

PacifiCorp

Energy West Mining Company

Deer Creek Mine

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R645-301-200 SOILS SECTION

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MFS1834B Deer Creek Mine: Mill Fork Lease ML-48258 Soils Map

R645-301-200. SOILS**R645-301-220. ENVIRONMENTAL DESCRIPTION**

The soils in the permit area are developed primarily from sandstone and shale parent materials of the North Horn, Upper Price River, Castlegate, and Blackhawk formations. Along the highest parts of the ridge of East Mountain, a few spots have soils developed from the Flagstaff Limestone. The regolith consists of both residual and colluvial materials, yielding soils that range from shallow to very deep. Most soils are well drained with potentially rapid runoff due to the steepness of most of the slopes.

The range of elevations (from 7,600 to over 10,700 feet) and steep slopes with varying aspects are the cause of large soil temperature and moisture differences. The soils on lower elevation / south facing slopes are hot and dry, and those at higher elevations and north facing slopes are cool and moist. Soil temperature regimes include cryic (cold) and frigid and the soil moisture regimes are udic (moist) and ustic (semiarid). The aspen and spruce-fir vegetation types are characteristic of the cryic/udic environment and the lower elevation mountain brush with some pinion-juniper is characteristic of the frigid/ustic environment.

Soils on sandstones are typically cobbly or stony with textures of loamy sand, sandy loam, or loam. Rock outcrops are common, especially in areas of the Castlegate Sandstone. These soils are most common along the east side of the permit area.

Most of the area at higher elevations have clayey soils derived from the North Horn Formation. Textures of clay loam, silty clay loam, and clay are common. The subsoils often have a higher clay content than those of the surface soils. They have higher water holding capacities and are prone to slope failures. These clayey soils typically have high self-healing capabilities, and tend

to buffer the effects of tension cracks created in the soil zone that are occasionally formed by subsidence.

Topsoil development is most pronounced in areas with aspen vegetation types. It is commonly 10 to 20 inches thick in these areas, and has relatively high organic matter and nutrient contents. On the steep, north-facing slopes that support spruce-fir type forests, topsoil thicknesses may vary from three to ten inches.

Major soil limitations in the lease area include high soil erosion potentials, slope instability, cold temperatures and a short growing season, stoniness, and some droughty soils on the lower elevation /south facing slopes.

R645-301-221. PRIME FARMLAND INVESTIGATION

In the Environmental Assessment for the Mill Fork Lease Tract, LBA #11, prepared by the U.S.D.A. Forest Service (6/97), Chapter 1, Section G, states:

“There are no prime farmlands, rangelands, or alluvial valley floors within the proposed lease area. Leasing of the tract should not result in significant impacts to paleontological resources; threatened or endangered plant or animal species. Protection of these resources is provided under the lease stipulations and Federal and State laws and regulations.”

Energy West has conducted numerous reconnaissance surveys of the Mill Fork permit area, consulted existing soils surveys and aerial photography, and concludes that there is no Prime Farmland or cropland within the permit area. This conclusion is based on the steep and rugged character of the terrain over the entire permit area. Historically, the permit area has been used only for cattle and sheep grazing.

R645-301-222. SOIL SURVEY

Planning for surface disturbances to include mine facilities in the Mill Fork area is in the early infancy stage at present. Details for location, area, and design have not yet been worked out. As these details become more definite, the applicable governmental agencies will be notified and the permitting process will be initiated. As part of this permitting process, a complete soil survey of each and every mining and reclamation operation within the Mill Fork area will be detailed in this section. However, the Mill Fork area has been mapped as part of a Soil Survey conducted by the Manti Division, Manti-LaSal National Forest.

R645-301-222.100. A Map Delineating Different Soils

Map MFS 1834B shows the areal distribution of the different soil types in the Mill Fork Permit area. Refer to the Map Section for review of these areas.(D. Larsen, in progress).

R645-301-222.300. Soil Description

The soil units shown on the map MFS 1834B are described below.

Map Unit Number	Soil Units	Percent (%)
8	<i>Greyback Family - Echard - Cryorthents Complex</i>	
	1. Greyback family soils	40
	2. Echard family soils	20
	3. Cryorthents	20
	Inclusions:	
	1. Clayey soils with lower rock fragment content	20
20	<i>Strych - Pathead - Podo Families - Rubbleland Complex</i>	

Map Unit Number	Soil Units	Percent (%)
	1. Strych family soils	30
	2. Pathead family soils	30
	3. Podo family soils	15
	4. Rubbleland	15
	Inclusions:	
	1. Rock outcrops	10
42	<i>Aquic Cryoborolls, Loamy - Skeletal, Mixed</i>	
	1. Aquic cryoborolls, loamy-skeletal, mixed, loam, 5 to 15% slopes	90
	Inclusions:	
	1. Typic Cryoborolls, loamy-skeletal, mixed, loam, 5 to 15% slopes	08
	2. Aquic Cryorthents, loamy-skeletal, mixed, loam, 30 to 30% slopes	02
81	<i>Bundo - Lucky Star - Scout Families Complex</i>	
	1. Typic Paleboralfs, loamy-skeletal, mixed, fine sandy loam, 40 to 70% slopes	70
	2. Boralfic Cryoborolls, loamy-skeletal, mixed, loam, 30 to 60% slopes	20
	Inclusions:	
	1. Pachic Cryoborolls, fine-loamy, mixed, loam, 30 to 60% slopes	10
100	<i>Gralic - Behanin - Elwood Families Complex</i>	
	1. Typic Cryothents, loamy-skeletal, mixed (non-acid), cobbly fine sandy loam, 50% slopes	40
	2. Pachic Cryoborolls, loamy-skeletal, mixed, loam, 30 to 60% slopes	25
	3. Argic Cryoborolls, loamy-skeletal, mixed, very stony loam, 40 to 70 %	20
	Inclusions:	

Map Unit Number	Soil Units	Percent (%)
	1. Typic Cryoborolls, fine loamy, mixed	07
	2. Typic Cryorthents, fine loamy, mixed, calcareous, shallow, 40 to 60 % slopes	06
	3. Rock outcrops	02
107	<i>Curecanti - Elwood - Duschene Families Complex</i>	
	1. Loamy-skeletal, mixed typic Argiborolls	35
	2. Loamy-skeletal, mixed typic Cryoborolls	25
	3. Loamy-skeletal, mixed typic Cryoboralfs	25
	Inclusions:	
	1. Contrasting inclusions of rock outcrops and shallow soils	15
109	<i>Elwood Family Soils</i>	
	1. Loamy, skeletal, mixed Argic Cryoborolls	85
	Inclusions:	
	1. Contrasting inclusions of soils with lower content of rock fragment	15
301	<i>Greyback - Loamy, Mixed (non-acidic) Lithic Cryorthents - Bachelor Families Complex</i>	
	1. Typic Cryoborolls, loamy-skeletal, mixed, cobbly loam, 30 to 50% slopes	35
	2. Lithic Cryorthents, loamy-mixed (non-acid), stony, fine, sandy loam, 30 to 80 % slopes	25
	3. Typic Cryorthents, fine-loamy, mixed (calcareous), loam, 30 to 50 % slopes	20
	Inclusions:	
	1. Rock outcrops	05
	2. Typic Cryorthents, fine-loamy, mixed (calcareous), bouldery, loam 5 to 30 % slopes	05
	3. Argic Pachic Cryoborolls, fine-loamy, mixed, loam, 5 to 15 % slopes	05

Map Unit Number	Soil Units	Percent (%)
401	Adel - Merino Families Complex	
	1. Pachic Cryoborolls, fine-loamy, mixed, loam, 30 to 60 % slopes	40
	2. Lithic Cryoborolls, loamy-skeletal, mixed (non-acid), cobbly, loam, 8 to 60 % slopes	23
	3. Typic Cryorthents, loamy, mixed (non-acid), shallow, cobbly, loam, 8 to 30 % slopes	20
	Inclusions:	
	1. Pachic Cryoborolls, fine-loamy, mixed, cobble, clay-loam, moderately deep, 8 to 30 % slopes	15
	2. Rock outcrops	02
560	Clayburn - Broad Canyon Family Complex	
	1. Argic Pachic Cryoborolls, fine loamy, mixed, loam, 5 to 40 % slopes	45
	2. Typic Cryoborolls, loamy-skeletal, mixed, cobbly loam, 30 to 50 % slopes	40
	Inclusions:	
	1. Typic Cryoborolls, fine-loamy, mixed, shallow	05
	2. Boralfic Cryoborolls, loamy-skeletal, mixed, loam, 30 to 60 % slopes	05
	3. Pachic Cryoborolls, coarse-loamy, over sandy or sandy-skeletal, mixed, fine sandy loam, 30 to 60 % slopes	05
561	Claybyrn - Faim - Behanin Families Complex	
	1. Argic Pachic Cryoborolls, fine-loamy, mixed, loam, 5 to 20 % slopes	55
	2. Argic Pachic Cryogorolls, fine, montmorillonitic, loam, 5 to 20 % slopes	20
	3. Pachic Cryoborolls, loamy-skeletal mixed, loam, 10 to 30 % slopes	15
	Inclusions:	
	1. Lithic Cryoborolls, loamy-skeletal, mixed	09

Map Unit Number	Soil Units	Percent (%)
	2. Rock outcrop	01
711	Bundo - Lucky Star - Adel Families Complex	
	1. Typic Paleboralfs, loamy-skeletal, mixed, loam, 40 to 70 % slopes	50
	2. Boralfic Cryoborolls, loamy-skeletal, mixed loam, 30 to 60 % slopes	20
	3. Pachic Cryoborolls, fine-loamy, mixed, loam, 30 to 60 % slopes	20
	Inclusions:	
	1. Typic Cryorthents, loamy, mixed (non-acid), shallow, loam, 30 to 60 % slopes	10
820	Lucky Star - Bundo - Adel Families Complex	
	1. Boralfic Cryoborolls, loamy-skeletal, mixed, loam, 30 to 60 % slopes	55
	2. Typic Paleboralfs, loamy-skeletal, mixed, fine sandy loam, 40 to 70 % slopes	20
	3. Pachic Cryoborolls, fine-loamy, mixed, loam, 30 to 60 % slopes	20
	Inclusions:	
	1. Typic Cryorthents, loamy, mixed (non-acid), shallow	05

R645-301-230. OPERATION PLAN

All mining activities disturbance to associated with the Mill Fork permit area will be through underground mining operations activities. Mine plan layouts (Blind Canyon Hiawatha Seam) depicted in R645-301-500 Engineering Section, indicate potential portal breakouts located in Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease; *“The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts”*.

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**Update Volume 12 Text Section,
PacifiCorp, Deer Creek Mine, C/015/018**

**Volume 12
Biology Section
Replace Text Section**

R645-301-300 BIOLOGY SECTION

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APPENDICES

Appendix A Assessment of Spotted Bat (Euderma maculatum) and Townsend’s Big-eared Bat (Corynorhinus townsendii) in the Proposed Cottonwood Canyon Lease Area. Manti-La Sal National Forest, Emery County, Utah.

 Assessment of Spotted Bat (Euderma maculatum) and Townsend’s Big-eared Bat (Corynorhinus townsendii) in the Proposed North Rilda Area. Manti-La Sal National Forest, Emery County, Utah.

 Assessment of Spotted Bat (Euderma maculatum) and Townsend’s Big-eared Bat (Corynorhinus townsendii) in the Proposed Mill Fork Lease Area. Manti-La Sal National Forest, Emery County, Utah.

MAPS

MFS1821D	Deer Creek Mine: Mill Fork Lease ML-48258 Vegetation Map
MFS1849B	Deer Creek Mine: Mill Fork Lease ML-48258 Deer Habitat Map
MFS1822B	Deer Creek Mine: Mill Fork Lease ML-48258 Elk Habitat Map
MFS1852B	Deer Creek Mine: Mill Fork Lease ML-48258 Raptor Location Map (Refer to Confidential and Private Volume)

R645-301-300 BIOLOGY

R645-301-310. BIOLOGY INTRODUCTION

The following vegetative, fish, and wildlife resource information has been taken from the Data Adequacy document (Data Adequacy L.B.A No. 11, December 1996) and the Environmental Assessment (Mill Fork Federal Coal Lease Tract UTU-71307, Environmental Assessment document, Lease By Application, No. 11) reported by the Manti LaSal National Forest in June, 1997.

R645-301-320. ENVIRONMENTAL DESCRIPTIONS

R645-301-321. VEGETATION INFORMATION

The Mill Fork area contain very steep and narrow east-west trending canyons with rounded narrow ridge tops. Contour elevations range from approximately 8100 feet to over 10,600 feet. Vegetative cover and species composition within this elevation range is very diversified. Ecosystems within this portion of East Mountain contain various habitats that are mostly influenced by the steep and broken slopes and their orientations. Distinguishable ecosystems within the area are grasslands,, perennial forb lands, sagebrush lands, mountain brush lands, coniferous forest lands, , aspen forest lands, and pinyon/juniper woodlands.. Refer to Map MFS1821D in the Maps Section for the diverse vegetative communities.

Grasslands - These lands make up only a small portion of the Mill Fork Lease Area. Grasslands include both perennial and desert grasses at high and low elevations. Salina wild rye grass is the dominant grass at the lower elevations and Letterman needle grass

dominates the high elevation ridge top sites. They are predominately found on slopes with a south to southwestern exposure.

Perennial Forb Lands - Perennial forbs exist mainly on or near ridge tops. Common species found include sages, vetches, and clovers. These forbs are important food source for deer and elk populations as well as cattle and sheep.

Sagebrush Lands - This vegetative type is found on most of the steep south slopes and high elevation ridge tops. Less than 10% of the Mill Fork area occur in this type. Grasses are interspersed within this community. Salina wild rye grass is the dominant grass at the lower elevations and Letterman needle grass dominates the high elevation ridge top sites. Few forbs are present in this type. The sagebrush species common in this vegetative type are black sagebrush and big mountain.

Mountain Brush Lands - Mountain brush vegetative types occur mostly on the mid-elevation south slopes, high elevation ridges and in the upper basins within the Mill Fork area. This type is present on about 15% of the area. The lower elevation sites are heavily used by wintering elk and deer and the higher elevation ridges and basins are used by sheep during the summer. Most of the vegetative types is classed as unsuitable for use by livestock, because of steep inaccessible slopes.

Coniferous Forest Lands - It is estimated that about half the Mill Fork area is covered with conifer timber vegetative type. These types are mostly found on the northerly exposed slopes of the canyon. Douglas fir make up about 85% of the conifer cover with alpine fir and spruce trees present only at the higher elevation ridge and in the upper basin. The dense forest growth on the steep canyon slopes provide a good scenic view, a

good watershed cover and wildlife habitat. Understory vegetation in this ecosystem is generally poorly developed due to shading.

Aspen Forest Lands - Aspen type occur on an estimated 20-25% of the Mill Fork area. They occur mostly on mid and higher elevation sites and on the lower canyon slopes. Most of the aspen types with the area are in either early or mid-seral condition. Only a few stands at high elevation and some isolated sites are in late seral condition. Stands of aspen mostly at higher elevations are being invaded by Douglas fir trees. The aspen ecosystem provide a very important habitat component for many wildlife species, both animal and birds. It also has a high value for livestock grazing and watershed values.

Pinyon-juniper ecosystems - These areas are dominated by pinyon pine and juniper. This ecosystem occurs only in the submontane ecological association. A diverse vegetative understory community is often lacking over wide expanses of the ecosystem. Thus, irregular shaped, but sometimes extensively sized openings have been created in the pinyon-juniper ecosystem for conversion to more productive sagebrush-grass, mountain brush or grassland settings.

Threatened, Endangered and Sensitive Plant Species

Threatened, endangered, and sensitive plant species of interest include *Astragalus monti*, *Hedysarum occidentale* var. *canone*, *Silene petersonii*, and *Aquilegia flavescens*. Populations of these species have been found to inhabit areas near the Mill Fork Lease area. The information discussed on the above listed species was provided by the Manti-LaSal National Forest and gained through personal interviews with Mr. Bob Thompson, Botanist, Manti-LaSal National Forest. The species are discussed below.

Astragalus montii - Monti's milkvetch

This plant is found at high elevations (10,000 to 11,000 feet) on the Flagstaff limestone outcrops. Populations are located on top of Heliotrop, Ferron and White mountains (Ferron Ranger District). This plant is associated with low growing sub-alpine vegetation.

Hedysarum occidentale - Canyon Sweetvetch

Scattered population of this plant occur in Lower Huntington Canyon, Straight Canyon, and near Joes Valley, Ferron District (5,500 to 7,000 feet). Plants are usually found on sites with a high water table, near springs or along stream beds, and along riparian sites within the Pinyon Juniper ecosystems. River birch and Squawbush are plants most commonly associated with this species.

Silene petersonii- Peterson catchfly

Scattered populations have been found mostly on Flagstaff limestone outcrops on higher elevation ridges and snowdrifts. Occurrences have been found from the Wagon Road Ridge, south to the top of White Mountain. This plant is part of the sub-alpine low forb plant community.

Aquilegia flavescens - Link trail columbine

This plant occurs in springs, seeps and perennial wet sites. Populations have been found in Link Canyon, Box Canyon, Muddy Creek drainage, Straight Canyon and Joes Valley.

Erigeron carringtoniae - Carrington daisy

"...Endemic at high elevations on the Wasatch Plateau (Emery, Sampete, and Sevier cos.), *E. carringtoniae* grows on flat to gently sloping plateau margins and

adjoining steep, eroding slopes, predominantly on the white Flagstaff Limestone (Stone, 1993a). Soils are generally quite shallow with little or no profile development, and consist of gravelly calcareous clays or clay loams overlain by a thin layer of loose, angular limestone fragments or gravel. Ten occurrences of *E. carringtoniae* are currently known (including two with > 1000 plants as recorded by B. Thompson in 1991)...” (Inventory of Sensitive Species and Ecosystems in Utah, Utah Division of Wildlife Resources, 1998). Occurrence has been confirmed by Mr. Bob Thompson (personal interview) in the southern end of the lease, however, in his opinion, there should be no impacts to this species due to subsidence.

Listed rare and other high interest plant species have been found to occur near the Mill Fork Lease area. The species are *Chrysothamnus nauseocus* var. *psilocarpus*, *Gentiana prostrata*, *Gentianopsis barbellata*, *Ligusticum porteri*. Mr. Bob Thompson indicated during a personal interview that no threatened, endangered or sensitive plant species have been found to occur within the Mill Fork Lease area. He believes that the four high interest species do not occur within the lease, however, no surveys have been conducted to verify their existence or absence. It was also Mr. Thompson’s opinion that impacts to vegetation due to mining induced subsidence will be negligible to vegetation within the Mill Fork Lease.

R645-301-322. FISH AND WILDLIFE INFORMATION

The Mill Fork area consists of portions of Crandall Creek, Mill Fork and Rilda canyons to the east and unnamed canyons to the west. Runoff from the area contributes to the Crandall Creek, Little Bear Creek, Mill Fork, and the Right Fork of Rilda Creek ; all are tributaries to Huntington Creek. The western side of the Mill Fork area consists of tributaries to the Indian Creek. The

southern portion contributes runoff to a small portion of the Cottonwood Creek. Crandall Creek and Indian Creek are the only tributaries considered perennial, all other tributaries are intermittent/ephermal. Continuous flows usually occur in spring and early summer as snowmelt. During late summer and fall, isolated thunderstorms are typical in the region.

Surface and ground water sources is provided for an abundance of fish and wildlife species in the Mill Fork area. Perennial streams support naturally-reproducing trout fisheries and aquatic communities typical to mountain environments. Water resources provides habitat for a variety of big and small game animals, non-game animals and birds. A complete listing of all theated and endangered fish and wildlife species that have the potential to be present near and/or within the Mill Fork lease can be found in the County lists of Utah’s Federally Listed Species (UDWR, 8/14/02, at <http://www.utahcdc.usu.edu/ucdc/>. A complete listing of all sensitive fish and wildlife species that have the potential to be present near and/or within the Mill Fork lease can be found at this same internet address. Some important species are discussed below.

I. Aquatic Species - The Utah Division of Wildlife Resources (UT DWR) has conducted game fish surveys of the perennial and intermittent streams in the Mill Fork area. Their reports show a variety of salmonid species in each of the streams; Crandall Creek, Little Bear Creek, Mill Fork Creek, Right Fork Rilda Creek, and Indian Creek. The following summarizes each stream with each representative game species.

- ◆ Crandall Creek Colorado Cutthroat (*Oncorhynchus clarki pleuriticus*)
 Rainbow Trout (*Salmo gairdneri*)
 Yellowstone Cutthroat (*Oncorhynchus clarki*)

- ◆ Little Bear Creek Yellowstone Cutthroat (*Oncorhynchus clarki*)
 Rainbow Trout (*Salmo gairdneri*)

- ◆ Mill Fork Creek Yellowstone Cutthroat (*Oncorhynchus clarki*)
Rainbow Trout (*Salmo gairdneri*)

- ◆ Right Fork Rilda Ck. Yellowstone Cutthroat (*Oncorhynchus clarki*)
Rainbow Trout (*Salmo gairdneri*)

- ◆ Indian Creek Brook Trout

In addition to the species listed above, the drainages are also likely to support populations of the following non-game species; speckled dace (*Rhinichthys osculus*), mottles sculpin (*Cottus bairdi*), bluehead suckers (*Pantostius delphinus*), and mountain suckers (*Catostomus platyrhynchus*) (Christopherson, UT DWR).

Benthic Invertebrates - The USGS in cooperation with the Utah DNR and Utah DOGM conducted a comprehensive hydrologic study (from July 1977 through September 1980) of the upper drainages of the Huntington and Cottonwood creeks. Data on benthic invertebrates were collected from 16 sites in October 1977, July and October 1978, and October 1979. This data will be cited and used as a baseline evaluation for the Mill Fork Tract. Refer to United States Geological Survey, Water-Resource Investigations, Open-File Report 81-539, Salt Lake City, Utah, 1981.

As written from the report, "...data indicate that there were significant seasonal differences in the benthic invertebrate population at a given site in addition to areal differences...These organisms appeared in their maximum numbers in the July samples collected at sites in the higher altitudes of the study area, but they were not present in any of the October samples. The large numbers found in July, reflected a seasonal cycle rather than an unnatural condition that allowed one species to dominate." The average diversity (Shannon-Weiner diversity index) found between 1977 and 1979 in Crandall and Mill

Fork canyons was 2.38 and 2.09, respectively. During hydrologic baseline data collection (2000-2002), the '77 through '79 study area in Mill Fork Canyon was dry.

II. Terrestrial Species - The Mill Fork and surrounding area contains habitat for a variety of wildlife including a potential of 84 mammals, 140 birds, and 25 reptiles and amphibians (Mill Fork Federal Coal Lease Tract UTU-71307, Environmental Assessment, LBA Application #11. June, 1997).

Mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) are common in the area. These species typically occupy the higher elevations for summer ranges from May through late October. These areas are important for grazing/browsing before the onsets of winter. Lower elevations are occupied for winter range habitat. Deer and elk summer and high value winter range areas are outlined on maps MFS1849B and MFS1822B in the Maps Section. Population trends of both deer and elk can be found on the DWR website (<http://www.wildlife.utah.gov/hunting/biggame.html>). This information can be reviewed for the Manti region by opening the appropriate .pdf file under Big Game Reports.

A number of Raptor occupy the Mill Fork area. These species include the Golden eagle (*Aquila chrysaetos*), Goshawk (*Accipiter gentillis*), Red-tailed Hawk (*Buteo jamaicensis*), Sharp-shinned Hawk (*A. striatus*), American kestrel (*Falco sparverius*), and Great Horned Owl (*Bubo virginiana*) (Mill Fork Federal Coal Lease Tract UTU-71307, Environmental Assessment, LBA Application #11. June, 1997). These species have been seen in the area in the spring and summer months. Nesting areas have been located along the high cliff areas and the aspen-conifer habitats during the Raptor reconnaissance survey conducted in May, 2001. These surveys are conducted annually using helicopter transport and with Division of Wildlife Resources personnel as well as company representatives. Map MFS1852B in the Maps Section illustrates each located nest in and near the Mill Fork permit area.

Three Golden eagle nest sites were identified during the 2002 Raptor reconnaissance survey within the Mill Fork Lease (refer to Map MFS1852B). All of the nests are located in the northeastern portion of the lease. Based on the ~~September 2005~~ ~~November 2002~~ mine layout, none of the nests are within the projected subsidence affected area (refer to maps MFS1839D and MFS1866D in the Engineering Section).

R645-301-322.210. Threatened and Endangered Species

The referenced Environmental Assessment reports “No threatened or endangered wildlife species are known to inhabit the proposed lease area. A Bald Eagles (*Haliaeetus leucocephalus*) nest near the Hunter Power Plant is approximately 26 miles southeast of the coal lease. The coal lease area is outside of the foraging area for the Bald Eagles. Two peregrine falcons (*Falco peregrinus*) were observed approximately 13 miles north in 1996. The falcons were observed during nesting season but no nest site was ever confirmed. It is generally accepted that peregrine falcons will forage up to 15 miles from their eyrie, however given the prey base available it is doubtful that the falcons would forage over the coal lease area. No roost sites have been found in the lease area ...”

Mexican Spotted Owls (MSO) have recently become a species of interest since the U.S. Fish and Wildlife Service (USFWS) designated (in January, 2001) 4.6 million acres on federal lands in Arizona, Colorado, New Mexico, and Utah as critical habitat. The designation includes 3.2 million acres in Utah. More specifically, the designation includes areas west of the Colorado River within the West Tavaputs Plateau in Carbon County and the northeast corner of Emery County east of US Highway 6. Other areas in Utah have been designated as critical habitat, however, these areas exist in the southern portion of the state. Typical MSO, habitat according to the 2001 Environment Assessment, consists of “a diverse array of biotic communities. Nesting habitat is typically in areas with a complex forest structure or rocky canyons, and contains uneven-aged, multi-storied mature or old growth stands that have high canopy closure (Ganey

and Balda 1989, USDI 1991). In the northern portion of the range (southern Utah and Colorado), most nests are in caves or on cliff ledges in steep-walled canyons....typically characterized by the cooler conditions...frequently contain small clumps or stringers of ponderosa pine, Douglas fir, white fir, and/or pinion-juniper”.

Dr. Dave Willey from Montana State University, known MSO expert, modeled representative habitat using the 2000 Willey-Spotskey Mexican Spotted Owl Habitat Model. The model included all areas of the Mill Fork Lease Tract. Figure 1 shows the lease boundary and surrounding area. Areas identified in black, are areas of potential nesting habitat. The green's are

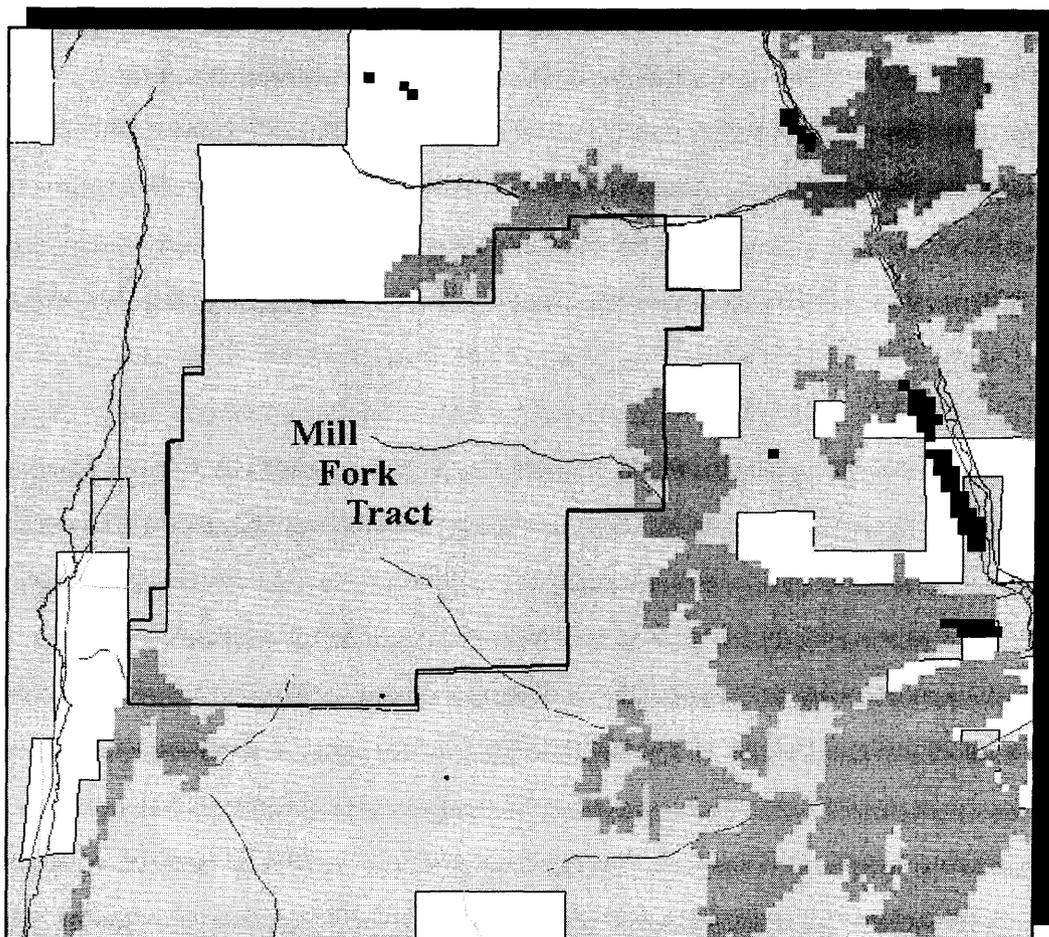


Figure 1: Mexican Spotted Owl nesting and foraging areas (Dr. Dave Willey, Montana State University, 2000).

identified as potential foraging areas of steep sloped mixed conifers. However, it is reported in the DWR's *Inventory of Sensitive Species and Ecosystems in Utah, 1997* that foraging, nesting and roosting habitats are "dominated by Douglas-fir and/or white fir...In the northern portion of the range (southern Utah and Colorado), most nests are in caves or on cliff ledges in steep-walled canyons." Potential steep sloped, mixed conifer foraging habitats of this type are found on the extreme northeastern border, extreme western border, and a small area in the southwest corner of the lease area as illustrated in Figure 1. Large ponderosa pines are typically found in lower elevations in the rocky canyons to the east of the lease tract. The west side of the tract supports

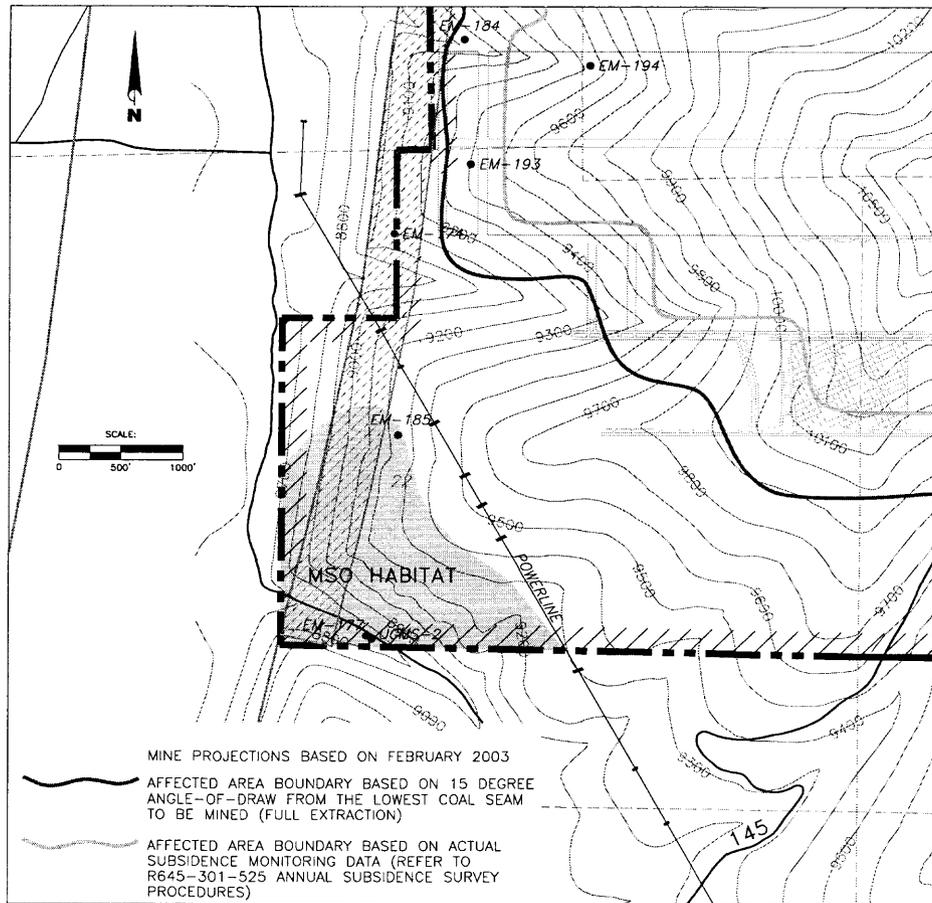


Figure 2: Southwest corner of Mill Fork Lease. The green shading is steep slope mixed conifer habitat (Douglas fir/white fir). Light blue lines indicate location of proposed mining.

both aspen and Douglas fir stands, however, this area lacks cliff ledges or steep walled canyons recognized as typical nesting habitats. Figure 2 shows the only area on the lease that supports potential MSO habitat subsidence. There are no potential MSO habitat within the lease that could be impacted by subsidence.

No sitings of the Mexican Spotted Owl have been made on the Mill Fork Lease Area (personnel communication with Rod Player, USFS - Price District). Areas west of the San Rafael have been surveyed two years in a row and no owls were found (Mexican Spotted Owl Training Class, Lora Romin, Frank Howell - DWR Instructor, March 21, 2002, Moab, Utah). It is PacifiCorp's opinion that with the facts given, mining will have no effect on the Mexican Spotted Owl if they occur in the lease area.

R645-301-322.230. Sensitive Species

The Colorado river cutthroat is thought to be present in the Crandall Creek drainage. Genetic testing is on-going to confirm if these fish are pure-strain Colorado cutthroats, however, no definitive data is currently available.

The Spotted bat (*Euderma maculatum*) depends on cliffs for roost/hibernation areas. These areas exist in isolated locations in the eastern portion of the Mill Fork permit area. Energy West Mining Company and Genwal Resources in 1997, contracted Richard Sherwin, Dr. Duke Rogers, and Carl Johansson to conduct a bat survey in the areas of Huntington Canyon, Straight Canyon, and Cottonwood Canyon. The purpose of this surveys was to assess the distribution, abundance, and habitat requirements of the Townsend big-eared and Spotted bats. These parameters were investigated for the following: 1) areas under consideration as potential lease sites for mining (North Rilda Area, Cottonwood Canyon LBA and the Mill Fork lease); 2) sites where subsurface coal mining is ongoing, and 3) sites (both on and off the Manti-La Sal National Forest) that serve as controls (no mining activities). The results of this surveys (Refer to the Appendix A:

Assessment of Spotted Bat (Euderma maculatum) and Townsend's Big-eared Bat (Corynorhinus townsendii) in the Proposed Cottonwood Canyon, North Rilda Area and Mill Fork Lease areas, Manti La Sal National Forest, Emery County, Utah.) are as follows:

Use assessment for Townsend's big-eared bats in specified areas

No Townsend's big bats were located within the survey areas during the project.

Use assessment for Spotted bats in specified areas

No Spotted bats were mist netted during these studies, refer to Appendix A Table 1 for a summary of results. There is some indication that water source(s) may not be as critical for the Spotted bat as for other species of bats with which it co-occurs. In a study of urine concentrating ability among selected species of bats, the spotted bat could concentrate its urine more effectively than any species of bats evaluated, with the exception of two typically "desert species", the pallid bat (Antrozous pallidus) and the Western pipistrelle (Pipistrellus hesperus - Geluso, 1978). It is likely that the Spotted bats were using water sites specifically to forage rather than drink, making netting extremely difficult.

Spotted bats were observed throughout the eastern (lower elevation) portions of the study areas. The highest concentration of calls were recorded in Rilda and Huntington Canyons. These canyons seem to best represent "classic" Spotted bat habitat with an abundance of fractured sandstone cliffs, and large areas of suitable foraging habitat.

From three studies, it appears that Spotted bats are using the cliffs as roosting areas and the canyons as flyways to reach the lower elevation foraging areas. The principal Spotted bat foraging areas are located over the lower elevation riparian habitat located near the mouth of Huntington Canyon. Spotted bats concentrated foraging efforts above the upper canopy of intact riparian vegetation, particularly cottonwood trees (Populus ssp.).

Spotted bats were not restricted to the study areas, but rather are widely distributed in low densities throughout the entire area. In fact, Spotted bats were detected in suitable habitat throughout the area (including utilizing the parking lots of the Village Inn Motels in Huntington and Castledale).

There also is evidence that the Spotted bats tolerate at least moderate human disturbance while foraging. Surveys were conducted at several sites near roads with light to moderate vehicular traffic (Crandall Canyon, Huntington Canyon), including tandem trucks used for hauling coal from the Genwal Mine portal located in Crandall Canyon. Spotted bats were observed foraging at low elevations sites off the lease areas, sometimes within 30 meters of the right of way.

Spotted bats are common throughout the Huntington Canyon area. They were identified utilizing the lease areas (North Rilda and Mill Fork), the active mine permit areas and the control sites (refer to Appendix A, Table 2). Based on the number of individuals observed and their habitat use patterns, it does not appear that current mining practices represent a long term threat to the viability of this population. The bat communities in all areas sampled consist of the same suit of species among all areas of similar habitat and complexity (this includes sites in actively mined areas, control sites, and proposed lease areas (North Rilda and Mill Fork).

The fact that Spotted bats are relatively common in active and previously mined areas implies that past cliff failures have not dramatically impacted resident populations. As a cliff roosting species, it is likely that they have adapted to tolerate natural rock falls and subsidence. Mine related cliff failures do not generally result in a net loss of habitat (ie. cliffs), but rather provide replacement habitat which may later be colonized by members of the local population. The results of the study indicate that Spotted bats are “common” enough throughout the area that the localized failure of cliffs (as a result of coal mining within the proposed lease areas [North Rilda Area and Mill Fork]) does not pose a serious threat to the population as a whole.

R645-301-323. MAPS AND AERIAL PHOTOGRAPHS

Maps for vegetation diversity, deer and elk habitat, and raptor nest locations are included in the Maps Section of R645-301-300. Biology. The reader should review these maps to locate these environmental resource items of interest. In addition to biologic base maps provided in this section, PacifiCorp conducts annual reconnaissance surveys, including subsidence monitoring (annual aerial photogrammetric surveys), infer-red photography (5 year intervals), and hydrologic monitoring.

R645-301-330. OPERATION PLAN

All mining activities disturbance to associated with the Mill Fork permit area will be through underground mining operationsactivities. Mine plan layouts (Blind Canyon-Hiawatha Seam) depicted in R645-301-500 Engineering Section, indicate potential portal breakouts located in Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease, *“The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts”*.

R645-301-332. ANTICIPATED IMPACTS DUE TO SUBSIDENCE

Multiple surveys have been conducted on the portion of the surface of East Mountain that could possibly be affected by the full extraction or second mining of coal from the Mill Fork Permit area. It has already been determined that there are renewable resources present in the area in the forms of springs, water seeps, grazing land, timber, and wildlife. Also present in the permit area are unimproved roads, trails, a gas well and pipelines, power transmission lines, and some portions of the Castlegate Sandstone escarpment (see Pre-Subsidence Survey Map MFS1839D).

Known springs and seeps that are located within the Mill Fork Lease second mining areas are shown on the Pre-Subsidence Survey Map. The Hydrologic Section of the Mill Fork MRP, Appendix A, contain a listing of sampling sites and a monitoring schedule. Most of the streams within the permit area are ephemeral and/or intermittent. The Crandall Canyon Creek and the lower portion of Rilda Canyon Creek is considered perennial. The streams that flow into Mill Fork Canyon are fed by springs that emanate primarily in the North Horn Formation within the permit boundary. Portions of the headwaters of the drainage basins that feed Crandall and Rilda canyons are within the Mill Fork Lease. Second mining, i.e. longwall extraction or room & pillar mining, of the Mill Fork area will not occur beneath the main stream channels of these canyons. First mining development of access mains from Deer Creek Mine to the Mill Fork Lease will occur to the north of the Right Fork of Rilda Canyon.

The entire permit surface area is utilized for grazing of sheep and cattle during the summer season. Experience from the existing PacifiCorp permit areas has shown that the effects of subsidence on grazing and grazing lands are minimal.

All existing timber resources on the Mill Fork permit area are administered by the U.S.D.A. Forest Service. Experience on the existing PacifiCorp permit areas over the last 25 years has shown that subsidence does not affect timber resources or access to timber resources.

Experience on the existing PacifiCorp permit areas over the last 25 years has shown that the effects of subsidence on vegetation and wildlife resources are minimal (Rod Player, Bob Thompson, USFS, personal communication). As mentioned above, PacifiCorp conducts annual aerial surveys for monitoring subsidence. On 5 year intervals, infer-red photography technology is used. This photo documentation will be used as a monitoring tool to record any changes in vegetation. Monitoring will be conducted as stated until the Division approves a permit area reduction of the affected area.

Should significant subsidence impacts occur, the applicant will restore, to the extent technologically and economically feasible, those surface lands that were reduced in reasonably foreseeable use as a result of such subsidence to a condition capable of supporting presubsidence reasonably foreseeable uses.

R645-301-333. MINIMIZATION OF DISTURBANCES AND ADVERSE IMPACTS TO FISH AND WILDLIFE

In review of this mining permit application, the USFWS have identified that water consumption by underground coal mining operations could jeopardize the continued existence of or adversely modify the critical habitat of the Colorado River endangered fish species: Colorado pikeminnow, humpback chub, bonytailed chub, and razorback sucker. The USFWS has determined that water consumption by underground operations could potentially have adverse effects on the Colorado River basin. The USWFS considers consumption to include; evaporation from ventilation , coal preparation, sediment pond evaporation, subsidence on springs, alluvial aquifer abstractions into mines, postmining inflow to workings, coal moisture loss, and direct diversions. These consumption processes are discussed below.

Evaporation from ventilation - In mine water loss due to evaporation is a fairly easy calculation when the barometric pressure and vapor pressures are known. For example, on a 570,000 CFM mine fan, typical volumes of evaporation are approximately 18,000,000 gallons/year. However, this result is dependent on temperature and relative humidity. The evaporation evolves primarily from the inactive hydrologic systems mentioned above.

Coal Preparation - PacifiCorp owns water rights for use in their coal preparation plants.

Sediment pond evaporation - The sediment pond is used to hold rain and snow runoff that flows over disturbed areas of the coal mining and reclamation operations until accumulated sediment has dropped out. At that point the water is discharged into a receiving stream. This would not be considered a consumption mechanism.

Subsidence effect on springs - In twenty-five years of mining, there have been no reported effects on springs due to subsidence. Refer to the Hydrology Section R645-301-728 and Appendix B, Section 11, Probable Hydrologic Consequences (reported by Mayo and Associates, 2001).

Alluvial abstractions into mines - There will be no water infiltrations from alluvial systems into the mine.

Postmining inflow into workings - There currently no proposed mine openings for the Mill Fork Lease. Currently, there is a planned postmining water discharge associated with the Deer Creek portals (refer to the Deer Creek reclamation plan).

Coal moisture loss - Typically the inherent moisture in coal mined at Deer Creek is approximately 5%. Run-of-mine moisture averages approximately 8.5 %. Deer Creek is scheduled to mine 4.2 million tons in 2002. Using these values the consumption is approximately 161 acre feet of water.

Direct diversion - no consumption.

Adding the two losses due to mining operations (Evaporation + Coal Moisture) equals 161 plus 55 acre feet of water consumed. The resultant is approximately 216 acre feet of water per year. If mine discharge is added to the equation, an enhancement to the hydrologic resource would be achieved. In 2001, the Deer Creek mine discharged nearly 2,670 acre feet into the Huntington Canyon drainage system. Theoretically, this would be a net gain of 2,453 (2,670-216) acre feet of water into the Colorado River Basin. Therefore, it is the opinion of PacifiCorp and Energy West that water consumption by underground coal mining operation will not jeopardize the existence of or adversely modify the critical habitat of the Colorado River endangered fish species.

R645-301-340. RECLAMATION PLAN

All mining activities disturbance to associated with the Mill Fork permit area will be through underground mining operations activities. Mine plan layouts (Blind Canyon-Hiawatha Seam) depicted in R645-301-500 Engineering Section, indicate potential portal breakouts located in Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease, *“The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts”*.

PacifiCorp

Energy West Mining Company

Deer Creek Mine

**Update Volume 12 Text Section,
PacifiCorp, Deer Creek Mine, C/015/018**

Volume 12

**Land Use & Air Quality Section
Replace Text Section**

R645-301-400 LAND USE & AIR QUALITY

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MFS1836B Deer Creek Mine: Mill Fork Lease ML-48258 Oil and Gas Leases

MFS1856B Deer Creek Mine: Mill Fork Lease ML-48258 Management Units Manti-La Sal National Forest

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Hauck, F.R.
1979b Cultural Resource Evaluation in Central Utah - 1977. Cultural Resource Series, No.3, Bureau of Land Management, Salt Lake City,

Hauck, F.R.
1994 Cultural Resource Evaluation Proposed Well 42-14H in the East Mountain Locality of Emery County, Utah. AERC Paper No. 22, Archeological Environmental Research Corporation, Bountiful.

Hauck, F.R.
1995 A Class II (Sample Survey) Cultural Resource Evaluation in the East Mountain Locality of Emery County, Utah. AERC Project No. 1494, Archeological Environmental Research Corporation, Bountiful.

R645-301-400 LAND USE AND AIR QUALITY

R645-301-410. LAND USE INTRODUCTION

Historical use of the Mill Fork portion of the Deer Creek permit area has been grazing, wildlife, and recreation. Cattle are moved through the area to graze at the higher elevations. Native big game (deer, elk, bear, etc.), as well as, small game and non-game animals inhabit the area as described in R645-301-300: Biology. Recreation consists of hunting, sightseeing, and other miscellaneous outdoor activities.

The existing land use classification for the Deer Creek permit area is grazing and wildlife. This classification has been extended to the Mill Fork area for any areas that could potentially be affected by coal mining and reclamation activities. No areas are presently planned for surface disturbances.

A land use map has been constructed that documents the locations of all items discussed in the following sections. The reader should refer to map MFS1835B in Appendix A to review each items' location.

R645-301-411. ENVIRONMENTAL DESCRIPTIONS

There have been numerous coal exploration drilling projects conducted within the Mill Fork area. These areas were occupied by both industry and government. All drill sites and access roads have been reclaimed to Forest Service requirements and stipulations.

One producing gas well (EM32-23) is located near the southern border of the Mill Fork area. Merit Energy Company owns and operates the well, which has disturbed approximately two (2) acres of surface land. A buried 4-inch diameter steel gas pipeline runs from the well south along

FR 245 and down Flat Canyon. Merit Energy intends to expand the field by drilling additional holes within the Mill Fork area, but plans are currently on hold.

The land surface in the Mill Fork area has, however, been previously used for other non-mining activities. The southwestern portion of the area has a special use permit issued to Utah Power and Light Company. The company uses this 120 x 3,150 foot corridor for a 345 KV power transmission line.

Another power transmission line (69 KV) travels across the NW¹/₄NW¹/₄ of Section 8, T17S, R6E, SLB&M. The transmission line supplies power to the Genwal Resources, Crandall Canyon Mine.

An old limestone quarry is located east below Bald point and west of FR 245. The quarry was developed to gravel the Flat Canyon road for access to the top of East Mountain for gas well development. The associated access road, as well as the quarry, is no longer in use and has been fully reclaimed

The Flat Canyon road, which provides access to the East Mountain top, enters and leaves the southern boundary of the Mill Fork area. The road was upgraded to a single lane graveled surface road with drainage structures. The road provides access for mineral resource development, recreation, cattle range management, and firewood gathering. Traffic is approximately 5 to 10 vehicles per day (Mill Fork Federal Coal Lease Tract UTU-71307, E.A., L.B.A. #11).

Two grazing allotments are present within the Mill Fork area. Sheep graze on the northern end of the area, whereas, cattle graze on the southern end. Grazing is conducted throughout the summer and into the fall months of the year.

Numerous prescribed controlled burns have been conducted by the Forest Service in the past to encourage aspen and shrub growth, however, in 1995, a prescribed burn near the North Rilda Ridge area became uncontrolled and left approximately 135.0 acres affected.

Drawing MFS1856B shows the forest management plan for land use within the Mill Fork Lease Area. Out of the 5562.82 acres, 97.8% is dedicated as Range Forage Production, 2% is for Wood Fiber Production and Utilization, and 0.02% is utilized for Municipal Water Supply. It is not expected that any of the above stated land uses will be affected/impacted by underground mining related activities.

Any areas affected/disturbed by coal mining and reclamation activities will be restored to its approximate original condition pursuant to the land owners requests and wishes, as well as, State and Federal regulations.

R645-301-411.141. Cultural and Historic Resources

An archeological, historical, and cultural resource evaluation was conducted in 1995 for the Mill Fork area. The evaluation included the majority of the Mill Fork Tract and the South Crandall Tract. As reported in the Data Adequacy Report (Hauck 1995), the evaluation consisted of surveying 15% of the total 4710 acre study zone to assess its potential for containing significant resources that could be adversely affected by future subsidence activities related to mining. The evaluation consisted of both a file search, and a Class II, or stratified sample survey, of the 4710 acre study zone.

The file search was conducted of the study area at the State Historic Preservation Office (SHPO) in Salt Lake City, Utah , within the AERC database, and the US Forest Service in Price. The National Register of Historic Places has was consulted and no registered

historic or prehistoric properties will be affected by the proposed mining. Numerous surveys have been conducted within and adjacent to the Mill Fork Tract and have been cited in the Data Adequacy, December, 1996.

The areas under study contained all or part of State Sections 11, 12, 13, and 14 of Township 16 South, Range 6 East SLBM, and Sections 5, 6, 7, 8, and 18 of Township 16 South, Range 7 East SLBM. The majority of the study occurred on accessible highlands in the western and central portion of the study area. Of these 4710 total acres, AERC archaeologists, Glade Hadden, Doug Edwards, and Liz Mcomer intensively examined 405 acres or 8.6% of the total study area between July 25 and 27, 1995. Records in the Utah State Antiquities Section and AERC archives indicate that an additional 302 acres in the study area have been previously inventoried (Hauck 1979b, 1994).

The Class II sample survey was conducted by the archaeologists walking a series of 5 to 25 meter wide transects across the surface within the survey area. The width of the survey area depended on the slope, aspect, and ground cover. Localities having a moderate potential for containing cultural resource presence were subjected to transects of less than 12 meters in width.

The Class II sample survey of the 4710 acres was non-randomly developed due to the limited amount of acreage that was accessible for an archeological evaluation; a large percentage of the surfaces within the study area consist of narrow valleys, escarpments and densely forested steep slopes associated with the East Mountain locality. Thus, AERC's intensive evaluations were confined to the upper ridges and lower valleys, those accessible localities where prehistoric activities were most likely to have occurred.

Because of the surface alterations of excess ground cover, road blading, cattle and wildlife activities, much of the survey area was not easily evaluated for general archeological presence. However, cultural resources were easily obtained.

Observations of cultural materials resulted in examinations to determine the nature of the resource. The area was sketched, photographed, and recorded on the Intermountain Antiquities Computer System (IMACS) forms. These sites were then evaluated for their cultural significance which included a mitigation recommendation for preserving the significant resource.

One previously recorded non-significant cultural resource activity locus is located within the study area. Site 42EM 856 is a prehistoric lithic scatter originally recorded as an "S-III" classified site during the Central Coal Project (Hauck, 1979b). The site was re-visited during this survey and determined to be a non-significant resource.

One newly identified prehistoric cultural resource activity locus was identified and recorded during this study. Site 42EM 2430 consists of a non-significant lithic scatter.

Two isolated artifacts were observed during the evaluation. Both artifacts consist of lithic flakes that cannot be culturally identified or associated with activity loci.

No historic or prehistoric cultural resource activity loci were discovered and recorded during the examination.

Although no "paleontological survey" was conducted during the 1995 Class II survey, observations were made for paleontological artifacts. No paleontological loci were identified during the evaluation.

No impacts to potential cultural/paleo resources are expected since there is no planned surface disturbance. If surface disturbance is planned within the Mill Fork Tract, a paleontological survey will be conducted in this area.

The above sections and citations are taken from the Data Adequacy L.B.A No. 11, December 1996, as reported by A.E.R.C. This report was submitted by Genwal Resources Inc. to the United States Forest Service, Manti-LaSal National Forest, Price, Utah.

411.142. Protection of Public Parks and Historic Places

No public parks are located in or adjacent to the Mill Fork permit area. Abandoned Mined Lands (AML) areas may lay outside the proposed boundaries. These areas, if applicable, will be reclaimed in cooperation with the Abandoned Mine Reclamation.

R645-301-412. RECLAMATION PLAN

In areas where surface disturbances result from coal mining and reclamation operations, regrading and revegetation will be conducted to restore the areas to their premining conditions which they were capable of supporting prior to mining. The operations, if developed, will be managed according to State and Federal regulations and applicable lease stipulations.

All mining activities disturbance to associated with the Mill Fork permit area will be through underground mining operationsactivities. Mine plan layouts (Blind Canyon-Hiawatha Seam) depicted in R645-301-500 Engineering Section, indicate potential portal breakouts located in Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the

portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. ~~Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease, "The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts".~~

R645-301-413. PERFORMANCES STANDARDS

All disturbed areas will be restored in a timely manner to conditions they were capable of supporting before mining. Liability will be for the duration of the coal mining and reclamation operations and for the period of extended responsibility for achieving successful revegetation. All post mining land use criteria will be satisfied before the bond is fully released.

R645-301-420. AIR QUALITY

Reclamation operations on all areas that have been affected by coal mining and reclamation operations will be conducted in compliance with the requirements of the Clean Air Act (42 U.S.C. Section 7401 et. seq.).

PacifiCorp

Energy West Mining Company

Deer Creek Mine

**Update Volume 12 Text Section,
PacifiCorp, Deer Creek Mine, C/015/018**

**Volume 12
Engineering Section
Replace Text Section**

R645-301-500 ENGINEERING

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R645-301-510. INTRODUCTION

Coal mining has occurred since 1946 in Deer Creek Canyon, a tributary of Huntington Canyon in Emery County, Utah. Utah Power & Light Company (now PacifiCorp) purchased the operations and coal leases from Peabody Coal Company in 1977. The Deer Creek Mine portal, mine personnel, and its coal handling facilities are located in Deer Creek Canyon. PacifiCorp successfully acquired the Mill Fork Lease and entered COAL MINING LEASE AND AGREEMENT with the State of Utah on April 1, 1999. The coal tract as described in the lease contains approximately 5,562.82 acres, more or less. Mining of this Mill Fork Lease Area will be accomplished through the use of the Deer Creek portals and existing facilities and production of this area will continue in the Blind Canyon and Hiawatha coal seams.

A variety of engineering principles and techniques are applied in the Deer Creek Mine operation. More detail about the methodologies used to plan the coal mining activities for life of mine expectations at this operation can be found in Vol 2, part 3 of the MRP.

R645-301-511. GENERAL REQUIREMENTS

This document will include the general requirements to meet the State of Utah's regulatory requirements to mine coal in the Mill Fork Area as part of the Deer Creek Mine. The proposed new mining plan will include new information or reference the existing mine plan when appropriate. The potential impact to the environment will also be addressed. As reflected by its format, this amendment to the plan attempts to follow the Rules general format within R645-301-500 regulations.

R645-301-512. CERTIFICATION

Applicable cross sections and maps have been included or referenced within this document. They have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer or land surveyor, with assistance from experts in related fields such as hydrology, geology and biology.

**R645-301-513. COMPLIANCE WITH MSHA REGULATIONS AND
MSHA APPROVALS**

As required by MSHA regulations, the surface of the mine site is inspected on a quarterly basis, and on spot inspections as deemed necessary by the governing agency. All mine openings are inspected on a quarterly basis and /or more often if deemed necessary by MSHA. Compliance with the requirements of both DOGM and MSHA regarding these facilities shall be adhered to by PacifiCorp.

Because the area is a permitted coal mine, existing coal processing waste dams, embankments, impoundments, sediment ponds, and refuse piles comply with MSHA regulations governing them. Any new or additional structures proposed for mining the Mill Fork Area shall also be subject to these regulations.

Underground development waste, coal processing waste and excess spoil will continue to be disposed of in accordance with plans approved by MSHA and DOGM. There are no plans to return coal processing wastes to the underground workings at Deer Creek Mine.

R645-301-514. INSPECTIONS

All appropriate engineering inspections and reports will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

R645-301-515. EMERGENCY PROCEDURES

R645-301-515.10. Reporting a Slope Failure

At any time a slide occurs which may have a potential adverse effect on public, property, health, safety, or the environment, the operator will notify DOGM promptly of the problem and of any remedial measures planned to correct the problem. PacifiCorp will comply with any remedial measures requested by DOGM and agreed upon by the operator.

R645-301-515.20 Impoundment Hazards

No new impoundments are planned for the Mill Fork expansion. At the existing facilities, if any examination or inspection discloses that a potential hazard exists with any impoundment structure, the operator will notify DOGM promptly and detail the emergency procedures required for public protection and remedial action. If adequate procedures cannot be formulated or implemented, DOGM will be notified immediately.

R645-301-515.30 Temporary Cessation

Where temporary cessation of operations is necessary for a period beyond 30 days, the operator will submit proper notification and comply with the requirements of R645-301-300 regarding this action.

R645-301-520. OPERATION PLAN**R645-301-521. Introduction**

The plan for the mining in the Mill Fork Area includes references maps, cross sections, narratives, descriptions, and calculations indicating how the relevant requirements are met. The plan describes and identifies the lands subject to coal mining and reclamation over the estimated life of the operations and describes the size, sequence, and timing of the sub-areas for which it is anticipated that individual permits for mining will be sought.

R645-301-521.110. Previously Mined Areas

Areas previously mined at the Deer Creek Mine are shown on Vol. 4, Map 1-3 and Maps MFU1840D and MFU1841D included in this section.

R645-301-521.120. Support Facilities

Surface facilities of the Deer Creek Mine include the following: sediment pond, embankment fills, coal surge bin, transfer tower, breaker station, crusher station, coal weigh bin, truck load-out facility, conveyors, overland conveyor, parking lot, parking garage, office-bathhouse, warehouse-shop, materials storage area, access and service roads, mine ventilation fan, power supply and substation, water treatment system, high pressure pumphouse, water storage tank, sewer treatment system, and drainage system (see Vol. 5, Maps 3-9 and 3-9A).

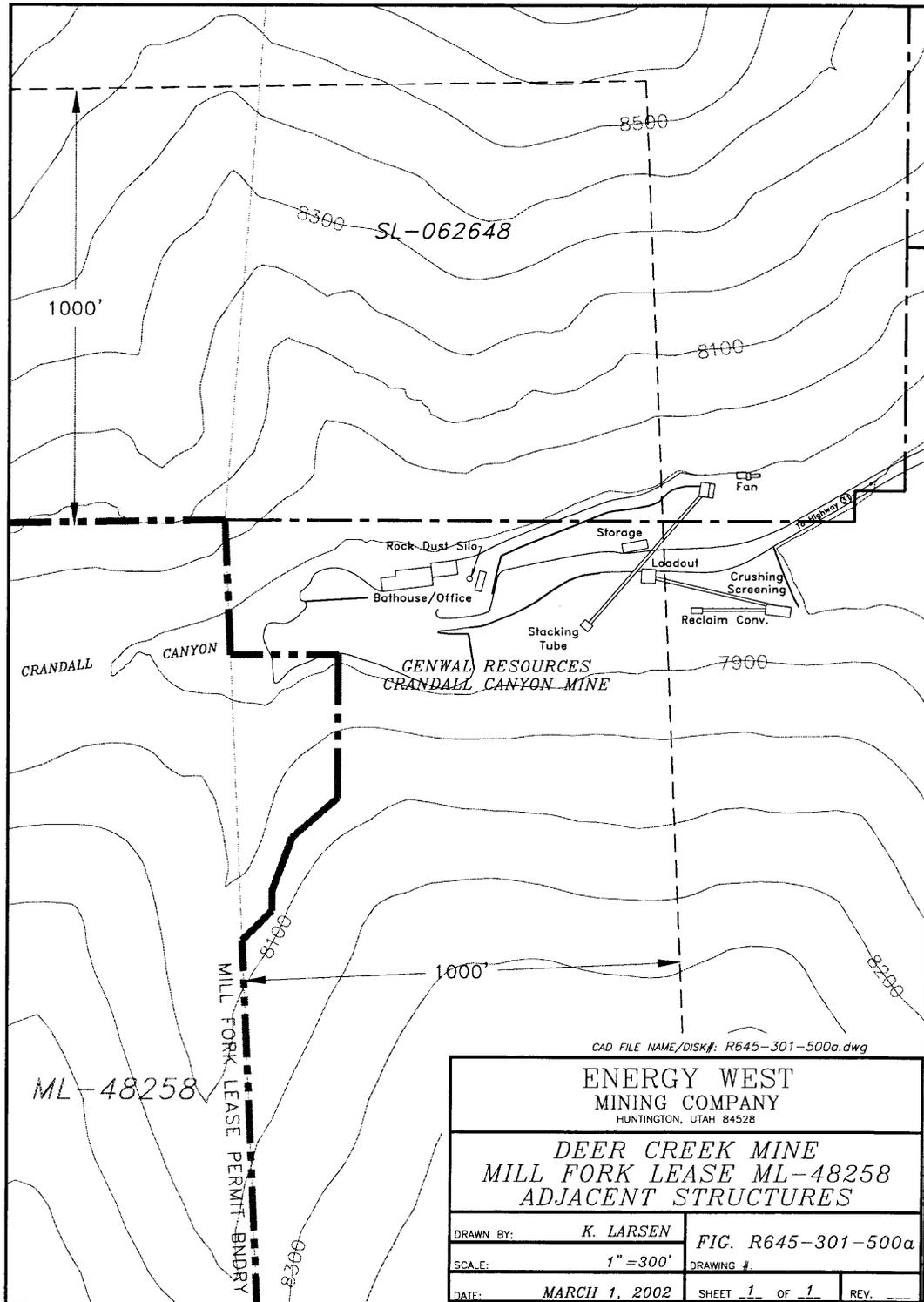
Another support facility of the mine is located in Rilda Canyon. This facility includes an access road and a pad area which supports two portals, a substation, power line, fan, water storage tank, and pumphouse. Topsoil removed prior to construction of the site is also stored within the permit area of the Rilda Canyon facilities. Additional information about this facility is provided in Vol. 2, Part 3 and Vol. 5, Map 3-9A.

An off-site support facility of the mine is the Deer Creek Waste Rock Storage Facility located northeast of the mine site, near State Highway 31. See Vol. 10 of the MRP for more details of the Deer Creek Waste Rock Site. Additional information about all support facilities at the Deer Creek Mine is included in Section 526 of this document.

All mining activities disturbance to associated with the Mill Fork permit area will be through underground mining operations activities. Mine plan layouts (Blind Canyon-Hiawatha Seam) depicted in R645-301-500 Engineering Section, indicate potential portal breakouts located in Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease, *“The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts”*.

R645-301-521.121. Location of Buildings

Volume 5, maps 3-9 series (drawings DS202E, DS1812E and CE-10883-EM) identify the location of all buildings and structures related to the Deer Creek Mine including Rilda Canyon. The Genwal Coal Mine is located within 1000 feet of the Mill Fork permit area. Figure R645-301-500a identifies the location of all buildings within 1000 feet of the permit area, with the identification of the current use of the buildings.



CAD FILE NAME/DISK#: R645-301-500a.dwg		
ENERGY WEST MINING COMPANY HUNTINGTON, UTAH 84528		
DEER CREEK MINE MILL FORK LEASE ML-48258 ADJACENT STRUCTURES		
DRAWN BY:	K. LARSEN	FIG. R645-301-500a
SCALE:	1" = 300'	DRAWING #
DATE:	MARCH 1, 2002	SHEET 1 OF 1 REV.

R645-301-521.130. Landowners and Right-of-Entry

The landowners of record both surface and subsurface, included in or contiguous to the permit area are shown on Map MFS1838D and described in the General Section - R645-301-112.

PacifiCorp applied for and received approval for a lease modification of 65.7 acres which connects Federal Coal Lease U- 06039 to the Mill Fork State Lease ML-48258 and grants legal right of entry to the Mill Fork Area.

R645-301-521.140. Mine Maps and Permit Area Maps

Maps MFS1838D, MFU1837D (General Section), MFU18410D and MFU1841D (Engineering Section) shows the existing leases of the permit and the Mill Fork Area along with the boundaries of all areas proposed to be affected over the estimated total life of the coal mining and reclamation operations.

R645-301-521.141. Boundaries of Areas Affected by Mining.

As documented in R645-301-525: Annual Subsidence Survey Procedures, the effects of significant subsidence are assumed to be coincident with the outline of the planned mine workings. Therefore, significant subsidence will not cross outside of the permit boundary. Map MFS1866D projects the affected area boundary based on two methods; 1) angle-of-draw, and 2) actual subsidence case studies from the East Mountain area. As depicted on map MFS1866D, the angle-of-draw method projects potential affected areas beyond the northern permit boundary. Based on historical case studies of actual subsidence, (refer to Figure R645-301-500E and Annual Subsidence Reports), the affected boundary will not exceed the permit boundary. If subsidence occurs outside the permit boundary based on annual subsidence surveys, PacifiCorp commits to amending the permit boundary to include the affected area.

R645-301-521.142. Maps of Planned Subsidence Areas.

Areas in which planned subsidence techniques (as discussed in R645-301-525, SUBSIDENCE CONTROL PLAN and Mining Methods and Subsidence) are to be used are shown on maps MFU1840D (Hiawatha Seam Mine Plan) and MFU1841D (Blind Canyon Mine Plan). These maps show the extent of the areas to be subsided and the sequence in which they will be subsided. As discussed in R645-301.521.141, map MFS1866D shows the extent of projected subsidence (affected area) based on two methods; 1) angle-of-draw, and 2) actual subsidence case studies from the East Mountain area.

R645-301-521.150. Land Surface Configuration Maps

Topographic maps used to depict surface contours with the permit area are shown in Map MFS1866D.

R645-301-521.170/180. Transportation/Support Facilities Maps

All mining activities disturbance to associated with the Mill Fork permit area will be through underground mining operations activities. Mine plan layouts (Blind Canyon Hiawatha Seam) depicted in R645-301-500 Engineering Section, indicate potential portal breakouts located in Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease, *“The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific*

environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts”.

R645-301-522. COAL RECOVERY

This section includes a description of the mine plan and measures to be used to maximize the use and conservation of the coal resource. The description attempts to show that coal mining and reclamation operations are conducted to maximize the utilization and conservation of the coal, while utilizing the best technology currently available to maintain environmental integrity. This decreases the likelihood of re-affecting the land in the future through coal mining and reclamation operations.

The Mill Fork Area is governed by SITLA, BLM and DOGM for conservation and royalty payments of the coal scheduled to be mined. Mining plans must be approved by SITLA in cooperation with the BLM before mining can occur within this area. A Plan of Operations has been ~~submitted~~ approved and is on file with ~~these two agencies and~~ SITLA to ensure the diligent development and extraction of all minable coal.

The lower Blackhawk Formation of the Wasatch Plateau contains two minable seams in this general area - the Blind Canyon (upper) and Hiawatha (lower) coal seams. Interpretation of the surface drilling information indicates that both seams are minable over 50% of the Mill Fork Area. Thus, multiple seam mining will be extensively practiced where the Blind Canyon seam will be mined first and the Hiawatha seam extracted afterwards. This situation requires prudent mine planning and practices to optimize safe mining and resource recovery. Based on previous experience at the Cottonwood and Deer Creek operations with multiseam mining, all main entries are columnized as closely as possible to the upper seam mains and all development gate entries proposed in the lower seam are staggered into the gob of the panel extracted above them

by at least 50'. Ongoing exploration including select additional surface holes as well as interseam drilling (approximately 2000' distances along gates) during the mining of the Blind Canyon seam is required to define minable thickness limits and potential quality.

Another major consideration to the overall coal recovery of this area is deep overburden. The area of the Blind Canyon minable seam greater than 2000' of overburden is 40% and in the Hiawatha minable area accounts for 51%. The maximum overburden exceeds 2600'. This plays a significant part in the layout of the mine plan and a major determinant in the potential reserve recovery. The present layout shows primarily three panels in a series, a barrier and then three more panels for the minimization of potential face stress that may result in face and tailgate bouncing.

The operator will mine, generally to the top rock in all development entries to maintain integrity of the top against abutment pressures exerted by the longwall retreat. Most development entries will be no more than 8 ½' high or seam height to improve safety by limiting the exposure of the miners to high, unstable ribs. If the seam is greater than 8 ½', bottom coal will be left in the development entries. The physical limitations of the longwall equipment and safety considerations will determine the resultant retreat reserve recovery. Main or submain entries will be developed for long term stability in 3 to 6 entry configuration with pillars ranging from 80' x 80' to 100' x 120' (centers) in size. Longwall development gates will be developed on a two entry yield pillar configuration with a maximum pillar dimension of 50' x 100' centers. This type of layout has been proven in the Deer Creek and Wilberg/Cottonwood/ Trail Mountain mines since the early 1980's and proven very successful in both enhanced safety and reserve recovery.

Although maximum economic recovery is an important design criteria, other considerations must be looked at, especially the ability to mine maximum or minimum thickness or protective coal barriers which must be left in place to ensure the integrity of the mine entries associated with the

active underground workings and to protect personnel and the environment. These categories where coal reserves will not be recovered are addressed as follows:

(1) Property Boundary Barriers: All external property boundary lines are protected by a 50 foot (minimum) solid coal "buffer" barrier.

(2) Protective Main Entry Barriers: Protective main entry barriers are designed to protect long term mine entries from excessive abutment pressures of the retreating longwall. Design of these barriers are based on (i) intended duration of use, (ii) depth of cover in the area, (iii) geologic conditions present, and (iv) historical performance of similar sized barriers in similar conditions.

(3) Bleeder Entry Barriers: Bleeder entry barriers are designed to ensure the long term stability of the longwall panel bleeder system. Design of these barriers is based on (i) intended duration of use, (ii) depth of cover in the area, (iii) geologic conditions present, and (iv) historical performance of similar sized barriers in similar conditions. Evaluation of localized conditions at the time of development, in conjunction with the preceding design parameters, will be on-going to determine final barrier sizing so that bleeder entry stability and coal recovery may be optimized.

(4) Subsidence Protective Barriers: No second mining will take place within the following areas:

- ❖ Joes Valley Fault: a 22 degree angle of draw from the intersection of the Joes Valley fault on the western boundary of the lease.
- ❖ Gas well (Federal #23-32): located near the center of Section 23, T.16 S., R.6E. This is a producing well, with an attached transmission pipeline. The well is near

~~the southern extent of the mine plan. A barrier based on a 15° angle of draw will be left around the well.~~

- ❖ Mill Fork Access Development Mains: no second mining will take place under the main entries of the Mill Fork access development.

These are protective barriers for the long term integrity of their respective areas.

(5) Minimum Mining Height: Areas where the coal thickness is less than 7', in particular for longwall development and retreat. Mining below this height is not feasible under current economic conditions and existing equipment complement.

(6) Maximum Mining Height: In panels where the coal height exceeds the effective mining height of the mining equipment, including longwall equipment, either top or bottom coal will be left.

(7) Barriers Between Series of Longwall Panels: Solid coal barriers will be left between particular series of panels to minimize overriding side abutment pressures.

It is expected that recovery rates of approximately 85% can be obtained within the proposed longwall panel areas. The overall minable reserve recovery for the North Rilda Canyon area of the Deer Creek Mine is estimated at approximately 65%.

The Deer Creek mining plan is based on the geologic information of the area obtained from outcrops, drilling, and previous mining by the operator. For geologic information of this area, refer to R645-301-600 Geologic Section of this volume.

Table 500-1 provides the approximate number of acres affected by mining in five-year increments for the Mill Fork lease. In areas of seam overlap, only the first mining in the area is

considered in the calculation of acreage. Subsequent mining in the other seam is not considered since the area has already been affected.

Table. 500-1

Area Affected by Mining (acres)

(Based on ~~November 2002~~ ~~March 2005~~ Mine Plan)

Year	Affected Area (acres)
2003-2007	934 798
2008- 2012	1,422,998
2013- 2017	414,664
2018 - 2021	26,097

Total Affected Area = 3,030,557 acres

R645-301-523. MINING METHODS

Continuous Mining Units (Main Entry and Longwall Section Gateroad Development):

The principal purpose of the continuous mining units within the Mill Fork Area of the Deer Creek Mine is underground mine development (i.e. section development of mainline entries, longwall section gateroad development, and longwall section setup/bleeder entry development; along with development of mine water holding sumps, rock storage rooms, etc.).

Figure R645-301-500b illustrates the basic configuration of a typical five-entry mains, consisting of (nominal) 20 feet wide entries and crosscuts driven on standard 80 feet x 100 feet entry centers. The pillars created measure a (nominal) 60 feet wide x 80 feet long; a size which has been developed for sufficient support of the main entries and overlying strata. Figure R645-301-500c also illustrates the basic configuration of a typical two-entry longwall panel development, consisting of (nominal) 20 feet wide entries and crosscuts driven on (nominal) 50 feet x 100 feet

entry centers. With the retreating longwall mining system, all panel development work is accomplished by continuous mining units prior to longwall installation

Continuous miners will provide the development openings for air, men and materials handling, and other utility services. The support and maintenance of these openings will be according to the approved MSHA Ventilation and Roof Control Plans. The contribution of the continuous miner units to the total production accounts for 15-20% of the total recoverable reserve and will vary from year to year with one to three units operating depending on the development window being maintained ahead of the longwall.

Longwall Mining System:

The predominant mining method to be used in the Mill Fork Area of the Deer Creek Mine will be *Longwall Retreat Mining*. This method, as practiced by PacifiCorp, presents the safest and most efficient underground resource recovery mining method available. About 80-85% of the production will result from the single operating longwall which is planned for use in the Mill Fork Area of the Deer Creek Mine.

As referenced above, the two-entry gateroad system is developed with (nominal) 20 feet wide entries and crosscuts driven on (nominal) 50 feet x 100 feet entry centers. This type of "yield pillar" configuration is designed so that the gateroad pillar will gradually yield as longwall retreat proceeds from panel to panel. The purpose of this design is to prevent the buildup of unrelieved stresses within the pillar by allowing the pillar to significantly crush and minimize the load transferred to the next panel or in the multiseam configuration to eliminate a large barrier to be formed which the lower seam would have to cross under. Figure R645-301-500c illustrates the basic configuration of a retreating longwall system. After gateroad entries are driven to the extent of the longwall panel length, on both sides of the longwall panel, setup and bleeder entries are driven to connect the gateroads. A solid coal barrier is left between the setup and bleeder

entries, size based on; (1) intended duration of use, (2) depth of cover in the area, (3) geologic conditions present, and (4) historical performance of similar sized barriers in similar conditions.

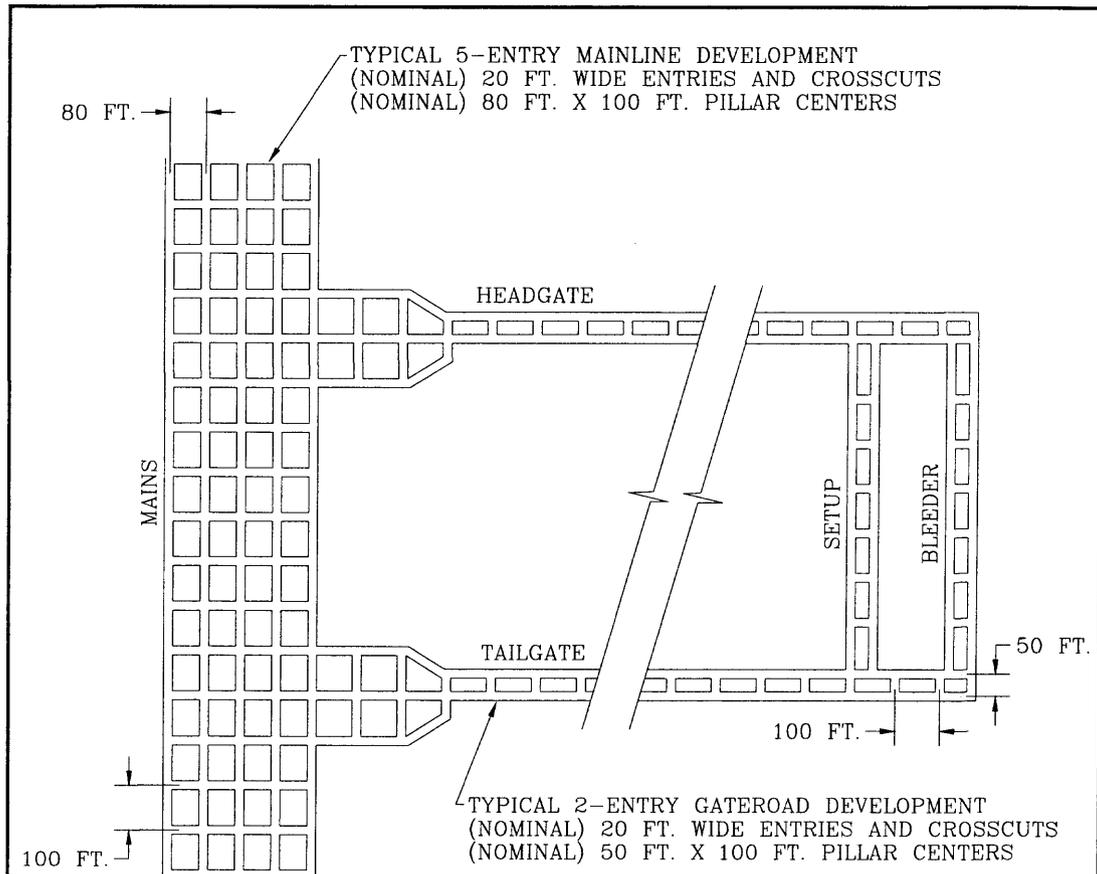


FIGURE R645-301-500b
TYPICAL MAIN ENTRY AND PANEL DEVELOPMENT
FOR THE MILL FORK AREA OF THE DEER CREEK MINE

CAD FILE NAME/DISK#: FIGURE R645-301-500b.DWG

ENERGY WEST MINING COMPANY HUNTINGTON, UTAH 84528	
DEER CREEK MINE MILL FORK AREA LONGWALL PANEL RETREAT	
DRAWN BY: K. LARSEN	FIG. R645-301-500b
SCALE: NONE	DRAWING #:
DATE: APRIL 16, 2002	SHEET 1 OF 1 REV. ____

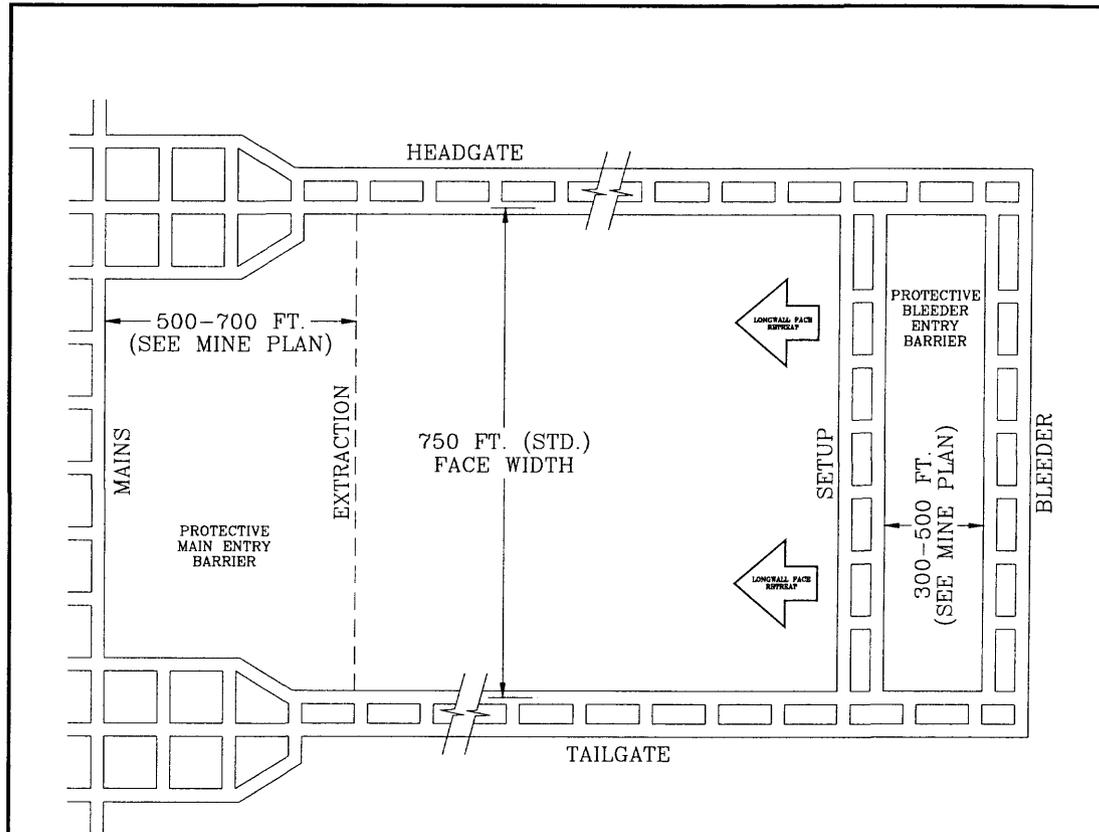


FIGURE R645-301-500c
 TYPICAL LONGWALL PANEL RETREAT
 FOR THE MILL FORK AREA OF THE DEER CREEK MINE

CAD FILE NAME/DISK#: FIGURE R645-301-500c.DWG

ENERGY WEST MINING COMPANY <small>HUNTINGTON, UTAH 84528</small>	
DEER CREEK MINE MILL FORK AREA LONGWALL PANEL RETREAT	
DRAWN BY: <i>K. LARSEN</i>	FIG. R645-301-500c
SCALE: <i>NONE</i>	DRAWING #:
DATE: <i>APRIL 16, 2002</i>	SHEET <i>1</i> OF <i>1</i> REV. <i>---</i>

Mine Layout

The mine layout of the Deer Creek Mine for the Mill Fork Area is illustrated on Maps MFU1840D and MFU1841D. The drawings show an arrangement of longwall panels and development sections interconnected by systems of main and sub-main entries. This arrangement is predicated on geographical dedication of reserves, regulatory mining restrictions, available coal quality, and geologic information.

The planned mine development sequence accommodates longwall panels as the primary means of efficiently extracting the reserves. This will ensure the best possible means of maximizing reserve recovery while maintaining consistent coal quality and ground control.

Longwall face width, depending on the geologic parameters of the coal deposit, varies from 500 feet to 780 feet wide. Standard face width is 750 feet center to center (from center-line of head-gate belt entry to center-line of tailgate entry), or 730 feet coal block width. Once installed in the setup entry, the longwall begins retreat mining (from the setup entry "outby" toward the main line entries). A protective barrier is left between the mined out longwall panel (extraction face) and the main line entries that is sized to insure long term main line entry stability.

Panels are designed within the mining area, bounded by natural and imposed limits, with varying degrees of confidence as to final location and extent. Faults may vary somewhat from currently assumed locations. Geologic limitations such as seam splits, channel scours, spars, stratigraphic thinning, burned coal areas, etc. may affect resource recovery by varying the mining limits by hundreds of feet as information becomes available and as mining recovery economics and practicality are further refined. Regulatory mining restrictions, such as escarpment protection barriers and perennial stream buffer zones further confine mining extent. Geotechnical restrictions, largely associated to deep overburden and massive geology may definitely reduce the

amount of coal recovered as fewer panels may be able to be mined in a series or safety concerns with potential “bouncing or bursting “ conditions persist.

Geotechnical Considerations to Mine Layout

The mine layout of the Deer Creek Mine for the Mill Fork Lease is illustrated on Maps MFU1840D and MFU1841D. The mine layout for this area is designed to be able to mine a large multi-seam area under deep cover by the safest manner and optimize reserve recovery. It is first to be accessed from the North Rilda area in the Hiawatha Seam and crossing the Lease Modification No 3 area into the Mill Fork Area with a six entry mains development which allows for crossing in a thicker seam. The layout and long term development plan for the Mill Fork Area is centered around optimum placement of the mains, panels and barriers. The mains are developed on the eastern perimeter of the 7 ‘ coal isopach which allows also for the shallowest cover for long term integrity. The mains on one side also allow for extended longwall panel lengths and decrease the number of frontal barriers left for longwall panels. The number of panels in a series has been generally kept to three to minimize the resultant increasing stresses created in the deep cover with side abutment contributions.

From the multi-seam consideration, the Blind Canyon (80' to 140' interburden) would be accessed as soon as possible from the Hiawatha Mains by means of rock slopes and a coal transfer shaft so that extraction of the upper seam will take place first. As the Hiawatha seam is developed, its mains also are on the eastern extent of the 7' coal isopach and panel lengths are maximized. The gate entry developments are developed under the gob of the Blind Canyon panels, offset a minimum of 50' from the gate developments of the Blind Canyon. This allows for a more stable development in the Hiawatha seam and higher stresses which may result from remnant pillars above may be absorbed on the longwall face below. Also, the barriers that are shown between the series of panels in the Hiawatha are outside or larger than the barriers left in the Blind Canyon. This is to insure that no high stress barrier will have to be “split” by the lower

seam developments. Also, all frontal barriers or barriers between series of panels is established at a minimum of 500' which historically in deep cover in this region is required.

Mine Production and Equipment

It is expected that an average production rate of 1,000 tons/machine shift for continuous miners and 9,500 tons/machine shift for longwalls will be the production rate in the Mill Fork lease. Table 500-2 lists the anticipated annual and total production of coal from the Mill Fork lease. This translates into two miner sections and one longwall section operating 2 shifts/day, 190 days/year in order to achieve the required coal output at full production. These production shifts are 10 hour shifts normally producing Monday through Thursday, with supplemental production and necessary construction performed by assigned workers on the weekend crews (Friday through Sunday).

Table 500-2

Mill Fork Lease Anticipated and Total Production

(Based on ~~November 2002-March 2005~~ Mine Plan)

<u>Year</u>	<u>Tons</u>	<u>Year</u>	<u>Tons</u>
2003	34,567.08 (actual) 48,981	2012	3,802,447 3,924,516
2004	561,769.84 (actual) 794,566	2013	3,734,935 3,818,205
2005	77,273.42 (actual Jan. & Feb.)	2014	3,514,229 3,906,435
	2,358,135 Projected Total		2,435,408 2,560,337
2006	3,937,024 4,254,848	2015	3,759,786 4,071,266
2007	3,731,671 4,288,238	2016	3,761,643 4,333,062
2008	3,691,566 4,168,237	2017	3,631,342 3,975,588
2009	3,902,339 4,260,357	2018	3,705,936 3,837,816
2010	3,548,291 4,325,550	2019	3,563,862 3,836,616
2011	3,663,544 4,210,726	2020	3,388,821 3,334,467
		2021	44,232

Total Tons = 58,413,413~~63,949,813~~

All in-mine coal haulage is by belt conveyor. Of the total entries in the main entry system, at least one entry is dedicated specifically to the belt conveyor. All mine personnel and materials are transported underground by diesel equipment. Table 5 (Vol. 2, Part 3) lists the major ancillary equipment used in Deer Creek Mine.

The extracted coal is sized in the Deer Creek coal handling facility and conveyed to the PacifiCorp - Huntington Power Plant, approximately two miles away. A portion of the coal is also trucked from the Huntington Plant coal yard and transported via truck to supplement the fuel requirements at the Carbon and Hunter Power Plants.

R645-301-524. BLASTING AND EXPLOSIVES

The Deer Creek Mine is a developed and producing underground mine and there is no anticipated need for any blasting activities incident to the underground mining activities. However, if circumstances develop that require surface blasting activities, a plan will be initiated in accordance with DOGM regulations in R645-301-524.

R645-301-525. SUBSIDENCE CONTROL PLAN

This section describes in detail the operator's plan to ensure minimal environmental impacts from mine-induced subsidence. The Engineering Section - Operation Plan plus the Geology Section (R645-301-600) present the detailed data on which the analytical approach for the subsidence control plan is based. The following subsections describe the principal factors involved in controlling subsidence impacts resulting from the proposed mining operations.

Subsidence Damage Probability Survey (Pre-Subsidence Survey)

Multiple surveys have been conducted on the portion of the surface of East Mountain that could possibly be affected by the full extraction or second mining of coal from the Mill Fork Area. The U.S.D.A. Forest Service (the exclusive surface management agency) has extensively addressed pre-subsidence issues in the Environmental Assessment for the Mill Fork Lease Tract, LBA #11.

It has already been determined that there are renewable resources present in the area in the forms of springs, water seeps, grazing land, timber, and wildlife. Also present in the permit area are unimproved roads, trails, a gas well and pipelines, power transmission lines, and some portions of the Castlegate Sandstone escarpment (see Pre-Subsidence Survey Map [Map MFS1839D - Refer to Confidential and Private Volume]).

Known springs and seeps that are located within the Mill Fork Area second mining areas are shown on the Pre-Subsidence Survey Map (Map MFS1839D, Refer to Confidential and Private Volume). Hydrologic Section of the Mill Fork MRP, Appendix A, contains a listing of sampling sites and a monitoring schedule. Most of the streams within the permit area are ephemeral and/or intermittent. The streams that flow into Mill Fork Canyon are fed by springs that emanate primarily in the North Horn Formation within the permit boundary. Portions of the headwaters of the drainage basins that feed Crandall and Rilda canyons are within the Mill Fork Area. Second mining, i.e. longwall extraction or room & pillar mining, of the Mill Fork Area will not occur beneath the main stream channels of these canyons. First mining development of access mains from Deer Creek Mine to the Mill Fork Area will occur to the north of the Right Fork of Rilda Canyon.

The entire permit surface area is utilized for grazing of sheep and cattle during the summer season. Experience from the existing PacifiCorp permit areas has shown that the effects of subsidence on grazing and grazing lands are minimal (refer to R645-301-300: Biology and/or Supplemental Volume 1, Lease Relinquishment).

All existing timber resources on the Mill Fork permit area are administered by the U.S.D.A. Forest Service. Experience on the existing PacifiCorp permit areas over the last 25 years has shown that subsidence does not affect timber resources or access to timber resources (refer to R645-301-300: Biology and/or Supplemental Volume 1, Lease Relinquishment).

Wildlife resources in the permit area are explained in detail in the Wildlife section of this permit application. Experience on the existing PacifiCorp permit areas over the last 25 years has shown that the effects of subsidence on wildlife resources are minimal (refer to R645-301-300: Biology and/or Supplemental Volume 1, Lease Relinquishment).

Only two roads (administered by the U.S.D.A. Forest Service) cross the permit area. These are the Flat Canyon Road, #145, and the East Mountain Road, #244. The Flat Canyon road serves as the access road to the gas well Federal #23-32 and to the top of the north end of East Mountain, and has been graveled and graded. No portion of the Flat Canyon road will be undermined. The East Mountain road, #244, is an unimproved dirt track that winds along the top of the main ridge. This road traverses the main second-mining areas of the Mill Fork Area. The road ends in the north half of Section 11, T.16 S., R.6E, and continues to the north as a pack trail. Several smaller roads and tracks branch off from this main road, but are minor in nature.

Two numbered foot and horse trails are present. The Mill Fork Canyon trail (#391) starts at the top of East Mountain, follows the Mill Fork canyon bottom to the switchback on the main Mill Fork Canyon road (outside the permit boundary). The reclaimed road that follows the top of the ridge between Mill Fork and Crandall canyons (#086) was first constructed during the 1960's as a fire-fighting access road, and later used by ARCO Coal Company to drill several exploration

core holes along the ridge. ARCO Coal Company reclaimed the road in 1982. A foot / horse trail follows the track of the old road. These trails should not be affected by subsidence.

A single gas well, own and operated by Merit Energy, is located within the permit area (identified as Federal #23-32), near the center of Section 23, T.16 S., R.6E. This is a producing well, with an attached transmission pipeline. A gas transmission pipeline extends from this well south along forest road #244 for about 2,000 feet, then exits the permit area to the south. The well is near the southern extent of the mine plan. PacifiCorp and Merit Energy entered into an agreement to establish a working relationship regarding multiple mineral development to insure the maximum utilization of the coal and oil and gas estates in certain lands in Emery County, Utah all in the interest of the conservation and full utilization of natural resources. A barrier based on a 15° angle of draw will be left around the well. Accordingly, the 2nd Left - 3rd Left longwall panel will be cut short at the edge of this subsidence barrier. The northern end of this pipeline falls within the same subsidence barrier as the well itself. No mining is planned under the pipeline. PacifiCorp commits to coordinating mining activities with Merit Oil Company associated with well Federal #23-32. Six months prior to conducting mining in and adjacent the 15° angle of draw protection zone, PacifiCorp will notify Merit Oil Company to coordinate operational considerations.

As stated in the agreement, "Merit is the owner and operator of a producing gas well in the Area of Interest identified as Well No. 32-23. The well was drilled in 1989. PacifiCorp is conducting active coal mining operations in the Area of Interest in the immediate vicinity of Well No. 32-23 by and through Interwest Mining Company, a wholly owned subsidiary, as its managing agent, and Energy West Mining Company, another wholly owned subsidiary, as mine operator. These

mining operations are in the Deer Creek Mine in the 12th West longwall panel, off of the 7th North Mains. It is anticipated that the full extraction of PacifiCorp's 12th West longwall panel could potentially cause a subsidence impact on Well No. 32-23. The parties wish to enter into a proactive agreement to establish the working relationship among the parties as this multiple mineral development activity takes place so as to insure the safe and effective compatible usage of both the coal and the oil and gas estates and to achieve maximum economic recovery of these natural resources". The multiple mineral development agreement was signed by all parties (PacifiCorp, Merit Energy, Division of Oil, Gas & Mining and SITLA) and became effective on August 12, 2005. This agreement achieves the purpose and intents of Utah Administrative Code R649-3-27.2 such that a cooperative agreement exists between Merit and PacifiCorp which allows multiple mineral development.

Energy West will report of the subsidence monitoring related to Well No. 32-23 in the Annual Subsidence Reports.

Another gas pipeline segment is buried along forest road #017 in the southwest corner of the permit area. This pipeline will not be undermined.

Two power transmission lines are present within the permit area. The largest is the Utah Power 345 KV line that crosses the southwest corner of the permit area in Section 22, T.16S., R.6 E.. The "Plan of Operations" approved in November 2002 included mining adjacent to the powerline. About 700 feet of this line crosses over the western end of the 11th West - 12th West Hiawatha longwall panel. Development mining in 11th and 12th West intercepted an extensive split in the Hiawatha seam which limited western development. Based on an revised mine plan, mining will

~~not affect the 345 KV line. As indicated in the proposed mine plans, (refer to Drawing MFS1839D), development mining will occur beneath or adjacent to two powerline structures, 1 - rigid four legged steel lattice tower and 1 - two-legged wooded pole H-frame. Based upon over twenty-years of subsidence modeling, the affected area as a result of mining will occur east of the powerline structures. This transmission line is owned and operated by Utah Power, a subsidiary of PacifiCorp. This transmission line will not be undermined by full extraction methods.~~

A second transmission line (25 KV) carries electricity from the lower portion of Mill Fork Canyon over the top of Mill Fork Ridge, and down into Crandall Canyon, to the Genwal Mine. This line crosses the small portion of the permit area that projects eastward (NW ¼ NW ¼ Section 8, T.16S. R.7 E.). This transmission line will not be undermined.

Genwal Coal Company maintains a radio repeater at the Mill Fork summit in Section 7, T.16S. R.7 E.. This repeater will not be undermined.

The Castlegate Sandstone outcrop and escarpment are exposed in several portions of the permit area (See the Pre-Subsidence Survey Map, MFS-1839D). Some of the outcrops to be undermined by second mining are shown in sections 1 and 12, T.16. S., R.6 E., and sections 6 and 7 of T. 16 S., R. 7 E. Subsidence of the Castlegate Sandstone escarpment has caused occasional cliff failures and rock falls in previous mining areas such as Newberry Canyon and Corncob Wash (Cottonwood Mine), Trail Mountain (Trail Mountain Mine 3rd East Longwall), and Rilda Canyon (Deer Creek Mine 8th West, 7th East and 9th East Longwalls). The Castlegate Sandstone is also exposed in Upper Joes Valley along the western edge of the permit area. Cliff outcrops of the Castlegate Sandstone are small and infrequent on the Mill Fork Lease. Based on

the current mine plan no cliff exposures of the Castlegate Sandstone on the Joes Valley side will be undermined by second mining. The Castlegate Sandstone exposures on the Joes Valley side of the permit area are mostly protected by the 22° angle-of-draw buffer zone to prevent second mining under the Joes Valley Fault. The 22° angle-of-draw buffer zone is a requirement (Stipulation #19) of the Environmental Assessment of the Mill Fork Lease Tract, LBA #11, prepared by the U.S.D.A. Forest Service, in which stipulations for leasing the tract were published. According to the E.A., only small failures of the Castlegate Sandstone are to be expected as a result of mine subsidence. Most of the exposed Castlegate outcrops within the Mill Fork Area will not be undermined by second mining.

No other structures, man-made or otherwise, are present on the Mill Fork Area that could be damaged by mine-induced subsidence.

Subsidence Angle of Draw Calculation:

The use in subsidence – related calculations of a 15 degree angle of draw (to the outside limit, or zero ground movement, refer to section below entitled Annual Subsidence Survey Procedures for the projected affected area) is an industry/agency accepted standard used for delineation of surface influence protection from mining areas considered for full extraction mining. Mining experience at Energy West's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MRP).

The angle of draw of subsidence produced by full-extraction mining can be influenced by many factors. These include the size and shape of the area mined, number of seams mined, thickness of

the coal extracted, depth of overburden, overburden composition, bedding and jointing characteristics of the overburden, fractures or faults in the overburden, adjacent mine workings, and adjacent areas of burned coal and clinker.

Based on data collected by the U.S. Bureau of Mines and eighteen years of subsidence data collection on East and Trail Mountains, the angle of draw in typical mining conditions is found to be between 0 and 15 degrees from vertical. In some limited areas, the angle of draw is greater than 15 degrees, but in every case, the angle is greater due to the influence of one of the other factors mentioned below.

Faults can influence the angle of draw. If mining occurs adjacent to an existing fault, the area of subsidence will follow the natural plane of weakness formed by the fault. In this case, the angle of draw will be the same as the dip of the fault.

Prehistoric burning of near-outcrop coal creates a partially collapsed rubble or "clinker" zone above the burned out coal, susceptible to further collapse under additional stress. If mine workings extend to an area of burned coal experience has shown that the overburden stresses above the mined area can be transferred to the adjacent burned coal and clinkers which may cause the clinkered areas to collapse or fail. In this case, the angle of draw may appear to be very shallow as the area of subsidence will encompass the mined area plus the clinker collapse area. The failure of the susceptible clinkered areas is the source of subsidence outside the normal area of influence.

For planning purposes, any barrier of protection left in the mine to protect surface features should use a 15 degree angle of draw unless one of the factors mentioned above is known to exist in the immediate area.

Mining Methods and Subsidence

Subsidence at the surface is minimized when mining areas are simple in shape, and mining extraction is complete and consistent within those areas. The operator intends to minimize surface effects of subsidence by using, wherever practical, the longwall mining method and mining the coal deposits as completely as possible. Approximately eighty percent (80%) of the recoverable coal reserve will be mined by the longwall method, the remaining area will be mined by continuous miner units.

The longwall mining method allows almost total extraction of the coal and induces caving of the immediate and upper roof strata. As the coal seam is extracted, the overlying strata cave rapidly. The caving process has been shown to propagate to within 100 feet of the surface in less than two weeks after mining. This was determined by a cooperative study conducted by the U.S. Bureau of Mines using Time Domain Reflectometry (TDR). In this study, a coaxial cable was cemented within a drill hole positioned near the center of the 14th West longwall panel in the Cottonwood Mine. As the caving of the strata occurred, the cable would shear or be stretched. The depth of the shears and stretches were identified with instruments on the surface.

The data collected from this study is contained in Vol. 3, Appendix IV of the Deer Creek MRP. Surface subsidence has been observed within two months of the coal extraction. In most areas, the subsidence will stabilize within 2 years of mining.

It is the operators intent to arrange longwall mining areas in large enough blocks of longwall panels as present mining technology or equipment allows in order to minimize the perimeter areas which would be on the sloping edges of the subsidence troughs. The “chain” pillars of support for the longwall gate roads have been designed on the yielding pillar principle so that they will yield to destruction and not impede subsidence within the blocks of panels.

The size of the support coal pillars used in main entries for both the Blind Canyon and Hiawatha seams to ensure long term stability has been determined by basic calculation for the deepest expected cover (from prior mining practice in the area) and USBM studies. Experience has also shown that, in multi-seam mining circumstances, columnizing main entry development pillars in both seams is essential for long term main entry stability.

Full extraction areas, by definition, are planned and can control subsidence in areas. It is anticipated that the planned subsidence will result in a generally uniform lowering of the surface lands in broad areas, thereby limiting the extent of material damage to those lands and causing no appreciable change to present land uses and renewable resources. Subsidence prediction work has shown that the expected maximum planned and controlled subsidence will vary from zero to fifteen (0-15) feet, assuming that the total cumulative extraction from the two seams will not exceed twenty (20) feet.

Subsidence Monitoring Plan

The establishment of a subsidence monitoring plan is a requirement of the Stipulations section (No.7) of the Environmental Assessment for the Mill Fork Lease Tract, LBA #11, Page A-2 by the U.S.D.A. Forest Service.

The operator initially adopted a twofold approach to subsidence monitoring:

- 1) aerial photogrammetry,
- 2) on-the-ground monumentation.

After seven years of comparing the two types of surveys it was determined that both methods effectively document the amount of subsidence which has occurred; however, the aerial photogrammetry method has the advantage of showing more detail because more data points can be monitored with less effort. Therefore in 1987, with the concurrence of the State of Utah Division of Oil, Gas & Mining (DOGM), the operator discontinued on-the-ground monumentation and now collects subsidence data solely by aerial photogrammetry.

The subsidence monitoring program, conducted since 1980, has produced data which not only document the amount of subsidence that has occurred but also allows the operator to predict the amount of subsidence that is likely to occur when mining in new areas. The detail of the data collected in years past is not included herein. This report is submitted annually to the BLM, USFS, and the Utah Division of Oil, Gas, & Mining.

Aerial Photogrammetry

PacifiCorp's subsidence monitoring program is primarily based on aerial photogrammetry. PacifiCorp has been using aerial photogrammetry - based subsidence modeling since 1980. This method has proven to be the best way to collect subsidence data on East Mountain. A baseline photogrammetric survey was conducted in 1980 that included over 21,000 elevations measured on approximate 200-foot spacing grid. In flat areas with limited vegetation, the elevations can be read from the photographs with a precision of one-half foot. In steeper areas, where cliffs are

present, the resolution is not as good, and inaccuracies of greater than ten feet can occur. In steeper areas, photogrammetric monitoring can, and has been, augmented by conventional survey data.

Annual Subsidence Survey Procedures

Aerial photographs of the entire Mill Fork permit area will be used in conjunction with 51 widely spaced survey control points on the ground (see Map MFS1857D, Flight Paths with Survey Control) to produce a digital elevation model of the ground surface in successive years from which a surface subsidence map is generated for each year. The ground control points are marked and surveyed using conventional survey methods, then flagged so that they can be seen in photographs taken from the air. Approximately 100 aerial photographs of the permit area will be taken along 7 flight lines that traverse the permit area from north to south. Overlapping portions of photographs taken from successive viewpoints along the flight lines produce stereoscopic views of the ground surface. These 93 views of overlapping photograph pairs are called “models” in the photogrammetric process. Elevations of the ground surface over the entire permit area are then calculated using a computer-aided stereoplotter, and verified using the 51 known survey points. Ground elevations are calculated for a grid of approximately 200-foot centers, optimized for terrain. The baseline data, including surveying and flagging ground control points, acquiring the aerial photographs, and generating the surface grid and map, for the Mill Fork Area were collected in 2000 (refer to MFS1857D Mill Fork Lease ML-48258 Subsidence Survey: Flight Lines with Survey Control) . These elevations will then be compared to elevations measured from the photographs taken annually in each summer. Using this method, ninety percent of the points measured will be accurate to within plus or minus one-half foot.

PacifiCorp participated with the governmental agency task force which included representatives from the Bureau of Land Management, Forest Service and the Division of Oil, Gas and Mining, to develop “*Memorandum of Understanding for Processing of Requested to Relinquish Federal Coal Leases (10-MOU-97-001)*”. This document established “Standards for Relinquishment Consideration” including the amount of accepted variation in annual subsidence data. As stated in the MOU, the area will be considered stable, if the cumulative subsidence during the period (3 years) has been 1 foot or less under normal circumstances. Based on this agreement, subsidence measurements and areas and subsidence areas shown on PacifiCorp’s annual subsidence maps show areas of total measurable subsidence greater than two feet. PacifiCorp’s experience on East Mountain since 1980 has shown that the areas of minimum detectable subsidence, i.e., one foot or more, very rarely extend outside of the outline of the total mine workings, even in areas where more than one seam has been mined. Figure R645-301-500d compares the predicted versus actual subsidence for the Deer Creek Mine (data from cooperative study conducted by the United States Bureau of Mines and PacifiCorp). The angle of draw for subsidence used in future mining areas should be 0°, or the outline of the planned mine workings in areas unaffected by faulting or near surface burned coal. Figure R645-301-500e depicts actual subsidence measured at the Deer Creek Mine north of the Roans Canyon Fault system (additional case studies can be observed in the Annual Subsidence Reports).

The applicant or applicants contractor will maintain survey control aerial targets within the permit boundary necessary to allow the interpretation of coordinate points on photos within ± 0.5 foot. Following this procedure the operator will conduct annually an aerial photo survey of all areas which have been undermined. The operator will continue monitoring all areas undermined until the operator and DOGM agree that the subsidence in a given area has become stable and no

further monitoring is necessary. The findings of the survey will continue to be reported to DOGM annually in a summary report.

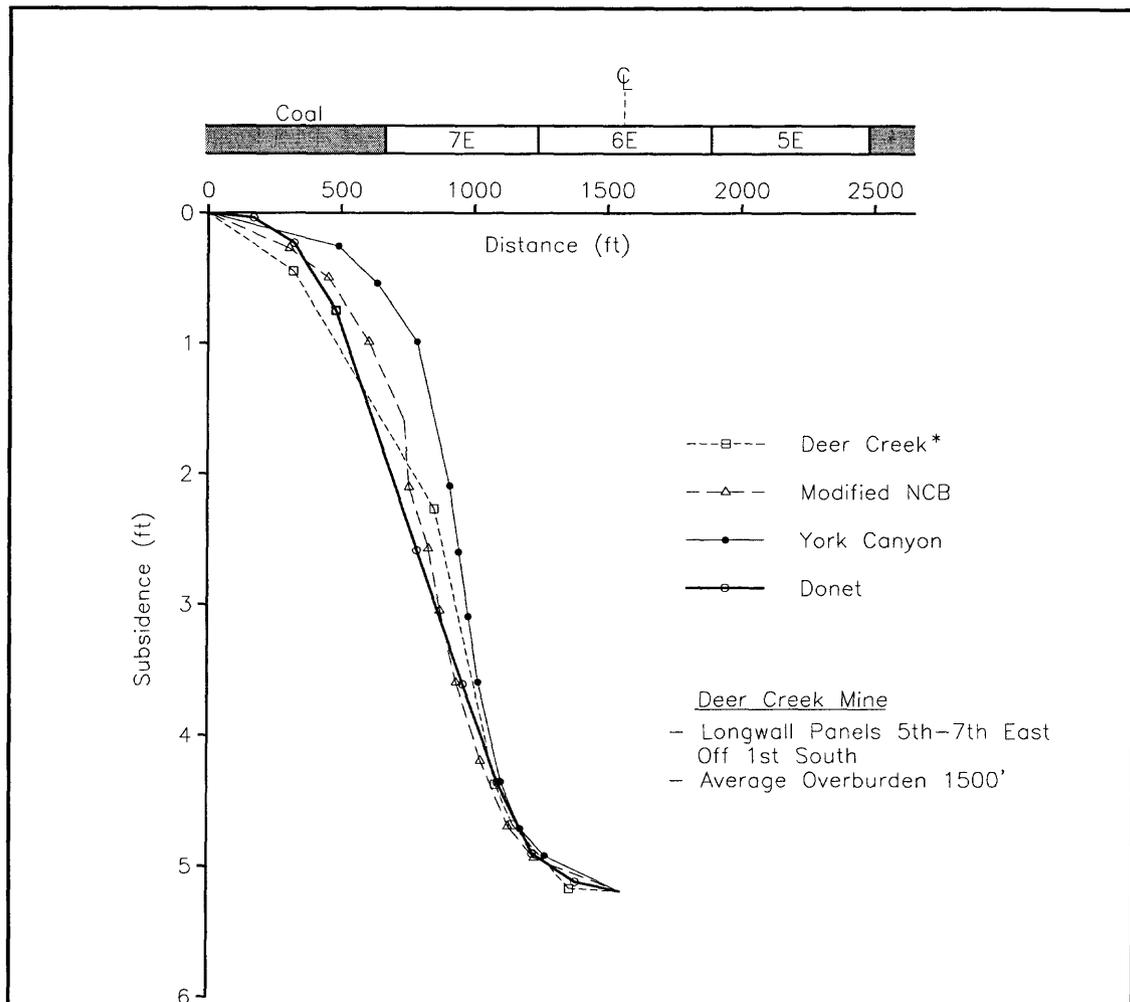
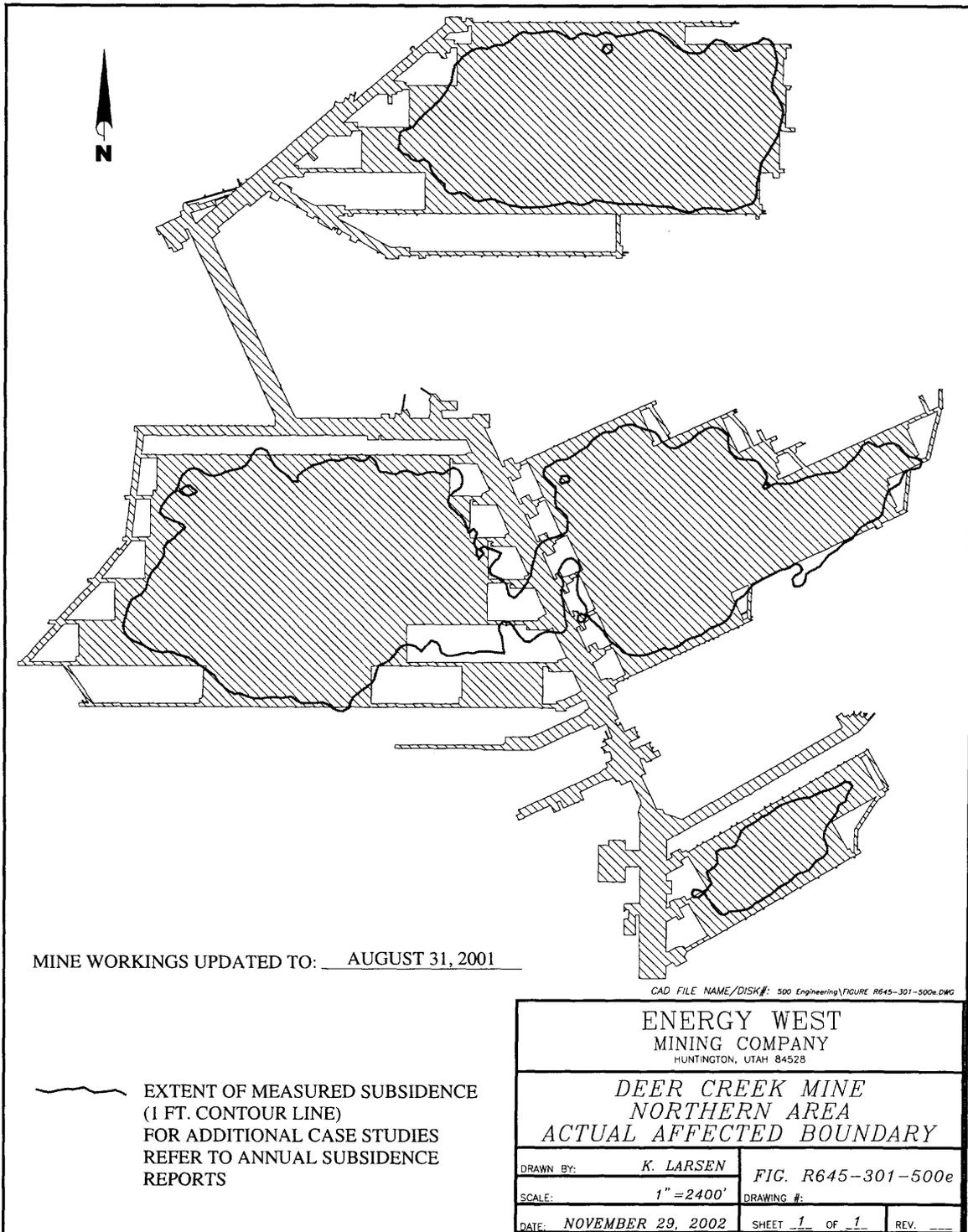


FIGURE R645-301-500d
 MEASURED AND PREDICTED SUBSIDENCE
 FOR THE MILL FORK AREA OF THE DEER CREEK MINE

CAD FILE NAME/DISK#: FIGURE R645-301-500d.DWG

- *Reference
- United States Bureau of Mines Case Study 1985
 - Maleki, Hamid, Subsidence Characteristics in U.S. Coal Mines, 1999

ENERGY WEST MINING COMPANY HUNTINGTON, UTAH 84528		
DEER CREEK MINE MILL FORK AREA MEASURED AND PREDICTED SUBSIDENCE		
DRAWN BY:	K. LARSEN	FIG. R645-301-500d
SCALE:	NONE	DRAWING #:
DATE:	APRIL 16, 2002	SHEET 1 OF 1 REV. _____



Special Monitoring - Castlegate Cliff Escarpment

Under the currently proposed mine plan for the Blind Canyon and Hiawatha seams, the amount of Castlegate Sandstone outcrop area that would be mined is only a fraction of the total Castlegate Sandstone outcrop area. Segments of the Castlegate Sandstone outcrop to be undermined by full extraction mining are discussed below (see also Map MF-1839D).

Approximately 3,300,700 linear feet of outcrop along the north slope of the right fork of Mill Fork canyon will be undermined by ~~second mining~~ of a single seam. Of this, about 1,600,375 feet are concealed by vegetation and soil, 1,500,184 feet are steep or rocky slopes, and about 200,490 feet are cliff exposures. Of this, ~~only~~ approximately about 2,000,250 feet of outcrop will be undermined by second mining. Except for about 1,300,149 feet of ~~rocky slopes~~ cliff exposures, ~~this the remaining~~ portion of the outcrop is ~~rocky slopes~~ completely concealed from view by forest cover.

The Castlegate Sandstone formation exposures in the Mill Fork Area contain fewer cliffs than areas to the south and east. This is due mainly to increased vegetative cover, especially on north-facing slopes. Due to the limited cliff exposures of the Castlegate Sandstone, the limited amount of Castlegate Sandstone exposures to be undermined, and the remoteness of these outcrops, no special monitoring or mine layout protection measures are planned for the escarpment in this area. The exact amount of Castlegate outcrops to be undermined by Blind Canyon and Hiawatha seam panels on the north side of the right fork of Mill Fork Canyon is unknown at this point as the exact layout of the panels has not been determined. The layout of these panels will be finalized after the surface exploration drilling program of summer 2006 is conducted. As there are no roads or structures down the fall line from these outcrops, no safety hazard is created.

Mitigation of Subsidence Damage Effects

Should significant subsidence impacts occur, the applicant will restore, to the extent technologically and economically feasible, those surface lands that were reduced in reasonably foreseeable use as a result of such subsidence to a condition capable of supporting similar presubsidence uses.

In order to restore any land affected by operations to a condition capable of supporting the current and postmining land uses stated herein, the operator will replace water (including State Appropriated Water Supplies: refer to R645-301-700.530 and Hydrologic Table MFHT-2) determined to have been lost or adversely affected as a result of operator's mining operations if such loss or adverse impact occurs prior to final bond release. The water will be replaced from an alternate source in sufficient quantity and quality to maintain the current and postmining land uses as stated herein. For a complete discussion including a list of State Appropriated Water Supplies within and adjacent to the Mill Fork Lease refer to R645-301-731.530 and Hydrologic Table MFHT-2.

During the course of regular monitoring activities required by the permit, or as the operator otherwise acquires knowledge, the operator will advise DOGM and the surface land management agency of the loss or adverse occurrence discussed above, within ten working days of having determined that it has occurred. Within ten working days after DOGM notifies operator in writing that it has determined that the water loss is the result of the operator's mining operation, the operator will meet with DOGM to determine if a plan for replacement is necessary and, if so, establish a schedule for submittal of a plan to replace the affected water. Upon acceptance of the plan by DOGM, the plan shall be implemented. The operator reserves the right to appeal

DOGM's water loss determinations as well as the proposed plan and schedule for water replacement as provided by Utah Code Ann. 40-10-22(3)(a).

Should any structure such as roads, (FDR-244), power line and related facilities, be adversely impacted as a result of subsidence directly related to the operation of the Deer Creek Mine, (including the Mill Fork Lease ML-48258), PacifiCorp will repair or replace the structure. PacifiCorp will inspect FDR-244 annually for damage and will repair any damages at the expense of PacifiCorp. The annual inspection will include review for tension cracks and buckling, followed by restoration of the road surface as necessary. PacifiCorp will notify the Forest Service if any inspection identifies any subsidence related feature which requires restoration.

Section Corners and Monuments

PacifiCorp commits to comply with Special Lease Stipulation #16 which states "The Lessee, at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed or displaced corner monuments (section corners, ¼ corners, etc.), their accessories and appendages (witness trees, bearing trees, etc.), or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah, and to the standards and guidelines found in the Manual of Surveying Instructions, United States Department of the Interior.

Subsidence Control

The operator will conduct the underground mining operations so as to prevent subsidence from causing material damage to the surface and to maintain the value and reasonable foreseeable use of that surface in accordance with the preceding subsidence control plan.

Lease Boundary Subsidence Barrier

The northern boundary of this lease adjoins leases currently being mined by Genwal Coal Company. Genwal's current mining and future mining will be within 100 feet of the northern permit boundary along its entire length. BLM has previously recommended that Pacificorp leave a 50-foot barrier between mine workings and permit boundaries. Pacificorps current mine plan uses a 100-foot barrier along the lease / permit area boundary in the Blind Canyon (upper) seam, which is planned to be mined first, as a precaution against overlapping the underlying Genwal workings in the Hiawatha seam which are known to cross the permit boundary line in at least one area. In the Hiawatha seam, a 400 - foot barrier will be left as a side abutment barrier to isolate Pacificorps longwall panels on the south side of the permit boundary from extracted Genwal longwall panels on the north side of the boundary.

As stated in R645-301-525: Annual Subsidence Survey Procedures, the effects of significant subsidence are assumed to be coincident with the outline of the planned mine workings.

Therefore, significant subsidence will not cross outside of the permit boundary. Map MFS1866D projects the affected area boundary based on two methods; 1) angle-of-draw, and 2) actual subsidence case studies from the East Mountain area. As depicted on map MFS1866D, the angle-of-draw method projects potential affected areas beyond the northern permit boundary. Based on historical case studies of actual subsidence, (refer to Figure R645-301-500E and

Annual Subsidence Reports), the affected boundary will not exceed the permit boundary. If subsidence occurs outside the permit boundary based on annual subsidence surveys, PacifiCorp commits to amending the the permit boundary to include the affected area.

Based on the current knowledge of the coal reserves on the south and east sides of the permit application area, no second mining will occur close enough to these permit boundaries to warrant a boundary protection barrier. As mentioned in the PROBABLE HYDROLOGIC CONSEQUENCES DETERMINATION section, (728: Hydrologic Balance - Surface Water System), the drainages conveying runoff away from the permit areas are streams in Rilda, Mill Fork, and Crandall canyons. Second mining, i.e. longwall extraction, of the Mill Fork area will be limited to the main ridge of East Mountain, underlying the headwaters of these canyons and subsidence will not occur beneath the stream channels of these canyons. Riparian zones that might exist along the canyons that form the headwaters of these streams are in areas of more than 600 feet of cover, where subsidence effects will not cause damage.

Joes Valley Fault Subsidence Barrier

Along the western boundary of the permit application area, the U.S.D.A. Forest service has stipulated a 22° angle of draw barrier to protect the Joes Valley Fault from mine-induced subsidence effects. This barrier also prevents subsidence – related effects from crossing the permit area boundary to the west. The width of this barrier was calculated as follows: Using field reconnaissance, topographic maps, and low-altitude aerial photographs, the trace of the Joes Valley fault was drawn on the base map. At several locations along the trace of the fault, the elevation of the fault trace was interpolated from the surface elevation contours. The elevation difference between the fault trace and the projected elevation of the lowest seam to be mined (the

Hiawatha) was calculated. This elevation was multiplied by the tangent of the proposed angle of draw (22°) to determine the width of the barrier at each calculation point. This width was then drawn eastward perpendicular to the fault trace to determine the eastward extent of the barrier. A cross-sectional view of this barrier is shown on Map MFU1829D, Geologic Cross - Sections.

Public Notice

The operator will not mine in any areas that would allow potential subsidence effects (as indicated by the angle of draw) to affect any area outside of the lease and permit boundary until this constraint on coal recovery is resolved by SITLA, BLM and DOGM or permission is granted by the adjacent surface agencies. At least six months prior to mining, or within that period if approved by the Division, the underground mine operator will mail a notification to the water conservancy district, if any, in which the mine is located and to all owners and occupants of surface property and structures above the underground workings. The notification will include, at a minimum, identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined. PacifiCorp complied this requirement on December 9, 2002. The entire surface area of the Mill Fork Lease is administrated by the Forest Service. PacifiCorp considers the permit application process to be the prior notification.

R645-301-526. MINE FACILITIESIntroduction

Coal production from the Mill Fork Area will be transported by an underground conveyor belt system to the Deer Creek Mine facility. The Deer Creek Mine facility is located on a 20 acre site at the junction of Deer Creek Canyon and Elk Canyon (refer to Volume 5, maps 3-9 and 3-9A). The site is characterized by moderate vegetation and rugged, steep terrain. Surface facilities include the following: sediment pond, embankment fills, coal surge bin, transfer tower, breaker station, crusher station, coal weigh bin, truck load-out, facility conveyors, overland conveyor, parking lot, parking garage, office-bathhouse, warehouse-shop, materials storage area, access and service roads, mine ventilation fan, power supply and substation, water treatment system, high pressure pumphouse, water storage tank, sewer treatment system, and drainage system (refer Volume 5, Maps 3-9 and 3-9A).

There are also support facilities located in Rilda Canyon, a tributary of Huntington Canyon. The facilities pad and access road of this area occupy approximately 2.01 acres of Manti-La Sal National Forest land in the NW1/4, NW1/4, SE1/4 of Section 29, T16S, R7E, SLM (refer Volume 5, Maps 3-9). These facilities include an access road and a pad area which supports two portals, a substation, power line, fan, water storage tank, and pumphouse.

All facility plans are on file at PacifiCorp-Energy West Mining Company, 31 North Main Street, Huntington, Utah 84528. They are available for public inspection.

With the exception of roads and conveyors, a narrative explaining the construction, use, maintenance, and removal of the previously named facilities can be found in Vol. 2, Part 3 of the MRP.

R645-301-527. TRANSPORTATION FACILITIES

As indicated earlier, all disturbance to the Mill Fork permit area will be through underground mining activities. No additional transportation facilities are currently planned. For complete discussion on Transportation Facilities associated with the Deer Creek Mine refer to Volume 2, Part 3.

**R645-301-528. HANDLING AND DISPOSAL OF COAL,
OVERBURDEN, EXCESS SPOIL, AND COAL MINE
WASTE**

The Deer Creek Volume 2, Part 3 includes a narrative explaining the construction, modification, use, maintenance, and removal of coal, overburden, excess spoil, and coal mine waste.

R645-301-529. MANAGEMENT OF MINE OPENINGS

All mining activities ~~disturbance to~~ associated with the Mill Fork permit area will be through underground mining ~~operations~~ activities. Mine plan layouts (~~Blind Canyon Hiawatha Seam~~) depicted in R645-301-500 ~~Engineering Section~~, indicate potential portal breakouts located in

Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease, *“The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts”*.

For complete discussion on the sealing of existing mine openings, refer to Volume 2 ,Part 4.

R645-301-530. OPERATIONAL DESIGN CRITERIA AND PLANS

The Deer Creek MRP includes a general plan for each sediment pond, water impoundment, and coal processing waste bank, dam or embankment within the permit area (see Vol. 2, Part 3). No additional sediment ponds, impoundments, coal processing waste piles, dams or embankments are planned for the Mill Fork Area.

R645-301-532. SEDIMENT CONTROL

No surface facilities, sediment control, or other disturbance is planned for the Mill Fork Area.

For complete discussion on sediment control facilities at the Deer Creek Mine, refer to Volume 2 Part 3.

R645-301-533. IMPOUNDMENTS

No impoundments are planned for the Mill Fork Area.

R645-301-536. COAL MINE WASTE

No additional waste rock disposal sites are planned for development of the Mill Fork Area. The current sites and standards are listed in the Deer Creek MRP.

R645-301-534. ROADS

No new roads are planned for the Mill Fork Area. For a discussion on the access road for the Deer Creek Mine, refer to Vol. 2, Part 3 of the MRP.

R645-301-535. SPOIL

For a discussion on spoil of the Deer Creek Mine, refer to Vol. 2, Part 3 of the MRP.

R645-301-536. COAL MINE WASTE

Underground development waste, coal processing waste, and excess spoil will continue to be disposed of in accordance with plans approved by DOGM and MSHA. There are no plans to return coal processing wastes to the underground workings at the Deer Creek Mine.

R645-301-540. RECLAMATION PLAN

All mining activities disturbance to associated with the Mill Fork permit area will be through underground mining operations activities. Mine plan layouts (Blind Canyon Hiawatha Seam) depicted in R645-301-500 Engineering Section, indicate potential portal breakouts located in Crandall Canyon, (Section 5, Township 16 South Range 7th East SLB&M), within a 2.41 acre right-of-way easement acquired from Andalex Resources/Intermountain Power Agency upstream from the existing Crandall Canyon Mine operated by Genwal Resources. The location of the portal breakouts are considered preliminary at this point and will be evaluated and designed based upon future surface coal exploration programs and mine plan considerations. Prior to any surface disturbance, Energy West will secure all necessary permits. Prior to planned development, PacifiCorp will comply to Special Stipulations #5 in the Mill Fork Coal Lease, *“The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts”*.

A reclamation plan for the Deer Creek Mine is described in Volume 2, Part 4 of the MRP. This plan includes narrative, maps, designs and plans for the mine.

R645-301-541.2 Surface Coal Mining and Reclamation Activities

All underground openings, equipment, structures, or other facilities not required for monitoring, unless approved by the Division as suitable for the postmining land use or environmental monitoring, will be removed and the affected land reclaimed.

In addition to reclamation related to “Surface Coal Mining and Reclamation Activities”, PacifiCorp commits to comply with Utah State Lease For Coal ML-48258 lease stipulation 14. EQUIPMENT: RESTORATION 14.1 Equipment which states “Lessee may abandon underground improvements, equipment of any type, stockpiles and dumps in place if such abandonment is in compliance with applicable law, and further provided that Lessee provides Lessor with financial or other assurances sufficient in Lessor’s reasonable discretion to protect Lessor from future environmental liability with respect to such abandonment or any any associated hazardous waste spills or releases. Lessee shall identify and locate on the mine map the location of all equipment abandoned on the Lease Premises. PacifiCorp has developed a policy and commits to notifying the regulatory agencies prior to equipment abandonment and mine sealing. Notification to the agencies includes; the location and type of equipment, reason for abandonment, and an invitation to conduct a site visit to review the situation.

PacifiCorp

Energy West Mining Company

Deer Creek Mine

**Update Volume 12 Text Section,
PacifiCorp, Deer Creek Mine, C/015/018**

**Volume 12
Geology Section
Replace Text Section**

R645-301-600 GEOLOGY SECTION

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LIST OF REFERENCES

Doelling, H.H., 1972, Wasatch Plateau Coal Fields, *in* Doelling, H.H. (ed.), Central Utah Coal Fields; Sevier-Sanpete, Wasatch Plateau, Book Cliffs and Emery, Utah Geological and Mineralogical Survey Monograph Series No. 3, Salt Lake City, Utah.

R645-301-600 GEOLOGY SECTION

R645-301-610. INTRODUCTION

This part of the application provides a detailed description of the geology of the coal resources, surrounding strata, and surface features within the permit area (Lease ML-48258) and surrounding areas.

Since 1971, detailed data on the geology of the coal deposits within the permit and surrounding area have been collected, compiled, and analyzed by PacifiCorp and several government agencies. Information collected by PacifiCorp is the result of exploratory drilling, field investigations, geologic mapping, field sampling, aerial photography, and mapping of underground mine workings.

PacifiCorp has also used numerous geologic reference works by previous authors and agencies specifically written about the coal deposits of this area for the preparation of this section.

R645-301-611. GENERAL REQUIREMENTS

The geology within and adjacent to the permit area is discussed in Sections R645-301-621 through R645-301-627.

R645-301-611.200. Proposed operations as given under R645-301-630

Proposed mining operations are discussed in section R645-301-630, including mine layout and sequencing.

645-301-612. CERTIFICATION

All maps and drawings within R645-301-600 has been certified by a registered professional engineer.

645-301-620. ENVIRONMENTAL DESCRIPTIONS

The permit area, called the Mill Fork Lease (ML-48258), consists of approximately 5,563 acres of coal lands located in the Wasatch Plateau coal field of central Utah (See Figure 1, Introduction). The permit area is located entirely within Emery County.

The Wasatch Plateau is one of several high plateaus in central Utah located along the western boundary of the Colorado Plateau geological province. The geology of this region is characterized by flat-lying sedimentary rocks, ranging in age from Paleozoic to Recent, with simple geologic structures such as gentle folds and mostly normal faulting. This thick "layer-cake" of sedimentary rocks has been deeply dissected by erosion. The Mill Fork Lease consists

of the surface and subsurface coal resources that underlie the north end of East Mountain, one of several high, flat north-south ridges that make up the Wasatch Plateau. The headwaters of Mill Fork Canyon and Crandall Canyon cut into East Mountain on the eastern side of the lease. The steep escarpment of the Joes Valley fault forms the western boundary of the lease. Elevations range from 7,500 feet in the lowest areas to over 10,000 feet at the tops of the plateaus, resulting in a broad diversity of climatic conditions and flora and fauna over the permit area. Annual rainfall in the region ranges from about 10 inches per year in the lower canyon bottoms to over 30 inches per year in high elevation areas. The dry climate of this area promotes erosion by inhibiting plant growth at lower elevations and on south-facing slopes.

A. REGIONAL GEOLOGY

The Energy West Mining Company mines and permit areas are located in the central portion of the Wasatch Plateau Coal Field in Emery County, Utah. Generally, this area is a series of high, flat-topped mesas flanked by heavily vegetated slopes which extend downward to precipitous cliffs. Below these cliffs steep slopes gradually flatten out into a broad flat valley (Castle Valley) below. Topographic relief of up to 5,000 feet can be measured from the top of the plateau to Castle Valley below. Horizontal coal seams occur within the strata of the Wasatch Plateau, about halfway between the valley floor and the top. The following discussion summarizes the stratigraphy and structural geology of the region and within the Energy West Mining Company permit area.

**Figure GF-1
Stratigraphy of East Mountain
(After Doelling, 1972)**

Period	Epoch/Age	Stratigraphic Unit		Thickness, feet	Description
QUAT.	Holocene (Recent)		Alluvium	0 - 200'	Valley fills, poorly sorted clay to boulders
TERTIARY	Paleocene	Wasatch Group	Flagstaff Limestone	100 - 200	Fossiliferous lacustrine limestone, gray
			North Horn Formation	500 - 1500	Variogated mudstones and clays, occasional sandstones & limestones, forms hummocky terrain.
CRETACEOUS	Maastrichtian	Mesaverde Group	Upper Price River Formation	600 - 800	Coarse-grained sandstones, occasional conglomerates, interbedded mudstones
	Campanian		Castlegate Sandstone (lower Price River Formation)	200 - 400	Coarse grained sandstone, occasional conglomerate lenses, tan color, massive cliff-former
			Blackhawk Formation	600 - 800	Interbedded mudstones, siltstones, and sandstones, bottom 150 feet contains coal seams and rider seams.
			Star Point Sandstone: Spring Canyon tongue Storrs tongue Panther tongue	200 - 400	Sandstone, gray-white, 3 main units inter-tongue with underlying Masuk Shale, tops of units occasionally bleached white, indicating overlying coal seams.
			Santonian	Masuk Shale Member	1,000 - 1,300
	Emery Sandstone	50 - 800		Sandstone, yellow-gray, cliff-former. May be associated with coal seams. Subsurface only in Mill Fork Lease.	
	Coniacian	Blue Gate Shale Member		1,500 - 2,400	Shale, blue-gray, nodular, irregularly bedded, forms badlands. Subsurface only in Mill Fork Lease.
		Turonian	Ferron Sandstone Member	50 - 950	Sandstone, yellow-gray, intertongues with Mancos shale, associated with important coal beds of Emery coal field, source of coal bed methane.

The regional geology of the Colorado Plateau in which the Wasatch Plateau coal field is situated is fairly simple. Sedimentary rocks have been accumulating in this region since Permian time (see Figure GF-1). A broad, high, flat region that encompasses southeastern Utah, southwestern Colorado, northwestern New Mexico, and northern Arizona, the Colorado Plateau has been an area of relative stability while mountain-building episodes have occurred in surrounding regions. The thick accumulations of sedimentary rocks in this region are being deeply dissected by erosion, leaving the most recent coal reserves in the higher plateaus, where they are now being mined. The Energy West permit area covers portions of East Mountain and Trail Mountain, which are separated by Cottonwood Canyon, a deep, partially glaciated valley.

During late Cretaceous (Campanian) time, from 75 – 85 million years ago, the Wasatch Plateau region lay at the edge of the Western Interior Cretaceous Seaway, with the sea to the southeast and a range of mountains (the Sevier Orogeny) to the northwest. Streams from these mountains brought eroded sediments southeast to the sea. Stagnant areas between these stream and river channels contained swamps in which peat accumulated. These stream channel and coal swamp deposits are now called the Blackhawk formation, a member of the Mesaverde Group of Cretaceous formations. During Campanian time, the sea advanced and receded several times, leading to the formation of several stacked coal seams within the Blackhawk sediments. The coal seams present in the Energy West permit area are named from lowest (oldest) to highest (youngest) the Hiawatha, Cottonwood, and Blind Canyon Seams. The Hiawatha and Blind Canyon seams are separated by 30 – 100 feet of interburden.

B. REGIONAL GEOLOGY SEDIMENTARY FORMATIONS

Numerous sedimentary rock formations are exposed in the Wasatch Plateau both above and below the coal bearing Blackhawk formation. Mining and construction activities affect a number of these, and the composition, arrangement, and physical characteristics of these formations greatly affect the mining and hydrologic characteristics of the area.

The geologic formations exposed in the Energy West permit area range from Upper Cretaceous (100 million years old) to Tertiary and Recent in age (see Figures MFU-1823D and GF-1). These formations, in ascending order from oldest to youngest, are the Masuk Shale member of the Mancos Shale, the Star Point Sandstone, the Blackhawk Formation, the Castlegate Sandstone, the Upper Price River Formation (all Cretaceous), and the North Horn Formation, and the Flagstaff Limestone (Tertiary). The coal deposits are restricted to the lower portion of the Blackhawk Formation, about 2,500 feet below the top of the Plateau. Recent geologic deposits include numerous stream terrace gravels along streams and rivers, glacial till deposits in the upper reaches of Cottonwood Canyon, and alluvial and colluvial fills in all of the significant drainages.

The Masuk Shale is the upper-most marine member of the Mancos Shale and consists of light to medium gray marine mudstones. This formation weathers readily, forming gray slopes that are often covered by debris and little or no vegetative cover. The Masuk shale is several hundred feet in thickness, and is the lowest and oldest of the geologic units exposed in the permit area. This formation is generally devoid of groundwater.

Overlying and intertonguing with the Masuk Shale is the Star Point Sandstone, a beach-front sandstone. In the East Mountain area the Star Point Sandstone usually consists of three prominent massive cliff-forming beach-front sandstones totaling about 400 feet in

thickness. These sandstone “tongues” are named from bottom to top: the Panther, the Storrs, and the Spring Canyon. In between the three tongues are beds of the Masuk Shale. The intertonguing of the Star Point and Masuk shale represents three transgression / regression episodes along the shoreline of the Cretaceous Interior seaway. The upper contact of the Star Point Sandstone is usually abrupt and readily identifiable on outcrops. Even though the Star Point Sandstone underlies almost the entire permit area, the low permeability and lack of recharge limit its usefulness as a water producing aquifer. The Star Point Sandstone occasionally exhibits aquifer characteristics in localized areas. These are isolated occurrences where regional faults have created secondary permeability and have been intersected by major canyons with perennial streams. An example of this type of occurrence is Little Bear spring located in Huntington Canyon.

The Blackhawk Formation consists of alternating mudstones, siltstones, sandstones, and coal. Although coal beds are generally found throughout the Blackhawk Formation, the thickest economically mineable seams are restricted to the lower 150 feet of the formation. The sandstones contained within the Blackhawk Formation are mostly fluvial stream channel deposits and increase in number in the upper portions of the formation. Fluvial sandstone channels that are in contact with the top of the coal seams occasionally cut into the coal (due to the erosion of peat by stream erosion during deposition) and create thinned coal zones called “scours.” Many of the tabular sandstones and sandstone channels contain perched water, mostly in fractures, joints, and bedding planes. The permeability of these sandstones is relatively low. Mudstones surrounding these channels usually function as aquicludes. The total thickness of the Blackhawk Formation in the East Mountain area is about 750 feet. The Blackhawk Formation usually forms a broad, consistent slope between the Star Point Sandstone cliffs below and the Castlegate Sandstone cliffs above.

The Castlegate Sandstone is the lower member of the Price River Formation. The Castlegate Sandstone sits on top of the Blackhawk Formation and forms a prominent 300-foot cliff in highly eroded areas of the southern outcrops of the permit area (the southern end of the Cottonwood and Trail Mountain mines), steep blocky slopes in moderately eroded areas (Rilda Canyon), and occasional blocky outcrops in forested or heavily vegetated areas (Mill Fork Canyon). The Castlegate Sandstone consists of about 200 to 400 feet of coarse-grained, arkosic, light tan fluvial sandstones; pebble conglomerates; and minor layers of mudstone.

The Upper Price River Formation, which overlies the Castlegate Sandstone, is about 600 to 800 feet thick and forms slopes which extend upward from the Castlegate Sandstone escarpment. The Upper Price River Formation is comprised predominantly of fine to coarse-grained sandstone but commonly contains mudstone beds between the point bar deposits. Although some mudstones are present, fine-grained, poorly sorted (occasionally conglomeratic) sandstones dominate the Upper Price River Formation.

The North Horn Formation is about 500 to 1000 feet thick in the East Mountain area. The North Horn Formation spans the Cretaceous-Tertiary boundary (65 million years ago). Mudstones and claystones dominate the rock types present and are generally gray to light brown in color, although black, pink, purple and greenish colors have been seen. The lower two thirds (upper Cretaceous in age) of the formation is generally highly bentonitic mudstone. Localized, lenticular sandstone channels are present throughout the formation. The sandstone beds are more common near the upper and lower contacts of the formation. The North Horn formation, because of the soft rock types present, is prone to slumping. Widespread areas of slumping and hummocky terrain are present in North Horn outcrops.

The Flagstaff Limestone is the youngest (Paleocene) and highest formation exposed in the permit area and consists of dense, white to light gray lacustrine limestone with abundant fossil shells. Resistant to erosion, remnants of 100 to 150 feet of this formation remain, forming caps on the highest plateaus.

Between the time of sediment accumulation and erosion, the sedimentary rocks of the Wasatch plateau were intruded by widely scattered igneous dikes. The approximate age of these dikes ranges from 8 to 24 million years. Though more common in the northern parts of the Wasatch Plateau, several dikes are known to exist within the Genwal Mine, just to the north of the northern permit boundary. These dikes are only a few feet or inches wide, and are traceable for only a few hundred feet. The extent and continuity of these dikes at depth is unknown, and the effects on mining, if any, are unknown at this time.

Stream terrace gravels have been deposited along the major rivers and valley floors at various historic erosional levels, and lay unconformably on top of the Masuk shale. These terrace gravels are extensively used locally for construction gravels. Some are partially cemented together by caliche – type calcareous cement. None of these terrace gravels occur at or above the coal mining levels. None of these gravels contain groundwater.

Glacial-till deposits are present in the upper half of Cottonwood Canyon. The classic ‘U’- shaped valley and presence of a terminal moraine show that this valley contained a small glacier during the last Pleistocene ice age (10,000 to 12,000 years ago). The depth of this till ranges from 80 to 150 feet thick at the valley floor. The groundwater characteristics of this till and the groundwater hydrology of Cottonwood Canyon are being closely monitored by Energy West Mining Company.

Most of the main drainages and side canyons in the permit area contain alluvial fill as a valley floor material. The depth of this fill material can be up to 100 feet in some of the major stream valleys. Seasonal streams, ground water, and various springs are present in these alluvial fills. The groundwater and surface water hydrology of these alluvial materials are closely studied and monitored by Energy West Mining Company.

C. STRUCTURAL FEATURES:

Several important structural features, the Straight Canyon Syncline, Flat Canyon Anticline and Huntington Anticline, the Roans Canyon Fault Graben, Mill Fork Fault Graben, Left Fork Fault Graben, Pleasant Valley Fault, and the Deer Creek Fault, have been identified adjacent to and within the Mill Fork permit area (see Map MFU-1823D, Geologic Formations Map).

Folding:

Strata in the Mill Fork area are gently folded in two broad structural features. The Flat Canyon Anticline crosses the southeastern portion of the permit area. This anticline trends southwest to northeast, and plunges to the southwest. Dips in the anticline range from two to six degrees with the south limb dipping the steepest.

To the north, the north limb of the Flat Canyon Anticline becomes the south limb of the Crandall Canyon Syncline, a flat-bottomed syncline. This syncline also trends southwest to northeast. Dips on the northwest side are much steeper than on the southeast side.

Faulting:

The only known fault within the Mill Fork permit area is the Joes Valley Fault, which forms the western limit of the coal reserves in this permit area. The Joes Valley Fault is the largest and most prominent of several north south trending fault zones within the

Wasatch Plateau coal field. Displacement of the fault is approximately 1,500 feet, downthrown on the western side. The fault creates a continuous north-south escarpment on the east side of Joes Valley. Several side canyons are cut into this escarpment on the western side of the permit area, all of which drain into Joes Valley. The fault zone itself is not visible along this escarpment, but the fault has been intercepted underground in the Genwal mine to the north. Where the fault has been intercepted in the Genwal mine workings, a drag fold is present, indicated by a gentle downward folding of the strata along the fault zone, extending for a few hundred feet to the east of the fault.

The nearest known faulting outside of the permit area is the Mill Fork fault graben. The Mill Fork fault graben passes to the southeast of the permit area (see Map MFU-1823D, Geologic Formations Map). This fault graben was crossed in ARCO's Huntington Canyon #4 Mine in Mill Fork Canyon and has a displacement of about twenty five (25) feet on the each side. The trend of this fault zone is approximately N 40° E. Based on projections from maps of #4 Mine, this graben should pass by the southeast corner of the permit area, between the Mill Fork lease and the existing Deer Creek Mine. Where it crosses the northern end of East Mountain, the fault has been mapped to have a displacement of thirty (30) feet down on the northwest side. Deer Creek mine workings have not intercepted this fault zone and exploration drilling in the right fork of Rilda canyon does not show any displacement, indicating that the displacement of the fault zone is too small to measure with exploration drilling, or that it has disappeared in this area. This fault zone does not appear in any surface outcrops.

R645-301-622 CROSS-SECTIONS, MAPS, AND PLANS

Map MFU-1823D, the Geologic Formations Map shows the locations and elevations on the surface of all exploration drillholes and test wells within the permit area. Thirty-five (35) coal

exploration holes and one gas well have been drilled within the permit area to date (August 2005). In 1975 Utah Geologic and Mineral Survey (UGMS) drilled DH-2. Five (5) holes were drilled by the USGS in the early 1980s: CLB-1, CLB-2, CLB-3A, SLB-1, and SLB-3. Two (2) holes were drilled by ARCO Coal Company in 1981: HC-2 and HC-3. PacifiCorp has drilled twenty-seven (27) holes to date within the lease (EM-169 through EM-195, ~~EM-182, EM-184 and EM-185~~). The single gas well on the property, Federal 32-23, was drilled in 1987, by Meridian Oil and Gas Co.

R645-301-621.200. Nature, Depth, and Thickness of the Coal Seams to Be Mined

Mining operations at PacifiCorp's mines have historically mined the two major seams present in the area, the Blind Canyon (upper) and the Hiawatha (lower) seams. ~~A minor, unsuccessful attempt to mine the Cottonwood seam (middle) was made in the Wilberg mine, but the seam was too thin. Cottonwood seam mine workings are insignificant in the overall operation.~~ The coal-bearing portion of the Blackhawk formation is the lower half of the formation, with the Hiawatha seam at or just above the interface between the Blackhawk formation and the Star Point Sandstone below.

Both the Hiawatha and Blind Canyon coals are ranked as High-Volatile Bituminous 'B' low sulfur coals.

The coal reserves in the Mill Fork Lease and remaining reserves at Deer Creek are in both the Hiawatha and Blind Canyon seams. The Hiawatha and Blind Canyon seams are close together, usually within 80 vertical feet. The depths of both seams, therefore, are similar in those areas where both seams are present. Overburden depths (Maps MFS 1824D & MFS 1825D) range from 0 feet, where both seams outcrop at the surface, up to about 2,600 feet under the Flagstaff

Limestone “caps” on East and Trail mountains. The overburden strata consist of those formations already listed in section R645-301-621:

- ◆ Flagstaff Limestone
- ◆ North Horn Formation
- ◆ Upper Price River Formation
- ◆ Castlegate Sandstone
- ◆ Blackhawk Formation

Localized rider coal seams are fairly common above both seams, occurring from 1 foot to 20 feet or more above the Hiawatha and Blind Canyon seams. None of these rider seams have been named or mined.

In this region of the Wasatch Plateau, the Hiawatha seam is the lowest coal seam present. In much of the mining area currently permitted by PacifiCorp, the Hiawatha seam rests directly on the Star Point Sandstone, a massive, medium-grained, brownish-gray sandstone, which makes a very good mine floor. In some areas, there are between 0 and 15 feet of interbedded softer mudstones and siltstones between the Hiawatha and the Star Point Sandstone.

Thickness of the coal seams is variable, ranging from as little as 0 feet up to 19 feet in the Blind Canyon and from 0 feet up to 19 feet in the Hiawatha. Coal thickness is dependent on two main factors – the amount of peat originally deposited in the Cretaceous swamps, which varies from region to region, and the amount of scouring or erosion of the peat that took place after the peat was deposited but before lithification of the sedimentary sequence. More coal was deposited in the center of the swamp areas than around the edges, where distributary stream channels either prevented deposition, or scoured away the peat already deposited.

At some point in time during peat swamp development, the environment of deposition changed and each successive peat swamp was overrun by sediments, mainly mudstones and sandstones. Stream beds that passed directly over the previously deposited peats eroded sinuous channels of various depths into the peat and left behind sand-filled "scours," which cut varying amounts of top coal from the original thickness. The sudden losses of coal height that occur under these localized scours have impacts on coal mining operations that range from mild to disastrous.

Regional variations in coal thickness in the Blind Canyon and Hiawatha seams have been documented to varying degrees by mining activities and exploration drilling funded by government agencies and industry. Regional thickness trends of these seams are fairly well known, but the localized thickness variations caused by channeling are not as well known due to the localized nature of channeling. The Mill Fork region does not contain many exploratory drillholes because of its remoteness, and only general statements can be made based on this drilling as to the thickness trends in either seam.

R645-301-621.300. All Coal Crop Lines of the Coal to Be Mined

Coal outcrop and projected outcrop lines are shown on Map MFU 1823D. Coal outcrop lines are inferred where the outcrops are concealed by alluvium or colluvium. There are no significant coal outcrops within the Mill Fork lease, due to the depth of burial in this area, however, significant outcrops of both seams occur just to the east of the lease boundary in Crandall and Mill Fork canyons.

Strike and dip of the coal seams are shown on Map MFU 1827D and MFU 1828D. The strike of the coal seams varies as the coal beds and surrounding strata are folded by the different structures (Flat Canyon Anticline and Crandall Canyon Syncline) mentioned in the section on structures

above. The dip of the coal beds in this area is usually gentle, with dips rarely exceeding 4 or 5 degrees.

R645-301-621.400. Location and Depth of Gas and Oil Wells

Locations of all known oil and gas wells in and around the permit area are shown on Map MFU 1823D. One gas well, Merit Energy Co. East Mountain Unit 32-23, a producing well, is located within the permit boundary in Section 23, T. 16 S., R. 6 E. Total depth of this hole is 7,476', and the hole is completed in the Ferron Sandstone.

R645-301-623 ENVIRONMENTAL GEOLOGIC INFORMATION

R645-301-623.100. Acid- and Toxic-Forming Strata

Extensive sampling and testing of overburden strata, coal, and surrounding rocks has shown that there are almost no materials present that are potentially acid- or toxic- forming media. Almost all samples show slight alkalinity. Yearly sampling of in-mine roof, coal, and floor materials continue to confirm these results. Detailed analyses are presented in Appendix C.

R645-301-623.200 Reclamation Potential

Access to the Mill Fork permit area will be via a set of underground main entries from the existing Deer Creek mine workings. Other than possible future breakout locations for ventilation, there will be no surface facilities or disturbance within the permit boundary. If future breakouts become necessary, they will be permitted in a separate application. Reclamation, if necessary, will be performed in accordance with R645-301 and R645-302.

R645-301-623.300. Subsidence Control Plan

For the purposes of this section and the proposed operations in the Mill Fork area, a subsidence control plan has been developed. Refer to R645-301-500. Engineering for plan details.

Surface subsidence of all of the Energy West permit areas has been carefully surveyed, monitored and documented for almost 20 years. Subsidence is monitored by yearly comparison of new vs. old aerial photography using sophisticated photogrammetric measuring techniques, and is tied to known surveyed control points on the ground. Overflights by helicopter of all mined areas are conducted at least annually to inspect the ground surface. A Subsidence Monitoring Report is published annually, and submitted to various regulatory agencies.

If obvious subsidence - induced cracks appear at the surface, they are reported immediately to the surface-controlling agency and mitigation procedures are implemented if deemed necessary.

R645-301-624 GEOLOGIC INFORMATION

Numerous sedimentary rock formations are exposed in the Mill Fork Lease area on East Mountain both above and below the coal bearing Blackhawk formation. The composition, arrangement, and physical characteristics of these formations greatly affect the mining and hydrologic characteristics of the area.

The geologic formations exposed in the Mill Fork Lease permit area range from Upper Cretaceous (100 million years old) to Tertiary and Recent in age (see Figure GF1). These formations, in ascending order from oldest to youngest, are the Masuk Shale member of the Mancos Shale, the Star Point Sandstone, the Blackhawk Formation, the Castlegate Sandstone, the Upper Price River Formation, and the lower part of the North Horn Formation (all Cretaceous),

the upper part of the North Horn Formation, and Flagstaff Limestone (Tertiary). Recent geologic deposits include numerous stream terrace gravels along streams and rivers, glacial till deposits in the upper reaches of Cottonwood Canyon, and alluvial and colluvial fills in all of the significant drainages and in Joes Valley.

Vertical relief across the exposures of these formations is about 3,000 feet within the permit area. Overburden thickness above the lowest coal seam to be mined (the Hiawatha seam) ranges from about 200 feet up to about 2,600 feet.

This sedimentary sequence has been structurally modified over time only slightly. Two gentle fold structures, the Flat Canyon anticline and the Crandall canyon syncline, cross the permit area. Dips of the beds are generally very gentle, less than 5 degrees.

Faulting is present within the permit area. On the western side of the permit area, the Joes Valley fault forms the boundary of a major structural graben, called Joes Valley, which cuts off mineable coal reserves to the west. The displacement of this fault is at least 1,500 feet, down thrown on the western side. No other faulting is known to exist within the permit area.

Jointing of the sedimentary formations of the area is a significant and important feature. Jointing of the rocks surrounding the coal seams affects mine orientation and planning, as well as the hydrologic characteristics of the rocks. Joints in the area trend predominantly north – south to N 10° E (parallel to the Joes Valley Fault), with a few secondary sets at other orientations.

Surface and groundwater hydrology has been extensively studied within the permit area and adjacent areas. Surface water originates from melting snow, with a significant runoff season every year. Yearly precipitation has varied widely over the past 20 years, resulting in fluctuations of surface water flows and surface spring discharges.

Alluvial fills in the bottoms of Mill Fork and Crandall canyons have been shown to transport significant quantities of sub-surface water downstream. The streams in the right and left forks of Mill Fork canyon are intermittent, rising out of the alluvium, flowing, and sinking back into the alluvium multiple times as the water moves down-gradient toward Huntington Canyon.

Surface water flowing down the unnamed drainages into Joes valley behaves similarly to the waters moving down Mill Fork Canyon. The small streams in these canyons sink into and re-emerge from the alluvium in the canyon bottoms numerous times. As the streams cross the fault and emerge into Joes Valley, the water disappears into the alluvial fan material that has accumulated at the mouth of each canyon. Farther out in the valley, water emerges from underneath the alluvial fan material, forming a swampy area that parallels the fault trend.

Subsurface water, including water that is intercepted in mine workings, is usually encountered in ancient, perched aquifers. These perched aquifers are usually tabular or stream channel sandstones, which have moderate porosity, but low permeability. Water also is encountered perched in the open joint systems within these rocks. Subsurface water has also been encountered in some isolated incidents in fault zones and structural synclines, notably the Roans Canyon fault zone and Straight Canyon syncline, about 5 miles south of the permit area.

Extensive research has shown that the surface and underground hydrologic systems are not hydraulically connected. No impact to surface hydrologic systems is anticipated within the permit area. Some perched water will be encountered underground during mining activities within the permit area. The location and quantity of water encountered underground will depend on the types of rocks, joint patterns and geologic structures that are present.

R645-301-624.200. Overburden Removal

Since all mining and access related to the Mill Fork permit area will be underground, no portion of the permit area will be exposed to or adversely impacted by mining. Analyses of overburden materials are presented in Appendix C and in Table G-1 of the Deer Creek / Cottonwood / Des-Bee-Dove Geologic Section, Volume 8.

R645-301-624.230. Chemical Analyses of the Coal Seam for Acid- and Toxic- Forming Materials

Chemical analyses for the Blind Canyon and Hiawatha coal seams within the permit area are available from drill cores from Energy West drill holes EM-169 through EM-179, EM-182, EM-184 and EM-185, and ARCO drill holes HC-2 and HC-3. Coal core samples taken from Mill Fork Lease drill holes are tabulated in R645-300- Appendix A.

Sulfur forms data for the Blind Canyon and Hiawatha coal seams within the permit area are available from drill cores from ARCO drill holes HC-2 and HC-3. These results are tabulated below:

SULFUR FORMS		
	Blind Canyon Seam	Hiawatha Seam
Pyritic	0.03	0.09
Sulfate	0.00	0.00
Organic	0.47	0.43
Total	0.50	0.52

R645-301-624.310. Drill Hole Logs

R645-300 Appendix B contains a tabulation of all drill hole logs within the permit area.

Drillhole DH-2 (UGMS, 1975) is reproduced as a typical drill log in this appendix. All drill hole logs are available for review at Energy West Mining's main office in Huntington, including the proprietary holes completed by PacifiCorp.

R645-301-624.320. Chemical Analyses for Acid- or Toxic- Forming Materials

R645-300 Appendix C contains a table of analyses for acid- and toxic- forming or alkalinity-producing materials above and below the coal seams to be mined.

R645-301-624.330. Pyritic and Total Sulfur Chemical Analyses

A table of sulfur forms analyses for the Blind Canyon and Hiawatha seams is presented in the R645-301-624-230.

R645-301-627 DESCRIPTION OF OVERBURDEN

Overburden above the lowest seam to be mined (the Hiawatha Seam) is shown on Map MFU 1829D, Geologic Cross-Sections and Figure GF-1. The overburden above the coal seams to be mined includes the Blackhawk formation, the Castlegate Sandstone, the Upper Price River formation, the North Horn formation and the Flagstaff Limestone.

The Blackhawk formation consists of interbedded fluvial mudstones, siltstones, sandstones and coals. The vertical makeup of this formation is highly variable. Generally, the Blackhawk is sandier toward the top, and shalier toward the bottom. The mineable coal seams are usually

within the bottom 300 feet of the formation, along with numerous rider seams and carbonaceous mudstones. This formation usually forms a long, steep slope (about 40 degrees) with frequent outcrops of large channel sandstones. The Blackhawk formation ranges from 600 to 800 feet thick in the permit area.

The Castlegate Sandstone, which comprises the lower half of the Price River formation, is a prominent cliff-forming sandstone, which forms cliffs or steep blocky outcrops which are visible nearly everywhere in the permit area. The Castlegate is a massive, coarse grained, occasionally conglomeratic or arkosic sandstone. The prominent North – South joint set is usually clearly visible in outcrops of the Castlegate. The Castlegate Sandstone averages about 300 feet thick in the permit area.

The Upper Price River formation consists of interbedded coarse-grained sandstones that resemble those of the Castlegate Sandstone, but are softer, and interbedded with occasional mudstones. The Upper Price River formation forms a steep slope above the Castlegate Sandstone cliffs. The thickness of the Upper Price River formation is difficult to determine, due to its gradational contact with the overlying North Horn formation, but is probably about 600 feet thick in the permit area.

The contact between the Upper Price River formation and the North Horn formation is difficult to discern on East Mountain, but is generally picked as the change in slope from the steeper outcrops of the Upper Price River formation below to the gentler and more rolling slopes of the North Horn formation above.

The North Horn formation is a softer formation which forms the rolling, slumping, hummocky terrain near the top of East Mountain. The North Horn consists mostly of interbedded shales and clays, with occasional sandstone and fresh water limestone beds. The North Horn formation has

a characteristic orange to reddish purple color. Outcrops of the North Horn formation are rare, and usually seen on very steep eroded slopes or in landslide areas. The North Horn formation is about 800 – 1,000 feet thick in the permit area.

The Flagstaff Limestone forms isolated “caps” on the highest peaks of East Mountain. The Flagstaff Limestone is a fresh water lacustrine limestone which is about 100 to 200 feet thick. This limestone is hard and resistant.

In terms of potential subsidence, this combination of hard and soft formations has a beneficial effect. The Castlegate Sandstone is generally considered a barrier to subsidence. It is so thick and massive that in some places such as Trail Mountain, the Castlegate essentially prevents subsidence cracking from reaching the surface. No surface cracks have been detected on Trail Mountain. The softer formations above the Castlegate have a tendency to move and settle without major cracking due to their softer nature.

Most of the surface cracking in the Deer Creek mine area has occurred in shallow cover areas of Blackhawk Formation exposures, or along the edges of groups of longwall panels.

Because the Castlegate Sandstone is a prominent cliff-former, subsidence damage to the formations overlying the mines is concentrated in the Castlegate. This damage takes place when undermining causes vertical and overhanging cliff faces and balanced rocks to fail. Cliff failures of this type have been isolated to Newberry Canyon and Corncob Wash above the Cottonwood mine, and a section of cliff above the Trail Mountain Mine, and represent a fraction of the total amount of Castlegate Sandstone cliffs undermined. Minor rock falls above the Deer Creek Mine on the south side of Rilda Canyon have also been documented. Energy West is currently involved in an extensive study of the effects of subsidence on the Castlegate sandstone cliffs on

the north side of Rilda Canyon. The results of this study will determine the effectiveness of the empirical model developed and used to predict the likelihood of cliff failure.

The Castlegate Sandstone outcrop within the permit area exhibits prominent cliffs and points, especially in the head of Mill Fork Canyon. Some of these will probably be susceptible to subsidence damage. Most of the prominent Castlegate Sandstone cliffs, however, occur above areas where the coal seams are too thin to be considered mineable. Undermining of the Castlegate on the Joes Valley side of the permit area is prevented by the angle-of-draw buffer zone to keep mining away from the Joes Valley Fault.

R645-301-630 OPERATION PLAN

The permit area contains areas of mineable coal in both the Blind Canyon and Hiawatha seams. At present, the operation plan is to drive mains in the Hiawatha seam from the northwest corner of the Deer Creek mine northwest into the Mill Fork permit area then drive mains from south to north, bisecting the lease. Longwall panels in the southern Hiawatha reserves area will be developed as the mains are driven northward.

The Blind Canyon seam is mineable in the north half of the lease. When the Hiawatha seam mains pass under the mineable Blind Canyon reserves, slopes will be driven upward into the Blind Canyon seam. Blind Canyon seam development will take place with mains bisecting the reserve from south to north, and east-west longwall panels on either side of the mains. When the Blind Canyon reserves are extracted, development of the Hiawatha reserves that underly the Blind Canyon mineable area will then be developed and extracted.

R645-301-631 CASING AND SEALING OF BOREHOLES

Each coal exploration permit application will include a description of the methods used to backfill, plug, case, cap, seal or otherwise manage exploration holes or boreholes to prevent acid or toxic drainage from entering water resources, minimize disturbance to the livestock, fish and wildlife, and machinery in the permit and adjacent area. Each exploration hole or borehole that is uncovered or exposed by coal mining and reclamation operations within the permit area will be permanently closed, unless approved for water monitoring or otherwise managed in a manner approved by the Division. Use of an exploration borehole as a water monitoring or water well must meet the provisions of R645-301-731. The requirements of R645-301-731.400 do not apply to boreholes drilled for the purposes of blasting.

Exploration boreholes are plugged after use by filling the hole from total depth to the surface with type II portland cement/abandonite. If circulation cannot be maintained within the borehole, enough cement/abandonite to fill the borehole completely is pumped to the bottom of the hole, then the remainder of the hole is filled with bentonite chips or pellets to within the top 5' of the hole, and a cement surface plug containing a permanent hole identification marker is placed in the top of the hole. This hole plugging method is approved by the B.L.M. and D.O.G.M., and is used on all present and future exploration boreholes.

If an exploration borehole is to be converted to a water monitoring well, the water well regulations of the State of Utah are used to construct the well completion.

R645-301-632 SUBSIDENCE MONITORING

All mining within the permit area will be underneath the uninhabited East Mountain area. No dwellings or building structures will be undermined. A single gas well, own and operated by

Merit Energy, is located within the permit area (identified as Federal #23-32), near the center of Section 23, T.16 S., R.6E. The well is near the southern extent of the mine plan. A gas transmission pipeline extends from this well south along forest road #244 for about 2,000 feet, then exits the permit area to the south. The northern end of this pipeline falls within the same subsidence barrier as the well itself. No mining is planned under the pipeline. Another gas pipeline segment is buried along forest road #017 in the southwest corner of the permit area. This pipeline will not be undermined. PacifiCorp and Merit Energy entered into an agreement to establish a working relationship regarding multiple mineral development to insure the maximum utilization of the coal and oil and gas estates in certain lands in Emery County, Utah all in the interest of the conservation and full utilization of natural resources. ~~A barrier based on a 15^o angle of draw will be left around the well. Accordingly, the 2nd Left - 3rd Left longwall panel will be cut short at the edge of this subsidence barrier.~~

As stated in the agreement, "Merit is the owner and operator of a producing gas well in the Area of Interest identified as Well No. 32-23. The well was drilled in 1989. PacifiCorp is conducting active coal mining operations in the Area of Interest in the immediate vicinity of Well No. 32-23 by and through Interwest Mining Company, a wholly owned subsidiary, as its managing agent, and Energy West Mining Company, another wholly owned subsidiary, as mine operator. These mining operations are in the Deer Creek Mine in the 12th West longwall panel, off of the 7th North Mains. It is anticipated that the full extraction of PacifiCorp's 12th West longwall panel could potentially cause a subsidence impact on Well No. 32-23. The parties wish to enter into a proactive agreement to establish the working relationship among the parties as this multiple mineral development activity takes place so as to insure the safe and effective compatible usage of both the coal and the oil and gas estates and to achieve maximum economic recovery of these natural resources". The multiple mineral development agreement was signed by all parties (PacifiCorp, Merit Energy, Division of Oil, Gas & Mining and SITLA) and became effective on August 12, 2005. This agreement achieves the purpose and intents of Utah Administrative Code

R649-3-27.2 such that a cooperative agreement exists between Merit and PacifiCorp which allows multiple mineral development.

Energy West will report of the subsidence monitoring related to Well No. 32-23 in the Annual Subsidence Reports.

Two power transmission lines are present within the permit area. The largest is the Utah Power 345 KV line that crosses the southwest corner of the permit area in Section 22, T.16S., R.6 E.. About 700 feet of this line, including two towers, cross over the western end of the 2nd Left - 3rd Left Hiawatha longwall panel. This transmission line is owned and operated by Utah Power, a subsidiary of PacifiCorp. A second transmission line (25 KV) carries electricity from the lower portion of Mill Fork Canyon over the top of Mill Fork Ridge, and down into Crandall Canyon, to the Genwal Mine. This line crosses the small portion of the permit area that projects eastward (NW ¼ NW ¼ Section 8, T.16S. R.7 E.). This transmission line will not be undermined.

Genwal Coal Company maintains a radio repeater at the Mill Fork summit in Section 7, T.16S. R.7 E.. This repeater will not be undermined.

The only roads that will be undermined are the unimproved dirt trails that provide access to the top of the ridge. Subsidence damage to these roads is expected to be minimal, based on previous experience at the existing mines mentioned above.

The method used to detect and document subsidence on East Mountain divides the land surface into separate study areas based on the second-mining areas in the mine plan. These areas are then studied using photogrammetric comparisons of each successive year of mining progress. The photogrammetry is tied to known survey baseline points that are flagged each year.

R645-301-641 SEALING OF BOREHOLES

All exploration boreholes are sealed upon completion using the following method. The borehole is sealed with cement/abandonite from bottom to top through the drill pipe or other pipe lowered into the hole. As much cement/abandonite is used to fill the hole, or if the hole does not fill, enough cement/abandonite to fill the hole plus 10% is pumped through the pipe into the hole. If the hole does not fill to the surface, the remainder of the hole is filled with bentonite chips to within 5' of the surface. A cement surface plug is placed in the hole, and a brass marker with the hole number and year is placed on top of the cement, two feet below surface grade.

PacifiCorp

Energy West Mining Company

Deer Creek Mine

**Update Volume 12 Text Section,
PacifiCorp, Deer Creek Mine, C/015/018**

**Volume 12
Geology Section
Replace Appendix B**

**Appendix B
Mill Fork Drill Hole Tabulation**

Drill Hole Number	Date Completed	Drilled By	Type of Log	Hydrologic Characteristics	Total Depth (feet)	Proprietary
HC - 2	8/81	ARCO	E-Log	None Documented	2094	Yes
HC - 3	6/81	ARCO	E-Log	None Documented	1855	Yes
SLB - 1(USGS - 1)	10/80	USGS	E-Log	None Documented	1850	No
SLB - 3 (USGS - 9)	9/81	USGS	E - Log	None Documented	2959	No
CLB-2 (USGS - 2)	9/81	USGS	E-Log	None Documented	2720	No
CLB - 3A (USGS - 3)	8/81	USGS	E - Log	None Documented	2140	No
Gas Well	10/89	Meridian	E - Log	None Documented	7476	No
UGMS - 2	9/75	UGMS	Core Log	None Documented	889.4	No
EM - 169	7/00	Pacificorp	E-Log/Core	No Measurable Flow Observed	708	Yes
EM - 170	8/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	478	Yes
EM - 171	8/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	389	Yes
EM - 172	7/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	469	Yes
EM - 173	7/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	712.5	Yes
EM - 174	7/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	1399	Yes
EM - 175	7/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	1158	Yes
EM - 176	8/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	1259	Yes
EM - 177	9/01	Pacificorp	E-Log/Core	No Measurable Flow Observed	1017	Yes
EM - 178	8/02	Pacificorp	E-Log/Core	No Measurable Flow Observed	547	Yes
EM - 179	8/02	Pacificorp	E-Log/Core	No Measurable Flow Observed	507	Yes
EM - 180	5/03	Pacificorp	E-Log/Core	No Measurable Flow Observed	1337	Yes
EM - 181	6/03	Pacificorp	E-Log/Core	No Measurable Flow Observed	1537.5	Yes

**Appendix B
Mill Fork Drill Hole Tabulation**

Drill Hole Number	Date Completed	Drilled By	Type of Log	Hydrologic Characteristics	Total Depth (feet)	Proprietary
EM - 182	8/02	Pacificorp	E-Log/Core	No Measurable Flow Observed	1307	Yes
EM - 183	6/03	Pacificorp	E-Log/Core	No Measurable Flow Observed	1457	Yes
EM - 184	8/02	Pacificorp	E-Log/Core	No Measurable Flow Observed	1246	Yes
EM - 185	8/02	Pacificorp	E-Log/Core	No Measurable Flow Observed	1428	Yes
EM - 186	6/03	Pacificorp	E-Log/Core	No Measurable Flow Observed	1337	Yes
EM - 187	7/03	Pacificorp	E-Log/Core	No Measurable Flow Observed	1357	Yes
EM - 188	8/04	Pacificorp	E-Log/Core	No Measurable Flow Observed	1587	Yes
EM - 189	8/04	Pacificorp	E-Log/Core	No Measurable Flow Observed	1627	Yes
EM - 190	7/04	Pacificorp	E-Log/Core	No Measurable Flow Observed	1628	Yes
EM - 191	7/04	Pacificorp	E-Log/Core	No Measurable Flow Observed	1537	Yes
EM - 192	7/05	Pacificorp	E-Log/Core	No Measurable Flow Observed	1617	Yes
EM - 193	7/05	Pacificorp	E-Log/Core	No Measurable Flow Observed	1597	Yes
EM - 194	8/05	Pacificorp	E-Log/Core	No Measurable Flow Observed	1617	Yes
EM - 195	8/05	Pacificorp	E-Log/Core	No Measurable Flow Observed	1707	Yes

**DEER CREEK MINE
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