61
S0609512-055	WRD-18	54-72	28.3	3.76
S0609512-056	WRD-18	72-96	23.1	8.99
S0609512-057	WRD-19	0-6	20.1	6.69
S0609512-058	WRD-19	6-12	17.4	4.39
S0609512-059	WRD-19	12-24	23.5	2.51
S0609512-060	WRD-19	24-37	24.6	3.13
S0609512-061	WRD-19	37-51	22.7	2.40

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil Analysis Report

Talon Resources, Inc.

PO Box 1230

Huntington, UT 84528

Report ID: S[illegible]12001

Date: 11/13/2006

Work Order: S0609512

Project: Talon Resources Soil

Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	pH s.u.	Saturation %	Electrical Conductivity dS/m	Organic Matter %	Calcium meq/L	Magnesium meq/L	Sodium meq/L	Potassium meq/L	SAR
S0609512-062	WRD-19	51-68	8.5	29.1	0.48	0.8	2.07	1.87	0.36	0.22	0.26
S0609512-063	WRD-19	68-90	8.7	26.0	0.37	0.6	1.11	2.06	0.37	0.10	0.30
S0609512-064	WRD-21	0-8	8.4	30.6	0.46	2.0	2.94	0.74	0.26	0.48	0.19
S0609512-065	WRD-21	8-18	8.1	46.0	0.66	3.2	4.12	1.78	0.29	0.20	0.17
S0609512-066	WRD-21	18-36	8.4	30.5	0.49	1.2	2.64	1.61	0.33	0.10	0.22
S0609512-067	WRD-21	36-50	8.7	28.6	0.48	0.9	2.71	1.62	0.36	0.15	0.24
S0609512-068	WRD-21	50-62	8.7	27.9	0.37	1.0	1.91	1.24	0.32	0.12	0.25
S0609512-069	WRD-21	62-96	8.7	26.7	0.32	0.7	1.34	1.60	0.30	0.09	0.25

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potentia

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten

Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil Analysis Report
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: S 12001

Date: 11/13/2006
Work Order: S0609512

Project: Talon Resources Soil
Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	Sand %	Silt %	Clay %	Texture	Very Fine Sand %	Boron ppm	Nitrogen Nitrate ppm	Phosphorus ppm	Selenium ppm
S0609512-062	WRD-19	51-68	66.0	22.0	12.0	Sandy Loam	17.5		0.41	1.71	
S0609512-063	WRD-19	68-90	71.0	19.0	10.0	Sandy Loam	17.6		0.18	1.88	
S0609512-064	WRD-21	0-8	61.0	11.0	28.0	Sandy Clay Loam	18.6		2.30	7.11	
S0609512-065	WRD-21	8-18	59.0	11.0	30.0	Sandy Clay Loam	47.0		0.75	0.87	
S0609512-066	WRD-21	18-36	68.0	18.0	14.0	Sandy Loam	18.2		0.26	2.48	
S0609512-067	WRD-21	36-50	67.0	25.0	8.0	Sandy Loam	14.2		0.35	0.79	
S0609512-068	WRD-21	50-62	69.0	23.0	8.0	Sandy Loam	14.8		0.46	2.66	
S0609512-069	WRD-21	62-96	68.0	20.0	12.0	Sandy Loam	23.7		0.17	1.07	

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potentia
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil Analysis Report
Talon Resources, Inc.
PO Box 1230
Huntington, UT 84528

Report ID: S[illegible]12001

Date: 11/13/2006
Work Order: S0609512

Project: Talon Resources Soil
Date Received: 9/28/2006

Lab ID	Sample ID	Depths In.	CO3 %	Alkalinity PE meq/L
S0609512-062	WRD-19	51-68	19.7	3.45
S0609512-063	WRD-19	68-90	19.8	2.93
S0609512-064	WRD-21	0-8	21.2	3.76
S0609512-065	WRD-21	8-18	29.8	4.08
S0609512-066	WRD-21	18-36	20.3	2.72
S0609512-067	WRD-21	36-50	21.6	3.34
S0609512-068	WRD-21	50-62	16.8	2.51
S0609512-069	WRD-21	62-96	20.7	2.51

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potentia
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten
Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil Analysis Report

Talon Resources, Inc.

PO Box 1230

Huntington, UT 84528

Report ID: S[illegible]31001

Date: 11/14/2006

Work Order: S0610051

Project: Talon Resources Soil

Date Received: 10/3/2006

Lab ID	Sample ID	Depths In.	pH s.u.	Saturation %	Electrical Conductivity dS/m	Organic Matter %	Calcium meq/L	Magnesium meq/L	Sodium meq/L	Potassium meq/L	SAR
S0610051-064	WRD-20	6-13	7.8	47.6	0.56	2.4	2.47	1.47	0.14	0.67	0.10
S0610051-065	WRD-20	13-28	8.1	24.1	0.27	0.6	1.22	0.63	0.13	0.32	0.14
S0610051-066	WRD-20	28-54	8.0	25.4	0.32	0.2	1.40	0.76	0.07	0.42	0.07
S0610051-067	WRD-20	54-72	8.1	38.5	0.27	1.1	1.18	0.87	0.24	0.21	0.23
S0610051-079	WRD-20	72-96	8.2	28.3	0.32	0.3	0.97	1.23	0.16	0.28	0.16
S0610051-068	WRD-22	0-6	7.7	36.6	0.40	1.8	2.16	0.88	0.08	0.35	0.07
S0610051-069	WRD-22	6-15	7.7	48.0	0.34	3.7	1.85	0.83	0.16	0.19	0.13
S0610051-070	WRD-22	15-28	8.0	34.9	0.29	1.2	1.64	0.80	0.13	0.18	0.11
S0610051-071	WRD-22	28-48	8.0	28.0	0.25	0.8	1.18	0.64	0.13	0.16	0.14
S0610051-072	WRD-22	48-60	8.0	30.1	0.27	1.0	1.34	0.67	0.10	0.16	0.10
S0610051-073	WRD-22	60-84	8.2	27.3	0.30	0.5	1.08	0.96	0.09	0.25	0.09
S0610051-074	WRD-23	0-6	7.7	48.4	0.60	4.9	3.20	1.35	0.07	0.53	0.05
S0610051-075	WRD-23	6-12	7.9	44.6	0.38	2.9	1.97	0.91	0.15	0.30	0.13
S0610051-076	WRD-23	12-22	7.9	41.0	0.35	1.8	1.76	0.92	0.14	0.16	0.12
S0610051-077	WRD-23	22-40	8.0	33.2	0.24	0.7	1.12	0.77	0.15	0.06	0.16
S0610051-078	WRD-23	40-62	8.2	38.6	0.23	0.6	1.01	0.94	0.24	0.06	0.24
S0610051-035	WRD-23	62-80	8.1	43.9	0.44	0.8	1.61	1.95	0.64	0.14	0.48

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten

Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil A[illegible]s Report

Talon Resources, Inc.

PO Box 1230
Huntington, UT 84528

Report ID: S[illegible]1001

Date: 11/14/2006

Work Order: S0610051

Project: Talon Resources Soil

Date Received: 10/3/2006

Lab ID	Sample ID	Depths In.	Sand %	Silt %	Clay %	Texture	Very Fine Sand %	Boron ppm	Nitrogen Nitrate ppm	Phosphorus ppm	Selenium ppm
S0610051-064	WRD-20	6-13	41.0	29.0	30.0	Clay Loam	17.7		0.12	1.62	
S0610051-065	WRD-20	13-28	69.0	21.0	10.0	Sandy Loam	18.6		0.07	0.37	
S0610051-066	WRD-20	28-54	79.0	14.0	7.0	Loamy Sand	15.8		0.03	0.94	
S0610051-067	WRD-20	54-72	45.0	29.0	26.0	Loam	13.9		0.53	1.23	
S0610051-079	WRD-20	72-96	82.0	13.0	5.0	Loamy Sand	17.6		0.29	0.28	
S0610051-068	WRD-22	0-6	63.0	23.0	14.0	Sandy Loam	25.0		1.94	4.52	
S0610051-069	WRD-22	6-15	19.0	42.0	39.0	Silty Clay Loam	7.0		0.76	9.01	
S0610051-070	WRD-22	15-28	47.0	27.0	26.0	Sandy Clay Loam	5.6		0.80	0.31	
S0610051-071	WRD-22	28-48	65.0	21.0	14.0	Sandy Loam	13.7		0.29	0.13	
S0610051-072	WRD-22	48-60	65.0	21.0	14.0	Sandy Loam	14.5		0.35	0.07	
S0610051-073	WRD-22	60-84	74.0	18.0	8.0	Sandy Loam	21.8		0.57	0.28	
S0610051-074	WRD-23	0-6	31.0	38.0	31.0	Clay Loam	12.5		1.43	8.26	
S0610051-075	WRD-23	6-12	36.0	33.0	31.0	Clay Loam	14.7		0.31	1.74	
S0610051-076	WRD-23	12-22	38.0	34.0	28.0	Clay Loam	12.5		0.29	1.09	
S0610051-077	WRD-23	22-40	51.0	30.0	19.0	Loam	17.2		0.21	1.03	
S0610051-078	WRD-23	40-62	31.0	44.0	25.0	Loam	20.0		0.89	0.28	
S0610051-035	WRD-23	62-80	18.0	41.0	41.0	Silty Clay	14.0		0.35	1.65	

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten

Karen Barten, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

Soil A[illegible]is Report

Talon Resources, Inc.

PO Box 1230

Huntington, UT 84528

Report ID: S[illegible]1001

Date: 11/14/2006

Work Order: S0610051

Project: Talon Resources Soil

Date Received: 10/3/2006

Lab ID	Sample ID	Depths In.	CO3 %	Alkalinity PE meq/L
S0610051-064	WRD-20	6-13	20.8	3.13
S0610051-065	WRD-20	13-28	25.4	2.30
S0610051-066	WRD-20	28-54	21.7	2.72
S0610051-067	WRD-20	54-72	24.3	2.51
S0610051-079	WRD-20	72-96	16.5	2.51
S0610051-068	WRD-22	0-6	20.2	3.13
S0610051-069	WRD-22	6-15	23.8	2.72
S0610051-070	WRD-22	15-28	18.9	2.72
S0610051-071	WRD-22	28-48	17.9	2.30
S0610051-072	WRD-22	48-60	17.5	2.30
S0610051-073	WRD-22	60-84	21.0	2.51
S0610051-074	WRD-23	0-6	21.4	4.60
S0610051-075	WRD-23	6-12	23.6	3.34
S0610051-076	WRD-23	12-22	25.6	3.24
S0610051-077	WRD-23	22-40	29.8	2.30
S0610051-078	WRD-23	40-62	35.3	1.99
S0610051-035	WRD-23	62-80	30.4	2.09

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potentia

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Barten

Karen Barten, Soil Lab Supervisor

LABORATORY ANALYTICAL REPORT

Client: Alton Coal Development / Talon Resources
Project: Coal Hollow
Workorder: C07040226

Report Date: 04/24/07
Date Received: 04/05/07

		Analysis	EC SatPst	Saturation SatPst	Lime as CaCO3	pH SatPst	NO3 Soluble	K Soluble	K SatPst	K NH4OAc	P, Olsen-NAHCO3	Ca SatPst	Mg SatPst	Na SatPst	SAR
		Units	mmhos/cm	%	%	s_u_	mg/kg-dry	mg/kg-dry	meq/L	meq/100g	mg/kg-dry	meq/L	meq/L	meq/L	unitless
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
C07040226-001	SP-28	0-8	0.47	60.2	18.9	7.7	3.9	7.56	0.32	1.0	< 5	2.8	2.3	1.0	0.65
C07040226-002	SP-28	8-24	0.48	65.4	17.6	8.0	1.6	4.44	0.17	0.77	< 5	1.8	2.4	2.2	1.50
C07040226-003	SP-28	24-48	5.94	72.6	18.5	8.1	2.8	13.6	0.48	0.77	< 5	13	42	29	5.50
C07040226-004	SP-35	0-9	0.56	55.4	16.7	7.7	5.1	27.7	1.3	1.8	45	4.0	2.7	0.20	0.11
C07040226-005	SP-35	9-19	0.44	54.6	17.4	7.9	1.1	27.0	1.3	1.6	25	2.4	2.3	0.19	0.12
C07040226-006	SP-35	19-30	0.40	31.5	15.0	8.2	1.1	20.1	1.6	1.1	5	1.5	1.8	0.28	0.22
C07040226-007	SP-35	30-45	0.37	30.5	17.7	8.4	1.1	24.1	2.0	0.70	< 5	0.98	1.4	0.23	0.22
C07040226-008	SP-35	45-70	0.46	37.3	18.0	8.8	1.0	45.9	3.1	1.3	< 5	0.73	1.4	0.37	0.37
C07040226-009	SP-37	0-6	0.51	46.7	4.5	7.8	3.9	8.71	0.48	0.83	10	5.1	2.1	0.16	0.08
C07040226-010	SP-37	6-12	0.44	45.4	7.5	7.7	6.5	7.15	0.40	0.71	< 5	4.2	1.8	0.16	0.09
C07040226-011	SP-37	12-24	0.29	38.7	11.1	8.0	1.9	3.94	0.26	0.35	< 5	2.3	1.4	0.18	0.13
C07040226-012	SP-37	24-38	0.25	35.2	15.3	8.2	2.0	1.24	0.09	0.096	< 5	1.6	1.7	0.18	0.14
C07040226-013	SP-37	38-58	0.27	30.3	17.3	8.2	1.5	1.22	0.10	0.069	< 5	1.5	2.0	0.44	0.34
C07040226-014	SP-38	0-6	0.47	69.9	24.7	8.0	2.7	14.2	0.52	0.74	8	3.2	3.4	0.17	0.09
C07040226-015	SP-38	6-12	0.33	81.8	17.8	8.3	1.6	5.55	0.17	0.42	< 5	1.5	3.4	0.23	0.15
C07040226-016	SP-38	12-20	0.49	71.1	28.3	8.5	1.4	2.58	0.09	0.23	< 5	1.3	5.2	0.70	0.39
C07040226-017	SP-38	20-24	0.57	71.5	44.5	8.3	3.0	3.04	0.11	0.21	< 5	1.8	5.6	0.84	0.44
C07040226-018	SP-39	0-6	0.32	43.7	8.5	7.8	2.1	2.87	0.17	0.45	6	3.1	1.2	0.27	0.19
C07040226-019	SP-39	6-12	0.38	41.9	7.9	7.8	1.7	3.07	0.19	0.45	< 5	3.9	1.5	0.34	0.21
C07040226-020	SP-39	12-24	0.23	35.3	13.9	8.0	1.2	1.46	0.11	0.17	< 5	2.2	0.98	0.30	0.24
C07040226-021	SP-39	24-36	0.20	32.3	14.4	7.9	1.2	1.10	0.09	0.089	< 5	1.7	1.0	0.20	0.17
C07040226-022	SP-40	0-6	0.53	85.8	14.4	8.0	1.5	19.0	0.57	1.1	11	2.3	4.6	0.86	0.47
C07040226-023	SP-40	6-12	1.81	88.4	18.0	8.4	1.1	13.2	0.38	0.50	6	3.1	20	3.6	1.01
C07040226-024	SP-40	12-22	1.29	76.1	19.9	9.0	1.1	5.83	0.20	0.26	6	0.51	14	4.1	1.46
C07040226-025	SP-41	0-6	0.46	51.3	14.5	8.0	1.4	29.1	1.5	1.1	8	3.9	1.7	0.20	0.12
C07040226-026	SP-41	6-12	0.53	54.9	12.1	8.0	4.7	22.4	1.0	1.5	6	4.4	2.7	0.27	0.15
C07040226-027	SP-41	12-36	0.22	69.0	16.6	8.1	1.1	5.32	0.20	0.69	< 5	1.4	1.6	0.19	0.15
C07040226-028	SP-41	36-64	0.43	63.9	18.5	8.2	1.1	6.72	0.27	0.41	< 5	1.4	3.9	0.65	0.40
C07040226-029	SP-41	64-80	0.66	31.5	17.3	8.8	1.2	3.50	0.28	0.15	< 5	0.67	5.7	2.9	1.63
C07040226-030	SP-42	0-9	0.33	42.8	18.0	7.9	3.9	6.62	0.39	0.42	5	3.7	0.97	0.16	0.10
C07040226-031	SP-42	9-24	0.28	60.9	18.5	8.1	3.5	8.00	0.34	0.81	< 5	2.5	1.3	0.26	0.19
C07040226-032	SP-42	24-36	0.32	44.7	16.0	8.3	1.5	6.81	0.39	0.36	< 5	2.3	2.9	0.31	0.20
C07040226-033	SP-42	36-48	0.28	31.4	18.2	8.6	1.4	5.31	0.43	0.43	< 5	0.94	1.8	1.3	1.14

LABORATORY ANALYTICAL REPORT

Client: Alton Coal Development / Talon Resources
Project: Coal Hollow
Workorder: C07040226

Report Date: 04/24/07
Date Received: 04/05/07

		Analysis	Organic Matter	Sand	Silt	Clay	Texture
		Units	%	%	%	%	
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**
C07040226-001	SP-28	0-8	2.5	7.0	38	55	C
C07040226-002	SP-28	8-24	1.4	9.0	34	57	C
C07040226-003	SP-28	24-48	1.0	4.0	36	60	C
C07040226-004	SP-35	0-9	4.3	12	44	44	SiC
C07040226-005	SP-35	9-19	1.8	16	40	44	SiC
C07040226-006	SP-35	19-30	1.2	51	27	22	SCL
C07040226-007	SP-35	30-45	0.75	59	27	14	SL
C07040226-008	SP-35	45-70	0.86	42	39	19	L
C07040226-009	SP-37	0-6	4.0	38	30	32	CL
C07040226-010	SP-37	6-12	2.9	48	23	29	SCL
C07040226-011	SP-37	12-24	3.0	56	24	20	SL - SCL
C07040226-012	SP-37	24-38	0.67	71	18	11	SL
C07040226-013	SP-37	38-58	0.45	73	18	9.0	SL
C07040226-014	SP-38	0-6	6.2	12	44	44	SiC
C07040226-015	SP-38	6-12	3.4	2.0	47	51	SiC
C07040226-016	SP-38	12-20	1.9	11	46	43	SiC
C07040226-017	SP-38	20-24	1.1	10	42	48	SiC
C07040226-018	SP-39	0-6	2.3	36	33	31	CL
C07040226-019	SP-39	6-12	2.4	38	30	32	CL
C07040226-020	SP-39	12-24	1.2	62	20	18	SL
C07040226-021	SP-39	24-36	0.50	75	15	10	SL
C07040226-022	SP-40	0-6	5.7	10	42	48	SiC
C07040226-023	SP-40	6-12	2.9	5.0	44	51	SiC
C07040226-024	SP-40	12-22	1.4	21	44	35	CL
C07040226-025	SP-41	0-6	3.3	46	26	28	SCL
C07040226-026	SP-41	6-12	3.4	25	34	41	C
C07040226-027	SP-41	12-36	1.7	6.0	44	50	SiC
C07040226-028	SP-41	36-64	0.96	12	52	36	SiCL
C07040226-029	SP-41	64-80	0.56	54	31	15	SL
C07040226-030	SP-42	0-9	2.4	50	30	20	L
C07040226-031	SP-42	9-24	2.6	8.0	49	43	SiC
C07040226-032	SP-42	24-36	1.7	52	27	21	SCL
C07040226-033	SP-42	36-48	0.92	44	34	22	L

LABORATORY ANALYTICAL REPORT

Client: Alton Coal Development / Talon Resources
Project: Coal Hollow
Workorder: C07041141

Report Date: 05/13/07
Date Received: 04/24/07

		Analysis	EC SatPst	Saturation SatPst	Lime as CaCO3	pH SatPst	NO3 Soluble	K Soluble	K SatPst	K NH4OAc	P, Olsen-NAHCO3	Se SatPst	Ca SatPst	Mg SatPst	Na SatPst
		Units	mmhos/cm	%	%	s_u_	mg/kg-dry	mg/kg-dry	meq/L	meq/100g	mg/kg-dry	mg/L	meq/L	meq/L	meq/L
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
C07041141-001	Alton 48	0-3	0.52	85.6	4.5	7.7	2.6	6.41	0.19	1.1	10	< 0.001	3.6	1.3	1.4
C07041141-002	Alton 48	3-12	0.57	95.4	7.2	8.0	1.1	2.39	0.06	0.79	8	< 0.001	1.2	0.55	4.4
C07041141-003	Alton 48	12-30	2.63	106	7.5	8.2	1.3	5.38	0.13	0.86	7	< 0.001	3.0	1.8	17
C07041141-004	Alton 48	30-48	4.65	81.0	5.2	8.1	< 1.0	7.36	0.23	0.94	7	< 0.001	6.5	4.1	29
C07041141-005	Alton 48	48-84	6.20	87.5	4.0	7.9	1.4	11.8	0.35	1.1	9	< 0.001	15	8.1	37

LABORATORY ANALYTICAL REPORT

Client: Alton Coal Development / Talon Resources
Project: Coal Hollow
Workorder: C07041141

Report Date: 05/13/07
Date Received: 04/24/07

		Analysis	SAR	Very Fine Sand	Sand	Silt	Clay	Texture	Organic Matter
		Units	unitless	%	%	%	%		%
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
C07041141-001	Alton 48	0-3	0.92	4.8	7.0	33	60	C	3.5
C07041141-002	Alton 48	3-12	4.68	5.3	6.0	30	64	C	1.9
C07041141-003	Alton 48	12-30	11.2	11	12	28	60	C	1.7
C07041141-004	Alton 48	30-48	12.7	9.5	10	28	62	C	1.6
C07041141-005	Alton 48	48-84	10.8	6.5	7.0	30	63	C	1.5

LABORATORY ANALYTICAL REPORT

Revised Date: 05/18/07
Report Date: 05/06/07
Date Received: 04/16/07

Client: Alton Coal Development / Talon Resources
Project: Coal Hollow Project
Workorder: C07040695

		Analysis	EC SatPst	Saturation SatPst	Lime as CaCO3	pH SatPst	NO3 Soluble	K Soluble	K SatPst	K NH4OAc	P, Olsen-NAHCO3	Ca SatPst	Mg SatPst	Na SatPst	SAR
		Units	mmhos/cm	%	%	s_u_	mg/kg-dry	mg/kg-dry	meq/L	meq/100g	mg/kg-dry	meq/L	meq/L	meq/L	unitless
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
C07040695-001	Alton 49	0-3	0.42	58.0	17.8	8.1	< 1.0	7.04	0.31	0.46	7	2.9	1.5	0.07	0.05
C07040695-002	Alton 49	3-10	0.34	55.5	17.7	8.4	< 1.0	7.32	0.34	0.39	8	2.0	1.5	0.08	0.06
C07040695-003	Alton 50	0-4	0.20	75.4	18.5	8.4	1.4	6.38	0.22	0.78	6	1.6	0.36	0.13	0.13
C07040695-004	Alton 50	4-11	0.27	66.2	18.7	8.1	1.4	6.08	0.24	0.81	8	1.9	0.53	0.32	0.29
C07040695-005	Alton 50	11-19	0.30	72.0	18.5	8.4	1.3	4.97	0.18	0.65	9	1.9	0.59	0.57	0.52

LABORATORY ANALYTICAL REPORT

Revised Date: 05/18/07
Report Date: 05/06/07
Date Received: 04/16/07

Client: Alton Coal Development / Talon Resources
Project: Coal Hollow Project
Workorder: C07040695

		Analysis	Very Fine Sand	Sand	Silt	Clay	Texture	Organic Matter
		Units	%	%	%	%		%
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
C07040695-001	Alton 49	0-3	23	26	42	32	CL	2.0
C07040695-002	Alton 49	3-10	27	33	44	23	L	2.3
C07040695-003	Alton 50	0-4	3.7	4.0	38	58	C	1.4
C07040695-004	Alton 50	4-11	4.4	5.0	35	60	C	1.3
C07040695-005	Alton 50	11-19	6.3	7.0	37	56	C	1.4

Table C-2. Summary of laboratory analysis of overburden samples for Coal Hollow cor holes, year 1.

Sample ID	pH (Sat Paste)	E.C. @25°C	SAR	Sand	Silt	Clay	USDA Texture Class[1]	Very Fine Sand	Saturation Percent	Available Water Capacity[2]	Organic Matter (calculated)3	Organic Carbon	Erodibility Factor (K-Factor)[4]	$CaCO_3$	Boron (soluble)	Se (Hot H_2O sol)	Calcium, soluble (Sat. Paste)	Magnesium, soluble (Sat. Paste)	Sodium, soluble (Sat. Paste)	Potassium, soluble (Sat. Paste)	Nitrogen-Nitrate	Phosphorus	Alkalinity
	units	dS/m	unitless	%	%	%		%	%	in/in	%	%	unitless	%	mg/Kg	mg/Kg	meq/L	meq/L	meq/L	meq/L	mg/Kg	mg/Kg	meq/L
CH-01-05, 3 ft	8.00	0.33	0.12	0	49	51	SiC	0	78.4	0.12	2.0	1.05	0.29	28.3	0.4	†	1.42	1.63	0.14	0.37	<1	†	†
CH-01-05, 6 ft	8.20	0.34	0.33	0	49	51	SiC	0	82.9	0.12	1.5	0.77	0.30	30	0.4	†	0.69	2.19	0.4	0.35	<1	†	†
CH-01-05, 9-10 ft	8.40	0.52	0.96	10	61	29	SiCL	3	52.2	0.18	0.8	0.4	0.46	35.3	0.3	†	0.57	3.4	1.36	0.28	<1	†	†
CH-01-05, 12 ft	8.20	0.78	0.8	0	53	47	SiC	0	84.6	0.14	0.9	0.48	0.34	30.3	0.2	†	1.48	5.36	1.49	0.31	<1	†	†
CH-01-05, 12-13 ft	8.30	0.73	0.7	44	39	17	L	11	35.9	0.13	0.6	0.3	0.38	25.5	<0.1	†	1.71	4.69	1.25	0.26	<1	†	†
CH-01-05, 16 ft	8.30	0.65	0.66	20	55	25	SiL	6	50.5	0.17	0.7	0.35	0.42	30.3	0.1	†	1.58	4.05	1.11	0.27	<1	†	†
CH-01-05, 30 ft	8.00	3.13	0.79	8	47	45	SiC	0	81.9	0.14	0.9	0.45	0.32	26.1	0.4	†	16.9	25.8	3.65	1.11	1	†	†
CH-03-05, 0-3 ft	7.80	0.42	0.05	70	21	9	SL	11	25.7	0.08	1.2	0.62	0.24	15.6	<0.1	†	2.98	1.26	0.07	0.3	2	†	†
CH-03-05, 3-6 ft	8.30	0.27	0.09	77	17	6	LS	9	21.8	0.07	0.4	0.23	0.22	27.7	<0.1	†	1.73	0.87	0.1	0.12	<1	†	†
CH-03-05, 9 ft	8.40	0.25	0.11	82	13	5	LS	7	20.4	0.06	0.3	0.15	0.17	46.2	<0.1	†	1.1	1.32	0.13	0.09	<1	†	†
CH-03-05, 16 ft	8.40	0.4	0.31	80	14	6	LS	5	20.2	0.06	0.2	0.11	0.17	64.7	<0.1	†	1.22	2.24	0.4	0.16	<1	†	†
CH-05-05, 0-1 ft	7.90	0.43	0.1	30	41	29	CL	3	44.5	0.15	1.7	0.91	0.30	22.7	0.2	†	2.22	2.21	0.15	0.19	3	†	†
CH-05-05, 3 ft	8.20	0.43	0.19	64	23	13	SL	12	27	0.09	0.7	0.39	0.26	24.9	<0.1	†	1.28	3.02	0.28	0.15	1	†	†
CH-05-05, 9-10 ft	8.40	0.43	0.26	78	17	5	LS	4	20.8	0.06	0.2	0.13	0.18	60	<0.1	†	1.05	3.01	0.36	0.15	<1	†	†
CH-05-05, 14 ft	8.30	0.54	1.04	0	39	61	C	0	97.3	0.26	1.0	0.5	0.24	19.1	0.2	†	1.5	2.69	1.51	0.21	<1	†	†
CH-05-05, 19 ft	8.10	1.04	3.57	2	37	61	C	0	97.6	0.25	0.8	0.44	0.23	18.2	0.4	†	2.67	2.71	5.85	0.27	<1	†	†
Maximum	8.40	3.13	3.57	82.00	61.00	61.00		12	97.60	0.26	2.0	1.05	0.46	64.70	0.40		16.90	25.80	5.85	1.11			
Minimum	7.80	0.25	0.05	0.00	13.00	5.00		0	20.20	0.06	0.2	0.11	0.17	15.60	0.10		0.57	0.87	0.07	0.09			
Average	8.20	0.67	0.63	35.31	35.94	28.75	CL	4	52.61	0.13	0.9	0.46	0.28	31.56	0.29		2.51	4.15	1.14	0.29			

1. USDA soil textures: sand (S); loamy sand (LS); sandy loam (SL); loam (L); clay loam (CL); sandy clay loam (SCL); silty clay loam (SiCL); silty clay (SiC); clay (C).
2. Available water capacity calculated using using *Soil Water Characteristics Model* (Saxton et al., 1986).
3. Organic matter calculated from percent organic carbon.
4.Erodibility factor (K) calculated from lab and field data

Suitability Rating (Table 4. Utah DOGM, 2005): Good | Fair | Poor | Unacceptable

Undable to calculate because referenced calcualtion in Table 7, Footnote # 3 above is invalid for soils with percent silt + fine sand greater than 70 percent.

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal
Project:
Workorder: B07041015

Report Date: 04/27/07
Date Received: 04/12/07

	Analysis	Sand	Silt	Clay	Very Fine Sand	Texture	pH, Sat Paste	Cond_ Paste	Saturation	Ca, Sat Paste	Mg, Sat Paste	K, Sat Paste	Na, Sat Paste	SAR
	Units	%	%	%	wt%		s_u_	mmhos/cm	%	meq/L	meq/L	meq/L	meq/L	unitless
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07041015-001	CH-01-05, 3 Feet	< 1	49	51	0	SiC	8.00	0.33	78.4	1.42	1.63	0.37	0.14	0.12
B07041015-002	CH-01-05, 6 Feet	< 1	49	51	0	SiC	8.20	0.34	82.9	0.69	2.19	0.35	0.40	0.33
B07041015-003	CH-01-05, 9-10 Feet	10	61	29	3	SiCL	8.40	0.52	52.2	0.57	3.40	0.28	1.36	0.96
B07041015-004	CH-01-5, 12 Feet	< 1	53	47	0	SiC	8.20	0.78	84.6	1.48	5.36	0.31	1.49	0.80
B07041015-005	CH-01-05, 12-13 Feet	44	39	17	11	L	8.30	0.73	35.9	1.71	4.69	0.26	1.25	0.70
B07041015-006	CH-01-05, 16 Feet	20	55	25	6	SiL	8.30	0.65	50.5	1.58	4.05	0.27	1.11	0.66
B07041015-007	CH-01-05, 30 Feet	8	47	45	0	SiC	8.00	3.13	81.9	16.9	25.8	1.11	3.65	0.79
B07041015-008	CH-03-05, 0-3 Feet	70	21	9	11	SL	7.80	0.42	25.7	2.98	1.26	0.30	0.07	0.05
B07041015-009	CH-03-05, 3-6 Feet	77	17	6	9	LS	8.30	0.27	21.8	1.73	0.87	0.12	0.10	0.09
B07041015-010	CH-03-05, 9 Feet	82	13	5	7	LS	8.40	0.25	20.4	1.10	1.32	0.09	0.13	0.11
B07041015-011	CH-03-05, 16 Feet	80	14	6	5	LS	8.40	0.40	20.2	1.22	2.24	0.16	0.40	0.31
B07041015-012	CH-05-05, 0-1 Feet	30	41	29	3	CL	7.90	0.43	44.5	2.22	2.21	0.19	0.15	0.10
B07041015-013	CH-05-05, 3 Feet	64	23	13	12	SL	8.20	0.43	27.0	1.28	3.02	0.15	0.28	0.19
B07041015-014	CH-05-05, 9-10 Feet	78	17	5	4	LS	8.40	0.43	20.8	1.05	3.01	0.15	0.36	0.26
B07041015-015	CH-05-05, 14 Feet	< 1	39	61	0	C	8.30	0.54	97.3	1.50	2.69	0.21	1.51	1.04
B07041015-016	CH-05-05, 19 Feet	2	37	61	0	C	8.10	1.04	97.6	2.67	2.71	0.27	5.85	3.57
B07041015-017	CH-06-05, Soil	2	45	53	0	SiC	8.00	0.54	79.5	1.33	1.51	0.08	3.17	2.66
B07041015-018	CH-06-05, 5-10 Feet	20	39	41	6	C	8.50	ISS	ISS	ISS	ISS	ISS	ISS	ISS
B07041015-019	CH-06-05, 10 Feet	12	41	47	9	SiC	8.20	7.95	90.9	22.7	52.2	0.93	60.8	9.93
B07041015-020	CH-06-05, 20 Feet	10	31	59	6	C	8.00	7.18	143	26.7	23.3	1.07	61.7	12.3
B07041015-021	CH-06-05, 35-40 Feet	7	26	67	4	C	8.20	6.33	275	19.5	9.3	0.88	60.0	15.8
B07041015-022	CH-06-05, 42-49 Feet	6	44	50	5	SiC	8.30	6.47	192	12.3	7.0	1.07	66.4	21.4
B07041015-023	CH-01-05, 50 Feet, Dark Grey Clay	1	34	65	0	C	8.60	2.78	234	1.73	1.03	0.43	26.0	22.2

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal
Project:
Workorder: B07041015

Report Date: 04/27/07
Date Received: 04/12/07

	Analysis	Neut Potential	Acid Potential	Acid/Base Potential	Lime	Organic Carbon	Nitrate as N	B-H2O Extr	As-Total	Ba-Total	Cd-Total	Cr-Total	Cu-Total	Fe-Total
	Units	t/kt	t/kt	t/kt	%	wt%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07041015-001	CH-01-05, 3 Feet	280	1.1	280	28.3	1.05	< 1	0.4	9	99	< 1	24	17	17300
B07041015-002	CH-01-05, 6 Feet	300	0	300	30.0	0.77	< 1	0.4	6	91	< 1	20	16	16100
B07041015-003	CH-01-05, 9-10 Feet	350	0	350	35.3	0.40	< 1	0.3	6	104	< 1	16	11	12800
B07041015-004	CH-01-5, 12 Feet	300	0	300	30.3	0.48	< 1	0.2	< 5	87	< 1	18	14	14400
B07041015-005	CH-01-05, 12-13 Feet	260	0	250	25.5	0.30	< 1	< 0.1	< 5	124	< 1	11	8	9780
B07041015-006	CH-01-05, 16 Feet	300	0	300	30.3	0.35	< 1	0.1	5	89	< 1	13	10	11300
B07041015-007	CH-01-05, 30 Feet	260	0	260	26.1	0.45	1	0.4	6	99	< 1	19	14	14100
B07041015-008	CH-03-05, 0-3 Feet	160	0	160	15.6	0.62	2	< 0.1	< 5	56	< 1	7	6	8620
B07041015-009	CH-03-05, 3-6 Feet	280	0	280	27.7	0.23	< 1	< 0.1	< 5	96	< 1	7	< 5	7000
B07041015-010	CH-03-05, 9 Feet	460	0	460	46.2	0.15	< 1	< 0.1	8	202	< 1	8	< 5	8100
B07041015-011	CH-03-05, 16 Feet	650	0	650	64.7	0.11	< 1	< 0.1	< 5	234	< 1	7	< 5	11400
B07041015-012	CH-05-05, 0-1 Feet	230	0	230	22.7	0.91	3	0.2	7	67	< 1	17	13	13500
B07041015-013	CH-05-05, 3 Feet	250	0	250	24.9	0.39	1	< 0.1	< 5	61	< 1	8	6	8120
B07041015-014	CH-05-05, 9-10 Feet	600	0	600	60.0	0.13	< 1	< 0.1	< 5	107	< 1	7	< 5	8140
B07041015-015	CH-05-05, 14 Feet	190	0	190	19.1	0.50	< 1	0.2	< 5	106	< 1	14	13	14500
B07041015-016	CH-05-05, 19 Feet	180	0	180	18.2	0.44	< 1	0.4	< 5	85	< 1	15	14	14600
B07041015-017	CH-06-05, Soil	21	0	20	2.1	0.73	6	0.2	< 5	65	< 1	18	14	13800
B07041015-018	CH-06-05, 5-10 Feet	130	0	130	12.6	0.37	1	0.6	< 5	63	< 1	12	11	10000
B07041015-019	CH-06-05, 10 Feet	69	0	68	6.9	0.35	3	0.4	< 5	57	< 1	15	13	14200
B07041015-020	CH-06-05, 20 Feet	60	1.6	58	6.0	0.38	8	0.4	< 5	94	< 1	25	19	16600
B07041015-021	CH-06-05, 35-40 Feet	90	3.6	87	9.0	0.33	5	2.3	< 5	124	< 1	11	11	11500
B07041015-022	CH-06-05, 42-49 Feet	51	17	34	5.1	0.90	17	2.7	< 5	84	< 1	15	10	13500
B07041015-023	CH-01-05, 50 Feet, Dark Grey Clay	41	12	29	4.1	0.77	1	4.1	< 5	134	< 1	15	10	10600

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal
Project:
Workorder: B07041015

Report Date: 04/27/07
Date Received: 04/12/07

	Analysis	Pb-Total	Mn-Total	Hg-Total	Mo-Total	Se-Total	Ag-Total	Zn-Total
	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07041015-001	CH-01-05, 3 Feet	13	272	< 1	< 5	< 5	< 5	63
B07041015-002	CH-01-05, 6 Feet	12	222	< 1	< 5	< 5	< 5	61
B07041015-003	CH-01-05, 9-10 Feet	11	225	< 1	< 5	< 5	< 5	43
B07041015-004	CH-01-5, 12 Feet	11	283	< 1	< 5	< 5	< 5	54
B07041015-005	CH-01-05, 12-13 Feet	9	191	< 1	< 5	< 5	< 5	33
B07041015-006	CH-01-05, 16 Feet	10	159	< 1	< 5	< 5	< 5	40
B07041015-007	CH-01-05, 30 Feet	11	202	< 1	< 5	< 5	< 5	49
B07041015-008	CH-03-05, 0-3 Feet	7	152	< 1	< 5	< 5	< 5	28
B07041015-009	CH-03-05, 3-6 Feet	5	141	< 1	< 5	< 5	< 5	19
B07041015-010	CH-03-05, 9 Feet	< 5	217	< 1	< 5	< 5	< 5	14
B07041015-011	CH-03-05, 16 Feet	< 5	276	< 1	< 5	< 5	< 5	23
B07041015-012	CH-05-05, 0-1 Feet	11	264	< 1	< 5	< 5	< 5	47
B07041015-013	CH-05-05, 3 Feet	7	152	< 1	< 5	< 5	< 5	25
B07041015-014	CH-05-05, 9-10 Feet	< 5	233	< 1	< 5	< 5	< 5	16
B07041015-015	CH-05-05, 14 Feet	11	87	< 1	< 5	< 5	< 5	50
B07041015-016	CH-05-05, 19 Feet	11	144	< 1	< 5	< 5	< 5	54
B07041015-017	CH-06-05, Soil	11	118	< 1	< 5	< 5	< 5	46
B07041015-018	CH-06-05, 5-10 Feet	10	114	< 1	< 5	< 5	< 5	35
B07041015-019	CH-06-05, 10 Feet	9	108	< 1	< 5	< 5	< 5	35
B07041015-020	CH-06-05, 20 Feet	11	121	< 1	< 5	< 5	< 5	45
B07041015-021	CH-06-05, 35-40 Feet	19	322	< 1	< 5	< 5	< 5	44
B07041015-022	CH-06-05, 42-49 Feet	12	148	< 1	< 5	< 5	< 5	39
B07041015-023	CH-01-05, 50 Feet, Dark Grey Clay	13	80	< 1	< 5	< 5	< 5	43

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal Development, LLC
Project: Coal Hollow Project
Workorder: B07120398

Report Date: 12/18/07
Date Received: 12/06/07

	Analysis	Sand	Silt	Clay	Very Fine Sand	Texture	pH, Sat Paste	Cond_ Paste	Saturation	Ca, Sat Paste	Mg, Sat Paste	K, Sat Paste	Na, Sat Paste	SAR
	Units	%	%	%	wt%		s_u_	mmhos/cm	%	meq/L	meq/L	meq/L	meq/L	unitless
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07120398-001	CH-08 70-79 ft	8	59	33	2	SiCL	8.60	2.68	94.8	0.50	0.27	0.23	26.1	42.1
B07120398-002	CH-08 79.2 - 82.3 ft	35	41	24	18	L	8.30	1.90	55.1	0.20	0.15	0.16	20.8	49.8
B07120398-003	CH-08 82.3 - 83.8 ft	50	31	19	19	L	7.50	6.48	37.9	9.4	4.2	0.90	63.6	24.5
B07120398-004	CH-08 101 - 103 ft underburden	16	42	42	7	SiC	8.40	6.72	110	2.5	2.1	0.54	72.8	48.1
B07120398-005	CH-07 0 - 6 ft	2	45	53	0	SiC	8.30	4.27	88.3	4.91	10.9	0.34	36.5	13.0
B07120398-006	CH-07 6 - 15 ft	10	41	49	3	SiC	8.50	9.33	101	23.2	33.0	0.71	84.2	15.9
B07120398-007	CH-07 15 - 19 ft	5	45	50	4	SiC	8.20	10.0	89.4	22.8	18.4	1.34	106	23.3
B07120398-008	CH-07 19 - 27 ft	< 1	43	57	0	SiC	8.20	8.71	134	20.5	11.1	1.01	90.5	22.8
B07120398-009	CH-07 27 - 36 ft	< 1	39	61	0	C	8.70	3.68	259	1.69	0.83	0.33	35.6	31.7
B07120398-010	CH-07 36 - 46 ft	< 1	45	55	0	SiC	9.40	0.90	240	< 0.05	< 0.08	0.06	9.16	52.2
B07120398-011	CH-08 0 - 6 ft	18	41	41	0	SiC	8.20	3.95	55.8	11.5	48.5	0.60	3.22	0.59
B07120398-012	CH-08 6 - 11 ft	60	25	15	10	SL	8.30	2.96	27.4	8.65	30.1	0.40	3.75	0.85
B07120398-013	CH-08 11 - 20 ft	42	37	21	6	L	8.00	3.84	33.2	24.3	24.0	0.65	7.21	1.47
B07120398-014	CH-08 20 - 30 ft	4	51	45	0	SiC	8.10	2.55	81.6	12.0	7.92	0.56	11.5	3.64
B07120398-015	CH-08 30 - 40 ft	26	45	29	9	CL	8.00	4.20	52.2	25.3	15.1	0.82	17.7	3.94
B07120398-016	CH-08 40 - 50 ft	18	48	34	8	SiCL	8.10	5.44	65.1	21.4	11.3	0.95	43.4	10.7
B07120398-017	CH-08 50 - 60 ft	19	46	35	8	SiCL	8.20	5.63	71.2	16.9	10.6	1.00	49.4	13.3
B07120398-018	CH-08 60 - 70 ft	10	45	45	4	SiC	8.80	4.22	123	3.09	1.58	0.43	43.8	28.7

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal Development, LLC
Project: Coal Hollow Project
Workorder: B07120398

Report Date: 12/18/07
Date Received: 12/06/07

	Analysis	Neut Potential	Acid Potential	Acid/Base Potential	Lime	Organic Carbon	Nitrate as N	B-H2O Extr	Se-H2O Extr	As-Total	Ba-Total	Cd-Total	Cr-Total	Cu-Total
	Units	t/kt	t/kt	t/kt	%	wt%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07120398-001	CH-08 70-79 ft	170	9.8	160	16.7	1.70	1	1.0	0.02	8	74	< 1	12	11
B07120398-002	CH-08 79.2 - 82.3 ft	45	20	25	4.5	7.72	< 1	1.7	< 0.01	6	105	< 1	7	8
B07120398-003	CH-08 82.3 - 83.8 ft	37	13	24	3.7	1.82	< 1	1.4	< 0.01	< 5	54	< 1	5	< 5
B07120398-004	CH-08 101 - 103 ft underburden	110	14	93	10.7	4.60	1	6.5	0.02	< 5	79	< 1	13	13
B07120398-005	CH-07 0 - 6 ft	190	1.4	190	19.4	0.84	2	0.6	0.02	7	130	< 1	21	15
B07120398-006	CH-07 6 - 15 ft	220	1.1	220	21.8	0.33	1	0.8	0.03	< 5	91	< 1	15	12
B07120398-007	CH-07 15 - 19 ft	170	0	170	17.0	0.39	1	0.5	0.02	6	53	< 1	10	9
B07120398-008	CH-07 19 - 27 ft	110	3.2	100	10.7	0.66	1	0.8	0.01	7	56	< 1	11	9
B07120398-009	CH-07 27 - 36 ft	110	8.0	100	11.0	1.26	1	3.7	0.02	8	52	< 1	8	8
B07120398-010	CH-07 36 - 46 ft	95	8.3	87	9.5	1.09	1	3.2	0.01	< 5	49	< 1	< 5	10
B07120398-011	CH-08 0 - 6 ft	330	0	330	32.8	1.21	2	0.4	< 0.01	8	128	< 1	21	13
B07120398-012	CH-08 6 - 11 ft	290	0	290	29.2	0.28	2	0.1	< 0.01	5	124	< 1	9	6
B07120398-013	CH-08 11 - 20 ft	350	0	350	34.6	0.29	1	0.1	< 0.01	< 5	114	< 1	10	8
B07120398-014	CH-08 20 - 30 ft	120	0	120	11.6	0.44	1	0.3	0.01	< 5	59	< 1	12	12
B07120398-015	CH-08 30 - 40 ft	220	0	220	22.3	0.32	1	0.3	< 0.01	< 5	82	< 1	10	9
B07120398-016	CH-08 40 - 50 ft	210	3.8	210	21.2	0.65	1	0.6	< 0.01	5	94	< 1	13	11
B07120398-017	CH-08 50 - 60 ft	210	5.2	200	20.9	0.54	1	0.7	< 0.01	< 5	94	< 1	13	11
B07120398-018	CH-08 60 - 70 ft	150	11	140	15.2	0.70	1	0.8	0.02	< 5	91	< 1	16	14

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal Development, LLC
Project: Coal Hollow Project
Workorder: B07120398

Report Date: 12/18/07
Date Received: 12/06/07

	Analysis	Fe-Total	Pb-Total	Mn-Total	Hg-Total	Mo-Total	Se-Total	Ag-Total	Zn-Total
	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07120398-001	CH-08 70-79 ft	13700	11	162	< 1	< 5	< 5	< 5	39
B07120398-002	CH-08 79.2 - 82.3 ft	6860	7	48	< 1	< 5	< 5	< 5	25
B07120398-003	CH-08 82.3 - 83.8 ft	6810	< 5	35	< 1	< 5	< 5	< 5	13
B07120398-004	CH-08 101 - 103 ft underburden	10900	13	127	< 1	< 5	< 5	< 5	46
B07120398-005	CH-07 0 - 6 ft	16400	14	255	< 1	< 5	< 5	< 5	54
B07120398-006	CH-07 6 - 15 ft	11800	11	179	< 1	< 5	< 5	< 5	36
B07120398-007	CH-07 15 - 19 ft	9500	9	109	< 1	< 5	< 5	< 5	26
B07120398-008	CH-07 19 - 27 ft	11300	13	93	< 1	< 5	< 5	< 5	35
B07120398-009	CH-07 27 - 36 ft	9440	13	81	< 1	< 5	< 5	< 5	33
B07120398-010	CH-07 36 - 46 ft	6820	21	86	< 1	10	< 5	< 5	41
B07120398-011	CH-08 0 - 6 ft	13600	11	293	< 1	< 5	< 5	< 5	47
B07120398-012	CH-08 6 - 11 ft	8270	6	184	< 1	< 5	< 5	< 5	24
B07120398-013	CH-08 11 - 20 ft	9330	5	194	< 1	< 5	< 5	< 5	26
B07120398-014	CH-08 20 - 30 ft	9650	11	88	< 1	< 5	< 5	< 5	38
B07120398-015	CH-08 30 - 40 ft	10000	8	166	< 1	< 5	< 5	< 5	31
B07120398-016	CH-08 40 - 50 ft	12200	10	172	< 1	< 5	< 5	< 5	36
B07120398-017	CH-08 50 - 60 ft	11000	9	165	< 1	< 5	< 5	< 5	32
B07120398-018	CH-08 60 - 70 ft	12900	12	148	< 1	< 5	< 5	< 5	45

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal
Project: Coal Hollow Project
Workorder: B07120524

Report Date: 12/18/07
Date Received: 12/07/07

	Analysis	Sand	Silt	Clay	Very Fine Sand	Texture	pH, Sat Paste	Cond_ Paste	Saturation	Ca, Sat Paste	Mg, Sat Paste	K, Sat Paste	Na, Sat Paste	SAR
	Units	%	%	%	wt%		s_u_	mmhos/cm	%	meq/L	meq/L	meq/L	meq/L	unitless
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07120524-001	CH-01-05, Coal Grab Sample	92	5	3	5	S	5.70	3.04	75.0	24.8	15.5	0.22	4.42	0.99

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LABORATORY ANALYTICAL REPORT

Client: Alton Coal
Project: Coal Hollow Project
Workorder: B07120524

Report Date: 12/18/07
Date Received: 12/07/07

	Analysis	Neut Potential	Acid Potential	Acid/Base Potential	S, Total	S, H2O Extr	S, HCL Extr	S, HNO3 Extr	S, Residual	Lime	Organic Carbon	Nitrate as N	B-H2O Extr	Se-H2O Extr
	Units	t/kt	t/kt	t/kt	%	%	%	%	%	%	wt%	mg/kg	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07120524-001	CH-01-05, Coal Grab Sample	25	81	-56	2.78	0.18	0.01	1.34	1.25	2.5	38.5	1	5.6	< 0.01

ENERGY LABORATORIES, INC. • P.O. Box 30916 • 1120 South 27th S • • Billings, MT 59107-0916
800-735-4489 • 406-252-6325 • 406-252-6069 fax • eli@energylab.com

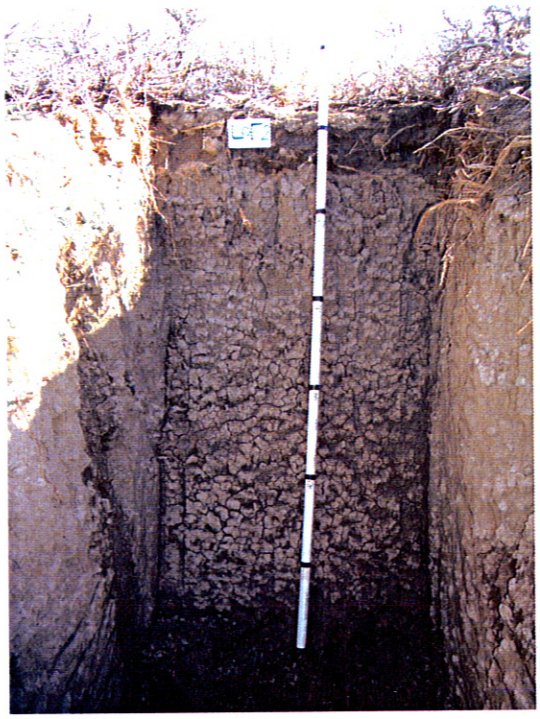
LABORATORY ANALYTICAL REPORT

Client: Alton Coal
Project: Coal Hollow Project
Workorder: B07120524

Report Date: 12/18/07
Date Received: 12/07/07

	Analysis	As-Total	Ba-Total	Cd-Total	Cr-Total	Cu-Total	Fe-Total	Pb-Total	Mn-Total	Hg-Total	Mo-Total	Se-Total	Ag-Total	Zn-Total
	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B07120524-001	CH-01-05, Coal Grab Sample	< 8	53	< 1	< 5	9	8830	< 5	47	< 1	< 5	< 8	< 5	17

Profile 1. A Family: fine, mixed, superactive, mesic Aridic Calciustept, photo not available.



Profile 2. D Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 3. M Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 4. Calendar Family: fine, mixed, superactive, mesic Aridic Haplustepts.

Profile 5. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 5 Area. Surrounding area.

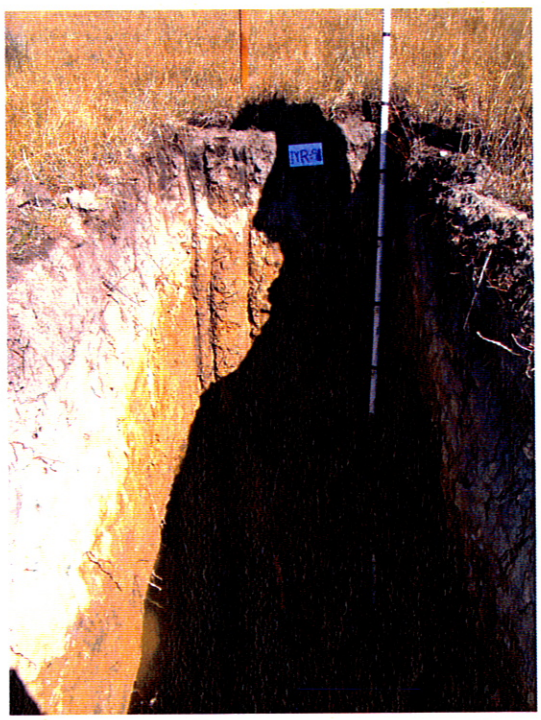
Profile 6. Cibeque Family: fine-loamy, mixed, superactive, mesic Aridic Calciustept.

Profile 6 Area. Surrounding area.

Profile 7. D Family: fine, mixed, superactive, mesic Aridic Calciustoll.

Profile 9A. Graystone; coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 8. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

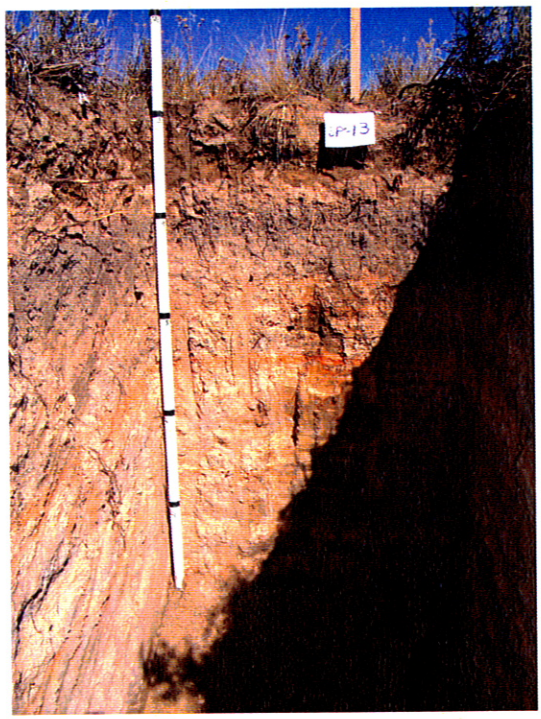


Profile 9B. Cookcan: coarse-loamy, mixed, superactive, frigid Typic Calciaquoll.

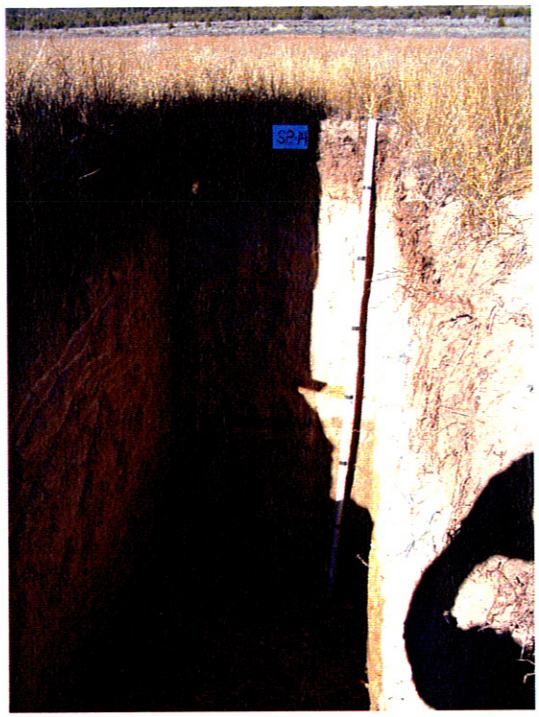
Profile 10. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 12. M Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 11. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.



Profile 13. Cibeque Family: fine-loamy, mixed, superactive, mesic Aridic Calciustept.



Profile 14. I Family: fine-loamy, mixed, superactive, frigid Aquic Calciustept.

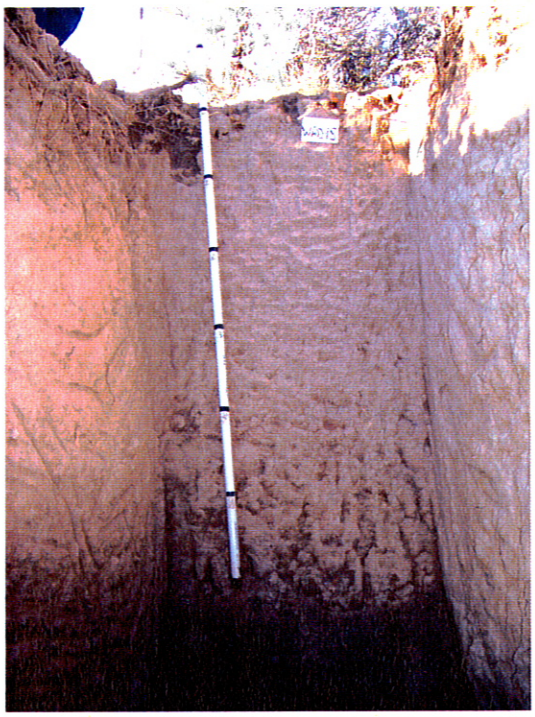
Profile 16. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 15. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 17. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 18A. Alamosa: fine-loamy, mixed, superactive, frigid Typic Argiaquoll.

Profile 19. Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll.



Profile 18B. Jonale Family: fine-loamy, mixed, superactive, frigid Aridic Calciustoll.

Profile 20. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 21. Snilloc: coarse-loamy, mixed, superactive, mesic Aridic Calciustept.

Profile 23. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 22 Brumley: fine-loamy, mixed, superactive, mesic Calcidic Haplustalf.

Profile 24. Calendar Family: fine, mixed, superactive, mesic Aridic Haplustepts.

Profile 25. M family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 26. N Family: fine, mixed, superactive, frigid Aquic Calciustoll.

Profile 27 A Family: fine, mixed, superactive, mesic Aridic Calciustept, photo not available.

Profile 28. A Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 29. D Family: fine, mixed, superactive, mesic Aridic Calciustoll, photo not available.

Profile 30. A Family; fine, mixed, superactive, mesic Aridic Calciustept.

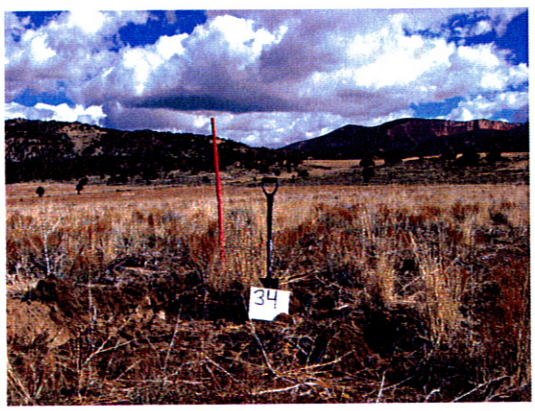
Profile 31. Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll, photo not available.

Profile 32 Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll.

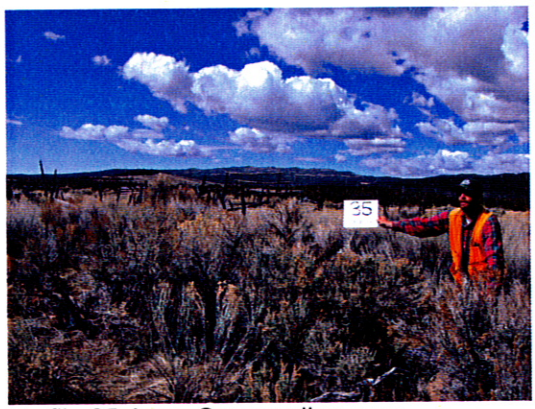
Profile 33. D Family: fine, mixed, superactive, mesic Aridic Calciustoll, photo not available.

Profile 34. Jonale Family; fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 35. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.



Profile 34 Area. Surrounding area.



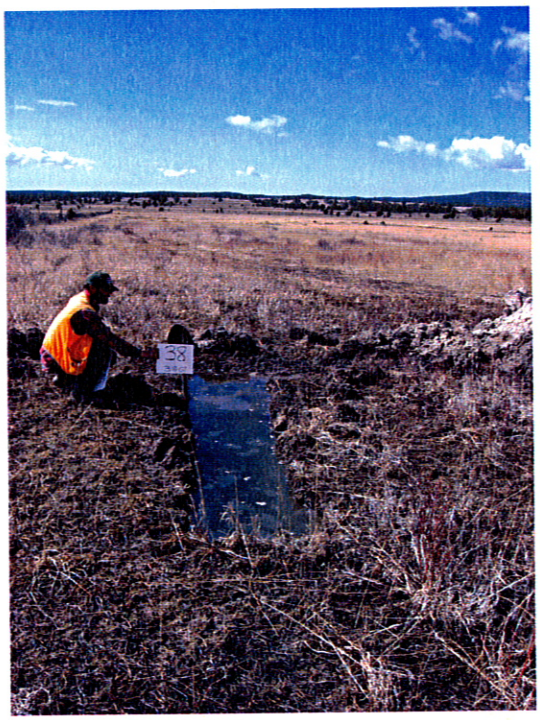
Profile 35 Area. Surrounding area.

Profile 36. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 37. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

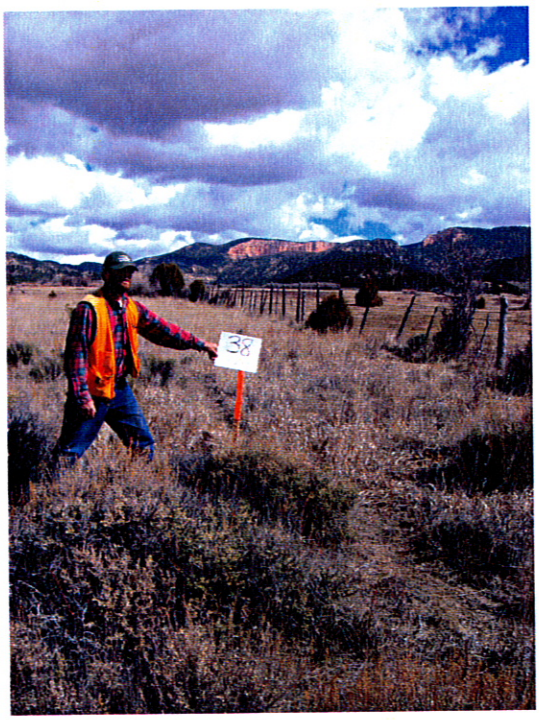
Profile 36 Area. Surrounding area.

Profile 37 Area. Surrounding area.



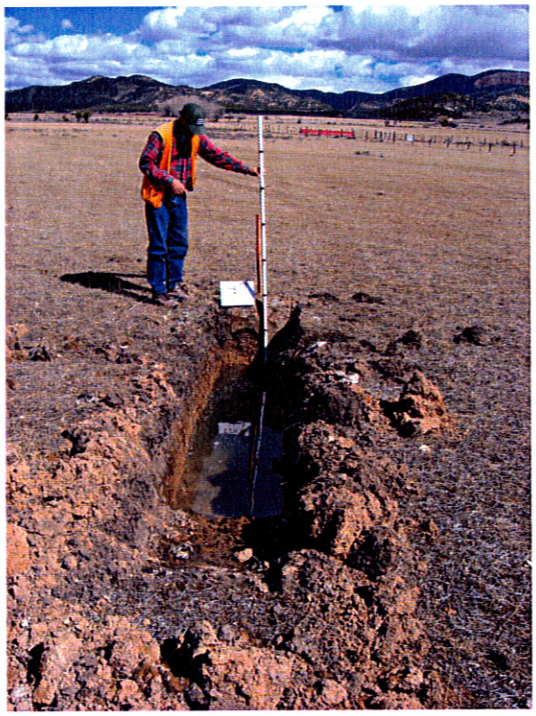
Profiles 38. Happyhollow Family: fine, mixed, superactive, frigid Aeric Epiaquept.

Profile 39. Graystone cobbly substratum family: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

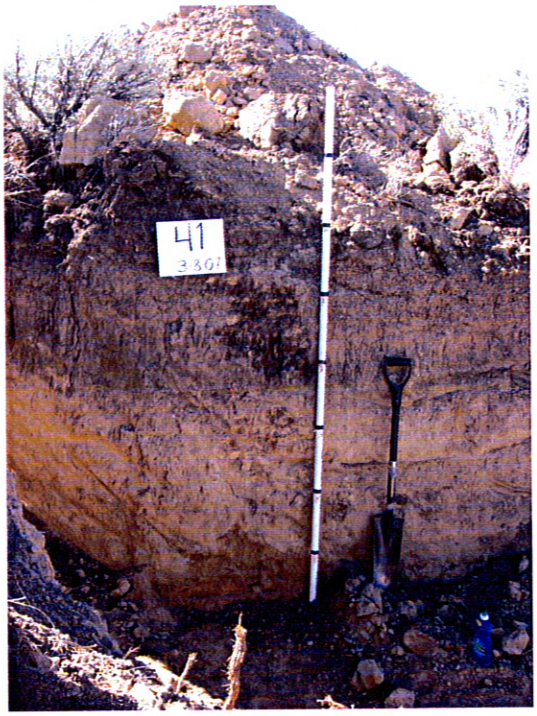


Profile 38 Area. Surrounding area.

Profile 39 Area. Surrounding area.



Profile 40. Tetonview Family: fine-loamy, mixed, superactive, frigid Aeric Calciaquoll.



Profile 41. D Family: fine, mixed, superactive, mesic Aridic Calciustoll.

Profile 42. Deacon: fine-loamy, mixed, superactive, mesic Aridic Haplustoll.

Profile 41 Area. Surrounding area.

Profile 42 area. Surrounding area.

Profile 43. Jicarilla Family: fine, mixed, superactive, frigid Typic Argiaquoll, photo not available.

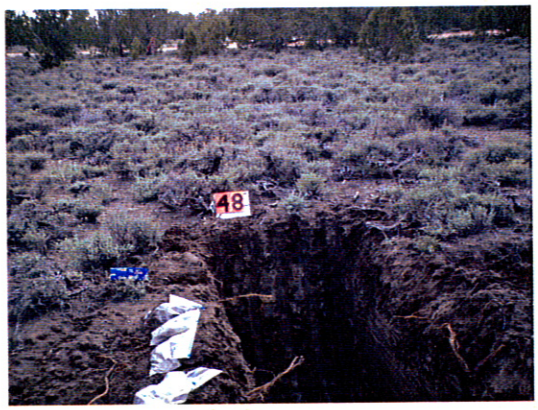
Profile 44. Happyhollow Family: fine, mixed, superactive, frigid Aeric Epiaquept.

Profile 45. Happyhollow Family: fine, mixed, superactive, frigid Aeric Epiaquept.

Profile 46. Alamosa: fine-loamy, mixed, superactive, frigid Typic Argiaquoll.

Profile 47. Brumley: fine-loamy, mixed, superactive, mesic Calcidic Hapustalf.

Profile 50. Zigzag: clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent.



Profile 48. Manzanst Taxadjunct Family: fine, mixed, superactive, mesic Aridic Haplustalf.

Profile 51. Brumley: fine-loamy, mixed superactive, mesic Calcidic Haplustalf. No photo available.

Profile 49 Area. Drififty Family: loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthent.

Photo 52. I Family: fine-loamy, mixed, superactive, frigid Aquic Calciustept.

Photo 53. Disturbed soil with single head sunflower.

Photo 54. Happyhollow Family: fine, mixed, superactive, frigid Aeric Epiaquept.

Photo 55. Cibeque Family: fine-laomy, mixed, superactive, mesic Aridic Calciustept.

Photo 56. Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll.

Photo 57. Cibeque Family. fine-loamy, mixed, superactive, mesic Aridic Calciustept.

Photo 58. Manzanst Taxadjunct Family: very fine, mixed, superactive, mesic Aridic Haplustalf.

Photo 59. A Family: fine, mixed, superactive, mesic Aridic Calciustept.

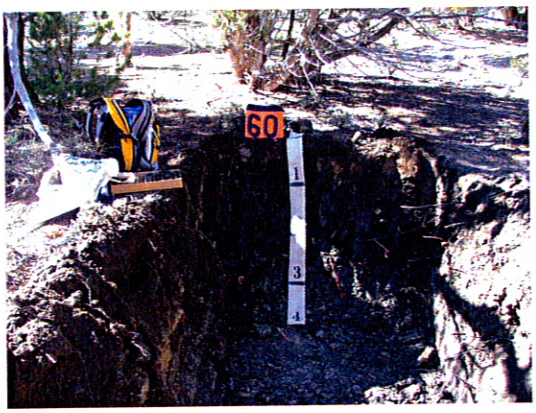
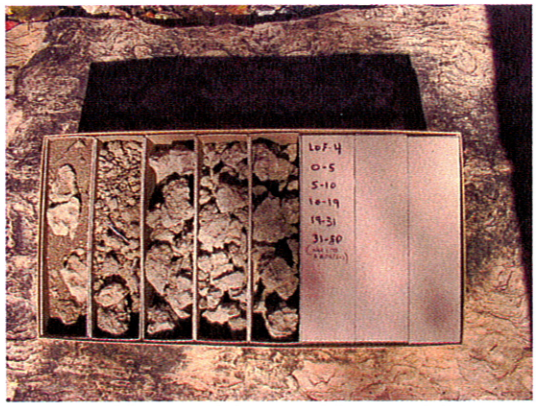


Photo 60. Manzanst Taxadjunct Family: very fine, mixed, superactive, mesic Aridic Haplustalf.

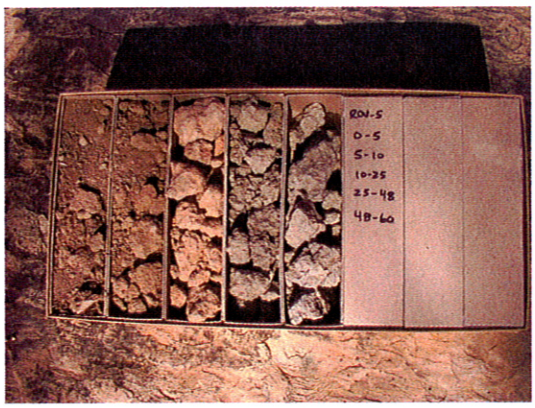
Profile 1. A Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 2. D Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 3. M Family; fine, mixed, superactive, mesic Aridic Calciustept.

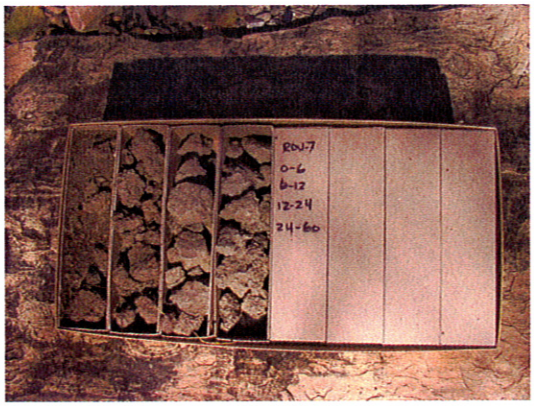


Profile 4. Calendar Family: fine, mixed, superactive, mesic Aridic Haplustepts.



Profile 5. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 6. Cibeque Family: fine-loamy, mixed, superactive, mesic Aridic Calciustept.



Profile 7. D Family: fine, mixed, superactive, mesic Aridic Calciustoll.

Profile 8. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 9A. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

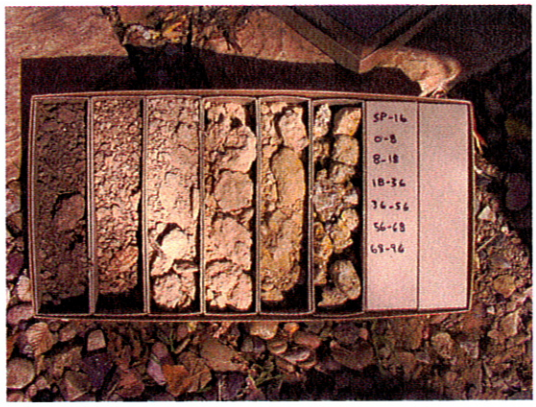
Profile 9B. Photo not available: Cookcan: coarse-loamy, mixed, superactive, frigid Typic Calciaquoll.

Profile 10. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 11. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

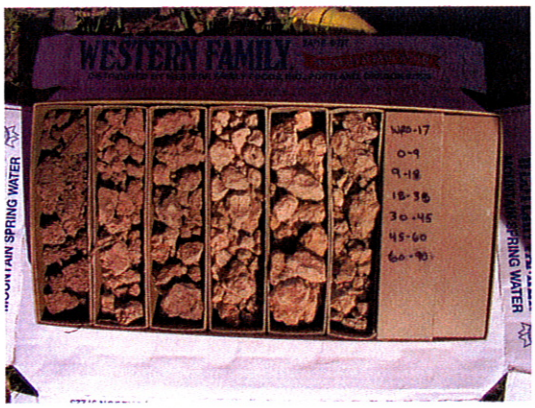
Profile 12. M Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 13. Cibeque Family: fine-loamy, mixed, superactive, mesic Aridic Calciustept.



Profile 16. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 14. I Family: fine-loamy, mixed, superactive, frigid Aquic Calciustept.



Profile 17. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 15. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 18A. Alamosa: fine-loamy, mixed, superactive, frigid Typic Argiaquoll.

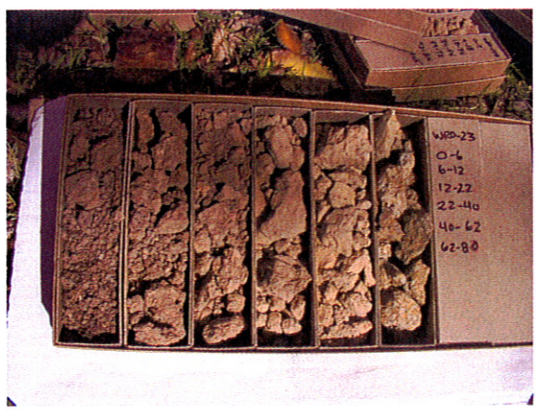
Profile 18B. Jonale Family: fine-loamy, mixed, superactive, frigid Typic Argiaquoll.

Profile 21. Snilloc: coarse-loamy, mixed, superactive, mesic Aridic Calciustept.

Profile 19. Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll.

Profile 22. Brumley: fine-loamy, mixed, superactive, mesic Calcidic Haplustalf.

Profile 20. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

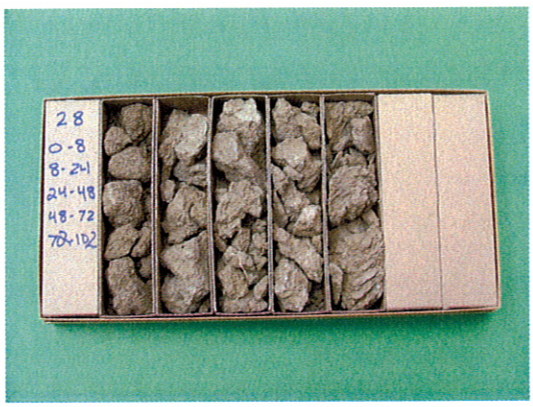


Profile 23. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 24. Calendar Family: fine, mixed, superactive, mesic Aridic Haplustepts.

Profile 27. A Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 25. M Family: fine, mixed, superactive, mesic Aridic Calciustept.

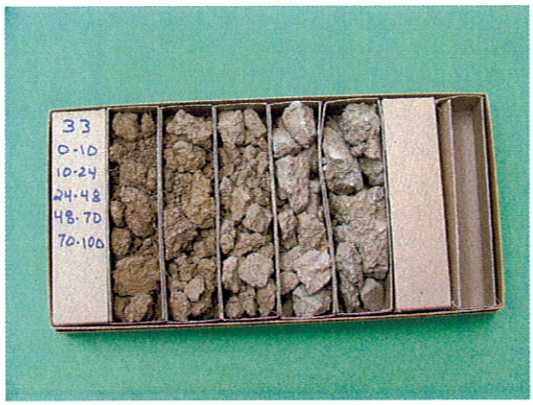


Profile 28. A Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 26. N Family: fine, mixed, superactive, frigid Aquic Calciustoll.

Profile 29. D Family: fine, mixed, superactive, mesic Aridic Calciustoll.

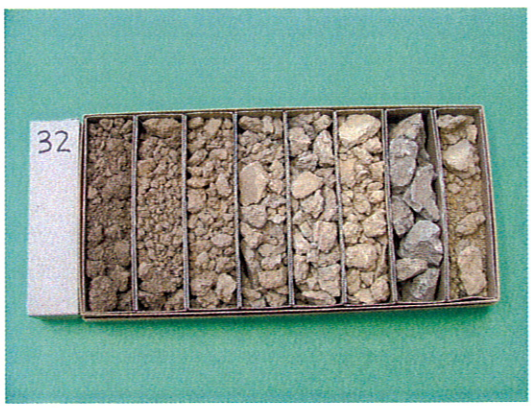
Profile 30. A Family: fine, mixed, superactive, mesic Aridic Calciustept.



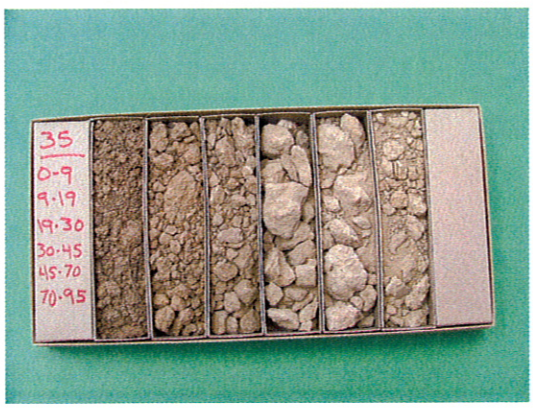
Profile 33. D Family: fine, mixed, superactive, mesic Aridic Calciustoll.

Profile 31. Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll.

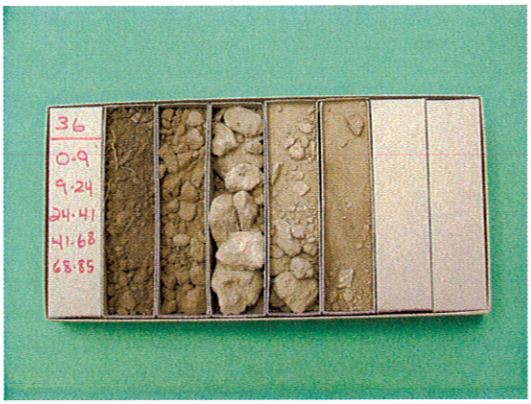
Profile 34. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.



Profile 32. Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll.



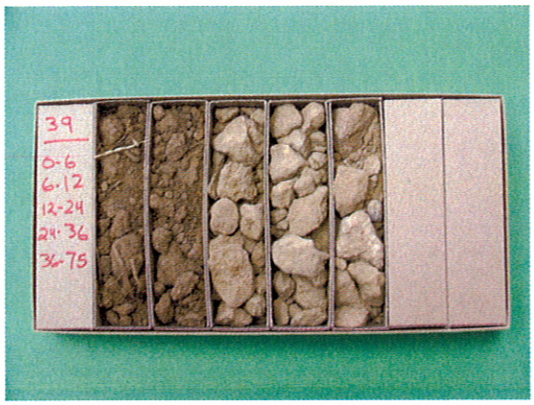
Profile 35. Jonale Family: fine-loamy, mixed, superactive, mesic Aridic Calciustoll.



Profile 36. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 37. Graystone: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profiles 38 (Left) and 40 (Right). Happyhollow Family: fine, mixed, superactive, frigid Aeric Epiaquept; Tetonview Family: (40) fine-loamy, mixed, superactive, frigid Aeric Calciaquoll.

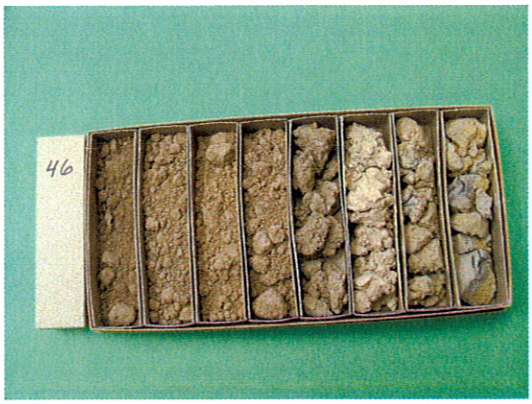


Profile 39. Graystone cobbly substratum Family: coarse-loamy, mixed, superactive, mesic Aridic Calciustoll.

Profile 41. D Family: fine, mixed, superactive, mesic Aridic Calciustoll.

Profile 42. Deacon: fine-loamy, mixed, superactive, mesic Aridic Haplustoll.

Profile 43. Jicarilla Family: fine, mixed, superactive, frigid Typic Argiaquoll.



Profile 46. Alamosa: fine-loamy, mixed, superactive, frigid Typic Argiaquoll.

Profile 44. Happyhollow Family: fine, mixed, superactive, frigid Aeric Epiaquept.

Profile 47. Brumley: fine-loamy, mixed, superactive, mesic Calcidic Hapustalf.

Profile 45. Happyhollow Family: fine, mixed, superactive, frigid Aeric Epiaquept.

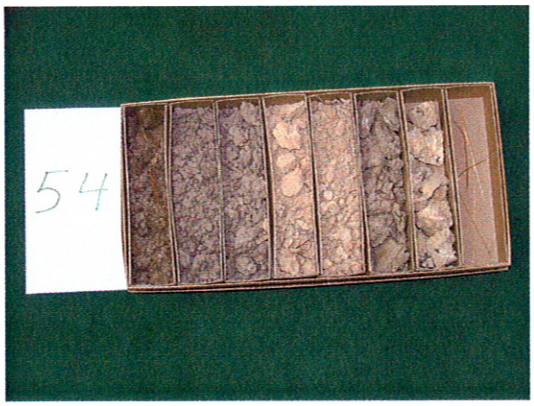
Profile 48. Manzanst Taxadjunct Family: very fine, mixed, superactive, mesic Aridic Haplustalf.

Profile 49 (Left) and 50 (Right). Drifty Family (49): loamy, mixed, superactive, calcareous, mesic Aridic Lithic Ustorthent; and Zigzag (50): clayey, mixed, superactive, calcareous, mesic, shallow Aridic Ustorthent.

Profile 51. Brumley: fine-loamy, mixed, superactive, mesic Calcidic Haplustalf.

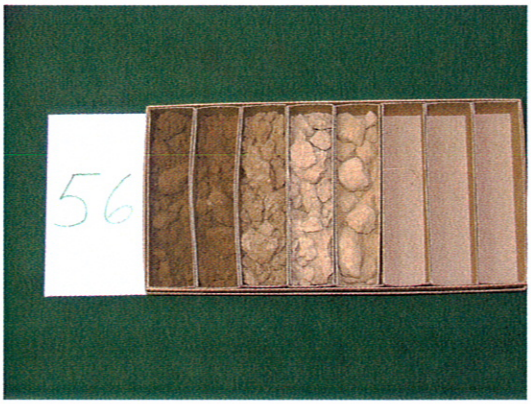
Profile 52. I Family: fine-loamy, mixed, superactive, frigid Aquic Calciustept.

Profile 53. Disturbed soil with one-head sunflowers.



Profile 54. Happyhollow Family: fine mixed, superactive, frigid Aeric Epiaquept.

Profile 55. Cibeque Family: fne-loamy, mixed, superactive, mesic Aridic Calciustept.



Profile 56. Wapiti Family: fine-loamy, mixed, superactive, mesic Calcidic Argiustoll.

Profile 57. Cibeque Family: fine-loamy, mixed, superactive, mesic Aridic Calciustept.

Profile 58. Manzanst Taxadjunct Family: very fine, mixed, superactive, mesic Aridic Haplustalf.

Profile 59. A Family: fine, mixed, superactive, mesic Aridic Calciustept.

Profile 60. Manzanst Taxadjunct Family: very fine, mixed, superactive, mesic Aridic Haplustalf.

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