VOLUME 2

RETAIN ONLY THE INDEX TABS.
DISCARD ALL OTHER TEXT.
INSERT THIS MATERIAL WITH INDEX TABS IN
PROPER LOCATIONS.

SOILS INFORMATION (783.21)

Portal and support facility areas for the Des-Bee-Dove Mine are cut into steep, nearly perpendicular rock cliffs. The areas are dominated by rock outcrop, rubble land, and shallow soils.

Nowhere in the vicinity is there a source of material which would usually be referred to as "topsoil." Soil tests on the disturbed and undisturbed areas and coal waste show that the materials in the portal areas should support selected vegetative materials. These test results, therefore, preclude the recommendation for procurement of topsoil for reclamation since the exposed materials are suitable growth media if properly managed. The one exception is that if during mining operations toxic substances are concentrated, it will be necessary to sample these areas periodically and take the necessary reclamation measures to dispose of or cover the areas in order to assure success of revegetation attempts.

(See Maps 2-14, 2-15 and 2-16)

C - Cut Areas

These are areas disturbed in order to effectively gain sufficient work area to carry out mining operations. Sandstone and shale bedrock are exposed. In general, these areas have chemical and physical properties which will support plant growth. The major problems are steepness and aridity.

F - Fill Areas

These areas are nearly level (parking areas) and steep slopes (more than 25%). The material derived from sandstone and shale with some coal waste is capable of supporting plant growth. The parking lots and storage areas may have places where undesirable conditions for plant growth have developed; these areas must be covered with suitable growth media before revegetation can be successful.

Co-Be - Comodore-Beenom Complex, 40-60% Slopes

Comodore soils occur near drainageways, and support Douglas fir. They are shallow and well-drained (50%).

Beenom soils are shallow and well-drained. They occur in the areas which support mostly grass vegetation (40%).

Included in mapping are other soils and Rock Outcrop.

Pedon descriptions follow:

Comodore is a loamy-skeletal, mixed, Lithic Cryoboroll.

A11--0-8 cm; very dark grayish brown (10 YR 3/2) very stony, very fine sandy loam; very dark brown (10 YR 2/2) when moist; weak, fine granular structure; soft, friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; few very fine and fine pores; 15% gravel, 45% cobbles and stones non-calcareous; mildly alkaline (pH 7.4); clear, smooth boundary.

A12--8-45 cm; very dark grayish brown (10 YR 3/2) very cobbly, very fine sandy loam; very dark brown (10 YR 2/2) when moist; weak, fine granular structure; soft; friable, slightly sticky, slightly plastic; common fine and medium, and coarse roots; few very fine pores; 15% gravel and 30% cobbles; non-calcareous; midly alkaline (pH 7.4); abrupt wavy boundary.

R--45 cm; sandstone bedrock

Beenom is a loamy mixed Lithic Argiboroll

A1--0-10cm; brown (10 YR 4/3) loam, dark brown (10 YR 3/3) when moist; weak, fine, subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine, fine, and medium pores; mildly alkaline (pH 7.6); abrupt smooth boundary.

B2t--10-35 cm; brown (10 YR 4/3) clay loam, dark brown (10 YR 3/3) when moist; strong, medium, subangular blocky structure; hard, firm, stocky, plastic; common very fine, fine, and medium roots; common very fine and

fine pores; few thin clay films on faces of peds; mildly alkaline (pH 7.6).

R--35 cm; sandstone.

These soils were not sampled for laboratory analysis since they are outside of the disturbed area; and the steep step-and-riser cut-slope adjacent cannot be replaced to its original status.

Samples from the cut-and-fill slopes and the undisturbed slopes near the mine portal were analyzed. The results are shown in Tables 1 and 2 of the Revegetation section along with coal waste. There is no indication that any of these materials will not support plant growth. The furnace slag used in the parking lot has a high pH, but it is presumed that this is from the fusion of calcium oxide and has no detrimental influence on plant growth when mixed with other suitable material.

Ro-R-S Rock Outcrop - Rubble Land - Sunup Gravelly Loam, 40-70% slopes

Rocky Outcrop is dominantly from sandstone and shale. The boulders in the Rubble Land are from sandstone (75%).

Sunup soils are shallow and formed in material derived from sandstone. Permeability is moderately rapid in the soil material above the rock (25%).

Taxonomic classification is loamy-skeletal, mixed, mesic, Lithic Ustic Torriorthents. Pedon description follows:

A1--0-4 inches; pale brown (10 YR 6/3) very gravelly loam; olive brown (2.5 Y 5/4) when moist; weak, fine granular structure; friable, slightly sticky, slightly plastic; few fine, medium, and coarse roots; common fine and few medium pores; 55% gravel; moderately calcareous, carbonates are disseminated; moderately alkaline (pH 8.3); abrupt wavy boundary.

C1--4-14 inches; light gray (2.5 Y 7/2) extremely flaggy, fine sandy loam, light yellowish brown (2.5 Y 6/4) when moist; massive; very friable; few fine, medium, and coarse roots; 40% flagstones; 30% channers; strongly calcareous, carbonates are disseminated; strongly alkaline (pH 8.8); abrupt smooth boundary.

R--14 inches; sandstone.

Included in mapping are areas of material which have sloughed and been deposited by gravity in small areas (less than 100 sq. ft.). The soil material is deeper than Sunup soils, and is characterized in Table 2. These areas are of such limited extent that they are of no consequence as a local source of cover material for revegetation.

Des-Bee-Dove Sedimentation Pond

This pond is cut into Chipeta soil and Mancos shale. The soil is classified as a clayey, mixed, calcareous mesic, shallow Typic Torriorthent. The moisture regime is aridic. The soil material above the shale is about 15 inches thick. The soil and shale are high in gypsum. The vegetation is dominated by saltbush.

No soil samples were analyzed at this site.

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Soil Survey of Parts of Carbon and Emery Counties, Utah. April 1979. Vol. I and II.

General Soil Map of the Permit Area (2-14)

I-E-R/E Typic Cryochrepts-Lithic Cryorthents-Rock outcrop loamy-skeletal, shallow association, 40-60% slopes. These soils are mostly loamy-skeletal and lithic with areas of sandstone outcrops.

In this Map Unit, Typic Cryochrepts make up about 50%, Lithic Cryorthents about 25%, and Rock Outcrop and Rubble Land about 20%; included are small areas of Mollisols on north and east-facing slopes.

The Cryochrepts can be generally described as follows: pale brown gravelly loam or sandy loam surface layer, with 25% sandstone fragments, 35 cm thick, underlain by a pale brown gravelly or stony loam, with 35-50% sandstone fragments, 100 cm thick.

The Cryorthents are mostly shallow, underlain by rock within 50 cm of the surface.

Rubble Lands are those areas where the soils are covered by large boulders so close together that there is little area between the boulders for plants to grow.

Rock Outcrop is exposed areas of bedrock. These areas are often nearly vertical cliff walls in canyons.

Mp/B Pachic Cryoborolls, loamy and loamy-skeletal, 10-25% slopes.

These are dark-colored soils in which the surface soils is more than 50 cm thick. Included in mapping are Typic Cryoborolls, Mollic Cryoboralfs, and Typic Cryochrepts.

Pachic Cryoborolls can generally be described as follows: a very dark grayish brown loamy surface layer 60 cm thick, overlying a grayish brown loamy subsoil 30 cm thick, and underlain by a pale brown gravelly sandy loam substratum containing 50% sandstone fragments.

Mtc — Typic Cryoborolls, loamy and loamy-skeletal, 25-40% slopes.

These are dark-colored soils under mixed conifer, sagebrush, and grass.

Included are areas of Pachic Cryoborolls and Mollic Cryoboralfs. Cryochrepts are on windswept ridges.

The Typic Cryoborolls can be generally described as follows: a dark grayish brown loamy surface layer about 40 cm thick, underlain by a pale brown clayey subsoil 40 cm thick, over a light gray calcareous substratum with up to 50% sandstone fragments.

References

1. Soils maps of Utah Power and Light mine sites: Deer Creek, Deseret, and Wilberg.
2. General Soils Map of Utah.
3. Soils map of a test area in T14S, R5E through 9E.
4. Soils map of Northwest Carbon, Inc., Rilda Canyon and Trail Creek Mine sites.

Sediment Pond - Des-Bee-Dove Mines (see Map 2-16)

Ch-B/B Chipeta - Badlands complex, 10-25% slopes, eroded.

This Map Unit is composed of shallow soils derived from Mancos shale and Badlands. Chipeta soils make up about 60% of this unit. They occur on side slopes and rounded ridge crests. The Badlands are very steep, eroded areas where there is essentially no soil. Badlands make up about 35% of this unit.

Inclusions are along drainageways where alluvium has accumulated in areas of less than one acre.

Chipeta silty clay loam, 3 to 20% slopes, eroded

The Chipeta soil is shallow and well-drained. It has formed from alkaline, gypsum-bearing, marine shale.

Present vegetation is mat saltbush, Gardner saltbush, and shadscale.

Permeability is slow. Available water capacity is 3 inches. Runoff is medium, and erosion potential is moderate.

This soil is in Capability Subclass VIIe, non-irrigated.

Taxonomic Classification is clayey, mixed (calcareous), mesic, shallow Typic Torriorthent.

Pedon description follows:

Ap--0 to 13 cm; grayish brown (2.5 Y 4/2 moist, 6/2 dry) silty clay loam; moderate, medium fine angular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; calcareous; clear, smooth boundary.

C1--13 to 33 cm; grayish brown (2.5 Y 4/2 moist, 6/2 dry) silty clay loam; moderate, medium fine angular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; calcareous; clear, wavy boundary.

C2cs--33 to 43 cm; dark grayish brown (2.5 Y 4/2 moist, 6/2 dry) silty clay.

Cr--43 cm+; weathered Mancos shale.

Badlands are severely eroded areas with little soil, and are dominated by relatively unaltered shale.

The Soils at the Mine Site (2-15)

Soil	Range Site	Yields* Favorable	Yields* Unfavorable
Chipeta	Desert Shallow Shale	200	100
Beenom	Mountainy Stony Loam	2000	1200
Sunup	Semi-Desert Shallow Loam (Pinyon-Juniper)	600	275
Comodore	Woodland (Douglas Fir)	No Data Available	

The Soils in the Generalized Soils Map For the Permit Area (2-14)

Would fall into:			
High Mountain Loam	Shrub or Aspen	2700	1250
High Mountain Loam		3000	1400
Woodland		Not assigned a range site - no data available.	

* Pounds of air dry production per acre per year.

Reference

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FISH AND WILDLIFE RESOURCES INFORMATION (783.20)

As required by the regulations the application has consulted with the D.O.G.M., the D.O.W.R. and U. S. Fish & Wildlife Service. An on-site field investigation of each mine site was conducted. In addition, the applicant felt to properly mitigate wildlife concerns a consultant (Jarvis) was retained to provide both wildlife baseline information and, in consultation with the U. S. Fish & Wildlife Service, initiate any necessary studies and identify any possible conflicts between wildlife and mining operations. This report is included in this section. Notwithstanding Judge Flannery's decision, applicant feels that without baseline data a proper wildlife mitigation plan cannot be developed.

As the Jarvis report and the D.O.W.R. baseline data are for the most part redundant, applicant has chosen to include only the consultant's report in this application but has included the mitigation and impact avoidance procedures as recommended by the D.O.W.R. in the Fish & Wildlife Protection Plan. The applicant has the D.O.W.R. complete baseline studies on file and copies have been sent to all concerned state and federal management agencies.

Mine Plan Area

The UP&L lease area covers the south half of East Mountain in the Wasatch Plateau. Life zones range from Upper Sonoran below the mines to Canadian on top. The three mines are located in steep rocky canyons on the south and east slopes of the mountain.

Methods

The mine plan was submitted to D.O.G.M. who, in turn, consulted the respected wildlife agencies for recommendations. Based on the Board's guidelines most of the wildlife information was obtained from existing records and publications. A field survey was conducted in 1981 to assess the occurrence of raptors and migratory birds nesting at the Cottonwood fan portal construction site. This survey is included in the Wilberg application.

Wildlife habitats were coordinated with the designations used in the vegetative survey. With the vegetative map and the species list for the Wasatch Plateau a list of species likely to occur in the mine area was developed (Table 1).

Wildlife Habitats

The habitats within the mine plan area are rated as 2 by Bob Scott and others for coal lands of Utah (Scott, 1977). Around the mines the cliffs are considered raptor nesting habitat with the slopes below and the flat lands above the cliffs as raptor feeding areas. The lower slopes and alluvial fans below the mines are rated as deer winter range. All elk range is above the mines on the top of East Mountain (Table 2) (see Maps 2-17 and 2-18).

The habitats at the Wilberg Mine and Des-Bee-Dove Mines are designated as pinyon-juniper with many open rock and cliff areas. At the Deer Creek Mine some riparian habitat exists along Deer Creek below the mine. The south

facing slopes of this steep canyon are covered with pinyon-juniper and the north facing slopes are covered with a mixed conifer stand.

The habitat designations are listed below:

S - Sagebrush
G - Grassland
SD - Salt Desert Shrubs
R - Riparian
P-J - Pinyon-Juniper
MC - Mixed Conifer (includes Aspen Groves)

a. Sagebrush - All the sagebrush communities are situated between 8,000 and 10,000 foot elevations along the top of the East Mountain plateau. They exist as short sage communities generally on ridge tops and flats. Aspen groves are scattered through the sagebrush communities on the flats and along the edges. A few areas around springs still harbor small wet meadows.

b. Grassland - Two small areas on ridges in tributaries of Cottonwood Creek.

c. Salt Desert Shrub - This plant community is located on the lower slopes adjacent to the access road to the Des-Bee-Dove Mines.

d. Riparian - The streams are small and flow through steep narrow canyons. Consequently the riparian zone is very narrow often less than 30 yards wide. The vegetative composition varies from the broad-leafed trees and shrub plant community normally depicted as characteristic of riparian

areas to many areas where there is only an increased density of conifers and/or aspen.

e. Pinyon-Juniper - This pygmy forest is located on steep slopes and talus slides that are crowned by near vertical to vertical rock escarpments. In many areas especially on the south face of East Mountain the forest consists of scattered trees growing amidst huge rocky cliffs and rough rock piles. Where steep canyons occur the pinyon-juniper forest is only found on south facing slopes or on rocky exposed ridges. In many areas where the pinyon-juniper grades into the mixed conifer stands a mountain brush plant community exists as an ecotone between the two tree dominated plant communities. These areas are generally confined to a single slope of less than 200 acres.

f. Mixed Conifer - The mixed community is spread all over East Mountain, on the top, the slopes, and in the steep side canyons. Below 8,000 feet elevation conifers are found only on north facing slopes in steep canyons. Fir species generally dominate the stands along with spruce and a scattering of aspens at the sagebrush interface.

Wildlife List (See Table 1)

Species of Special Significance

The species listed here and their habitat requirements are discussed in the following paragraphs. This list was derived from Utah Division of Oil, Gas and Mining's guidelines and from Utah Division of Wildlife Resources' status list (DOGM, 1980 and UDWR, 1979).

Species	Status	Habitat	Comments
Western Bluebird (Sialia mexicana)	Federal Migratory	MC,P-J	Probably occurs within disturbed area
American Peregrine Falcon (Falco peregrinus)	T & E	All	Does not occur, no sightings
Bald Eagle (Haliaeetus leucocephalus)	T & E	All	Winter visitor
Snowshoe Hare (Lepus americanus)	DWR limited	MC	Probably occurs on permit area but not in disturbed area
Northern Flying Squirrel (Glaucomys sabrinus)	DWR limited	MC	" "
Red Bat (Lasiurus cinereus)	DWR limited	MC	" "
Utah Mountain Kingsnake (Lampropeltis pyromelana)	DWR limited	R,P-J,MC	Possibly occurs in disturbed area
Utah Milksnake (Lampropeltis triangulum)	DWR limited	MC	Probably occurs on permit area but not in disturbed area
Tiger Salamander (Ambystoma tigrinum)	DWR questioned	R	" "

Threatened and Endangered

A letter from U. S. Fish and Wildlife Service dated November 6, 1980. "To the best of our knowledge, no endangered or threatened plant species or critical habitat

for threatened or endangered wildlife species occur in the disturbed areas of the subject mining operations."

Raptors

The raptors in this area are listed in prior paragraphs. Further discussions are found in the early parts of this discussion.

Effects of Mining Operations on Fish and Wildlife

The Deer Creek, Des-Bee-Dove and the Wilberg Mines are currently operating. Their effects on wildlife are now historical and the species affected have either emigrated from the disturbed sites, adjusted to the disturbances or expired due to loss of habitat. The primary losses were probably raptor nesting sites around the mines and deer winter range from road construction. At the Deer Creek Mine some riparian habitat was destroyed at the mine site.

The lower open slopes are used by raptors on the escarpment face for hunting activities where an abundance of rodents and small birds provide a prey base. Wintering migrants also utilize these same habitats for hunting. The vehicle traffic and human presence continue to disturb the natural hunting patterns. Data from the period prior to mining is lacking to evaluate the present situation (Land Use Map 2-17).

The traffic on the mine access roads kills an unknown number of deer each year. The percent loss to the wintering deer herds is unknown. Some raptor disturbance continues at

the mines and along the access roads which transect some of their hunting territory.

Following is a summary of certain reptile and amphibian species referred to in Utah Division of Oil, Gas and Mining letter to Utah Power and Light dated December 5, 1980.

a. Utah Mountain Kingsnake - These snakes are widely distributed throughout the mountains of Utah in specific localized drainages. The habitat requirements are drainages with wet meadows, brushy riparian areas and perennial streams. They use rocky south facing slopes adjacent to riparian habitat for denning.

   The drainages around East Mountain lack these components for a preferred environment because many of the streams are eroded and lack meadows. Thus it is doubtful these snakes inhabit any of the disturbed areas.

b. Utah Milksnake - This snake could occur in the riparian areas and in the mixed conifer habitat. Most likely place would be in that portion of the drainages with mixed conifer vegetation. This habitat type is far removed from any disturbed areas.

c. Tiger Salamander - These salamanders prefer quiet pools, ponds, or springholes. Since most of these water types occur on top of East Mountain it is doubtful any tiger salamanders would be disturbed by proposed construction.

Game Species

- Mule Deer (Odocoileus hemionus) - Mule deer range throughout all habitats on the mine property. Pinyon-juniper on the slopes of East Mountain are used as winter range. During other seasons deer concentrations are greater at high elevations. Although deer populations have declined over the past several years, the deer herd and habitat in the mine vicinity are in good condition (Dolton, 1977).
- Elk (Cervus canadensis) - Elk inhabit the sagebrush, and forest areas at the upper elevations on East Mountain, but do not ordinarily range into pinyon-juniper habitat. The seven year average of elk censused on East Mountain (1970-1976) was 76 antlerless and two antlered individuals seen per year (Dolton, 1977). This census included larger groups only and does not reflect a total population estimate (Dolton, 1977).
- Mountain Lion (Felis concolor) - This species inhabits rugged mountains and forest areas in the region and may occasionally occur on East Mountain (Dolton, 1977).

- Snowshoe Hare (Lepus americanus) - This species occurs in forested portions of mountainous areas in the region. It inhabits higher elevations on East Mountain (Dolton, 1977).
- Mountain Cottontail (Sylvilagus nuttalli) - Mountain cottontails inhabit brushy areas and forests, particularly on rocky slopes throughout the mine region (USDI Bureau of Land Management, 1976).
- Blue Grouse (Dendragapus obscurus) - Open conifer stands with brushy understory at higher elevations provide suitable habitat for this species. Blue grouse occur on East Mountain. The greatest density of the species in Utah is in the northern Wasatch Range (Rawley and Bailey, 1972).
- Ruffed Grouse (Bonasa umbellus) - Brushy woodlands (aspens, willows, and conifers) near streams and springs are suitable habitat. This species occurs at higher elevations on East Mountain, but good populations are generally limited to the Wasatch Range northwest of the mine property (Rawley and Bailey, 1972).
- Chukar Partridge (Alectoris graeca) - This species prefers steep, rock, semiarid slopes with low shrubs and rock outcrops. This species was introduced in Utah from 1951 to 1968. During this period 185,911 individuals were released at 191 different locations

(Rawley and Bailey, 1972). The species is now widely distributed throughout Utah and other western states.

- Mourning Dove (Zenaidura macroura) - This is an important game bird in many parts of North America. Mourning doves prefer open field and forest edge habitat, but occur over a broad range of vegetation types throughout the 48 conterminous United States. The species occurs in pinyon-juniper and forest edge habitat on East Mountain.

Special Status Species

No federally listed endangered or threatened species are known to occur on the site property (USDI, Fish and Wildlife Service, 1976). The black-footed ferret (Mustela nigripes), a federally endangered species, has recently been reported near Ferron, several miles south of the site (Dolton, 1977). This species is not likely to occur on mine property because preferred habitat (a prairie dog town) (USDI Bureau of Land Management, 1972a) is not present. American peregrine falcon (Falco peregrinus anatum) has been observed with 25 miles of the site in the winter of each of the past three years (Dolton, 1977). It is probably a winter visitor in the area (USDI Bureau of Land Management, 1972b), although, historically peregrine falcon aeries existed in the San Rafael swell area 30 miles southeast of the site.

The State of Utah has defined the status of selected animal species (Utah Division of Wildlife Resources 1976), some of which are likely to occur on or near the Wilberg Mine property as:

DECLINING: Any species of animal which, although still occurring in numbers adequate for survival, has been greatly depleted and continues to decline. A management program included protection or habitat manipulation, is needed to stop or reverse the decline.

LIMITED: Any species of animal occurring in limited numbers due to restricted or specialized habitat or at the perimeter of its historic range.

STATUS QUESTIONED: Insufficient data area available to permit a reliable assessment of the status of the species.

Special status species in Utah that might be found near the mine property are:

- Bobcat (Lynx rufus) Declining. Fur prices in recent years have resulted in high harvests. The species is presently under consideration for total protection until the current population trend is reversed. Bobcats probably occasionally use the habitats present on the mine property.
- Whitetail Jackrabbit (Lepus townsendi) Status questioned. Inhabits sagebrush flats in the region and may occur on site.

- Sandhill Crane (Grus canadensis) Limited. A few individual migrate through the region (Robbins et al, 1966).
- Fox Sparrow (Passerella iliaca) Status questioned. Suitable habitat for the species occurs at upper elevations on East Mountain on the mine property.
- Utah Mountain Kingsnake (Lampropeltis pyromelana infralabialis) Limited. Suitable habitat occurs on site. The species is in the region and may inhabit the mine area (Stebbins, 1966).

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TABLE I

VERTEBRATE SPECIES OF THE WASATCH PLATEAU

Fishes:

Species	Status	Habitat	Probable Occurence on UP & L Leases
Cutthroat trout	C	lakes, streams	
Rainbow trout	C	"	
Brown trout	C	"	
Brook trout	L	"	
Carp	C	"	
Utah chub	C	"	
Leatherside chub	C	streams	
Longnose dace	U	"	
Speckled dace	C	"	
Redside shiner	C	lakes, streams	
Bluehead sucker	C	"	
Mountain sucker	L	streams	
Mottled sculpin	C	"	
Largemouth bass	C	lakes	
Amphibians:			
Tiger salamander	C	R, MC	X
Great Basin Spadefoot toad	C	S	X
Western toad	K	R	X
Woodhouse's toad	C	G,S	
Chorus frog	C	S	X
Leapord frog	C	R	X

Reptiles:

Species	Status	Habitat	Probable Occurence on UP & L Leases	
Collared Lizard	C	SD		X
Leopard Lizard	C	SD		
Eastern Fence Lizard	C	SD,P-J		X
Sagebrush Lizard	C	SD,P-J		X
Tree Lizard	C	P-J		X
Side-blotched Lizard	C	SD	X	
Short-horned Lizard	C	SD,P-J,S,MC		X
Western Whiptail	C	SD		
Rubber Boa	C	MC		X
Striped Whipsnake	C	SD,P-J		X
Racer	C	S,MC		X
Ringneck Snake	K	R,MC		X
Gopher Snake	C	SD,P-J,S		X
Milk Snake	K	MC		X
Sonora Mountain Kingsnake	K	R,P-J,MC		X
Western Terrestrial Garter Snake	C	R,P-J,MC		X
Common Garter Snake	K	R		X
Night Snake	C	SD		
Midget Faded Rattlesnake	C	P-J		X
Birds:				
Common Loon	U	Lakes		
Horned Grebe	R	"		
Eared Grebe	C	"		
Western Grebe	C	"		
Pied-billed Grebe	C	"		

Birds con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Double-crested Cormorant	U	"	
Snowy Egret	C	Marshes	
Great Blue Heron	C	"	X
Black-crowned Night Heron	C	"	
American Bittern	U	"	
White-faced Ibis	C	"	
Whistling Swan	O	"	
Canada Goose	C	"	
White-fronted Goose	R	Marshes	
Snow Goose	U	"	
Ross's Goose	O	"	
Mallard	C	"	X
Gadwall	C	"	
Pintail	C	"	
Green-winged Teal	C	"	X
Blue-winged Teal	C	"	
Cinnamon Teal	C	"	
American Widgeon	C	"	
Northern Shoveler	C	"	
Wood Duck	R	"	
Redhead	C	Lakes	
Ring-necked Duck	U	"	
Canvasback	C	"	
Greater Scaup	U	"	
Lesser Scaup	C	"	

Birds cont.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Common Goldeneye	U	Lakes	
Bufflehead	U	"	
Ruddy Duck	C	"	
Hooded Merganser	R	Streams	
Common Merganser	C	Streams	
Red-breasted Merganser	C	"	
Turkey Vulture	C	All	X
Goshawk	C	MC	X
Sharp-shinned Hawk	U	MC,S	X
Cooper's Hawk	C	R,MC,P-J	X
Red-tailed Hawk	C	All	X
Swainson's Hawk	U	S,P-J	X
Rough-legged Hawk	C	SD	X
Ferruginous Hawk	U	SD	X
Golden Eagle	C	All	X
Bald Eagle	E	All	X
Marsh Hawk	C	SD	
Osprey	U	Lakes	
Praire Falcon	C	P-J	X
Peregrine Falcon	E	All	
Merlin	C	P-J	X
American Kestrel	C	R,SD,P-J	X
Blue Grouse	C	MC	X
Ruffed Grouse	C	MC	X
Sage Grouse	C	S	
California Quail	C	R	

Birds con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Chukar	C	SD	
Ring-necked Pheasant	C	Fields	
Sandhill Crane	R	Marshes	
Virginia Rail	C	"	
Sora Rail	U	"	
Common Gallinule	R	"	
American Coot	C	"	
Semipalmated Plover	U	"	
Snowy Plover	U	"	
Killdeer	C	S	X
Mountain Plover	R	Marshes	
American Golden Plover	U	"	
Black-bellied Plover	C	"	
Common Snipe	C	S	X
Long-billed Curlew	U	Marshes	
Willet	U	"	
Spotted Sandpiper	C	S	X
Solitary Sandpiper	U	Marshes	
Greater Yellowlegs	U	"	
Lesser Yellowlegs	C	"	
Pectoral Sandpiper	U	"	
Baird's Sandpiper	U	"	
Least Sandpiper	C	"	
Western Sandpiper	C	"	
Sanderling	U	"	
Short-billed Dowitcher	U	"	
Long-billed Dowitcher	C	"	

Birds Con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Marbled Godwit	C	Marshes	
American Avocet	C	"	
Black-necked Stilt	C	"	
Wilson's Phalarope	C	"	
Northern Phalarope	C	Lakes	
Herring Gull	U	"	
California Gull	C	"	
Ring-billed Gull	C	"	
Franklin's Gull	C	"	
Bonaparte's Gull	U	"	
Forsters Tern	C	"	
Common Tern	U	"	
Black Tern	C	"	
Caspian Tern	U	"	
Band-tailed pigeon	U	MC	
Rock Dove	C	P-J	
Mourning Dove	C	All	X
Yellow-billed Cuckoo	K	R	
Barn Owl	K	P-J	
Screech Owl	U	R	X
Flammulated Owl	K	MC	X
Great Horned Owl	C	All	X
Pygmy Owl	K	R,P-J	X
Burrowing Owl	L	SD	

Birds Con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Long-eared Owl	C	P-J	X
Short-eared Owl	C	Marshes	
Saw-whet Owl	K	MC	X
Common Nighthawk	C	SD	X
Poor-will	C	P-J	X
Black Swift	U	MC	X
White-throated Swift	C	P-J	X
Black-chinned Hummingbird	C	R	X
Broad-tailed Hummingbird	C	All	X
Rufous Hummingbird	C	MC	X
Calliope Hummingbird	C	MC	X
Belted Kingfisher	U	R	
Common Flicker	C	MC	X
Yellow-bellied Sapsucker	C	MC	X
Hairy Woodpecker	C	MC	X
Downy Woodpecker	C	R	X
Northern Three-toed Woodpecker	U	MC	X
Western Kingbird	C	SD	
Cassin's Kingbird	U	P-J	X
Eastern Kingbird	C	R	
Ash-throated Flycatcher	C	SD	
Says Phoebe	C	SD,P-J	
Willow (Traill's) Flycatcher	C	S	X
Hammond's Flycatcher	U	MC	X

Birds con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Dusky Flycatcher	C	MC	X
Gray Flycatcher	K	S,P-J	X
Western Flycatcher	C	MC	X
Western Wood Peewee	C	MC	X
Olive-sided Flycatcher	U	MC	X
Horned Lark	C	SD	X
Violet-green Swallow	C	All	X
Tree Swallow	C	S	X
Bank Swallow	C	R	
Rough-winged Swallow	C	R	
Barn Swallow	C	P-J	X
Cliff Swallow	C	P-J	X
Purple Martin	U	MC	X
Steller's Jay	C	MC	X
Gray Jay	R	MC	X
Scrub Jay	C	R,P-J	X
Black-billed Magpie	C	R,P-J	X
Common Raven	C	All	X
Common Crow	O	R	
Pinion Jay	C	S,P-J	X
Clark's Nutcracker	C	MC	X
Black-capped Chickadee	C	MC	X
Mountain Chickadee	C	MC	X
Plain Titmouse	C	P-J	X
Bushtit	C	MC	X
White-breasted Nuthatch	C	MC	X
Red-breasted Nuthatch	C	MC	X

Birds con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Pygmy Nuthatch	C	MC	X
Brown Creeper	C	MC	X
Dipper	C	R	
House Wren	C	MC	X
Rock Wren	C	SD,P-J	X
Canyon Wren	C	P-J	X
Bewick's Wren	C	P-J	X
Long-billed Marsh Wren	L	marshes	
Mockingbird	U	R	
Gray Catbird	U	R	
Sage Thrasher	C	S	X
American Robin	C	R,MC	X
Hermit Thrush	C	MC	X
Swainson's Thrush	C	MC	X
Veery	U	R	
Western Bluebird	U	MC,P-J	X
Mountain Bluebird	C	S,MC	X
Townsend's Solitaire	C	MC,P-J	X
Blue-gray Gnatcatcher	C	R	X
Golden-crowned Kinglet	U	MC,P-J	X
Ruby-crowned Kinglet	C	MC	X
Water Pipet	C	plains	
Bohemian Waxwing	U	R,MC	X
Cedar Waxwing	C	woodlands	
Northern Shrike	U	SD	
Loggerhead Shrike	C	SD	
Starling	C	All	X

Birds con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Solitary Vireo	U	R,P-J	X
Warbling Vireo	C	R	X
Orange-crowned Warbler	C	MC	X
Nashville Warbler	U	MC	X
Virginia's Warbler	C	P-J	X
Yellow Warbler	C	R	
Magnolia Warbler	U	MC	X
Yellow-rumped Warbler	C	MC	X
Black-throated Gray Warbler	C	P-J	X
Townsend's Warbler	U	MC	X
MacGillivray's Warbler	C	R	X
Yellowthroat	L	R	
Yellow-breasted Chat	C	R	
Wilson's Warbler	C	R	X
American Redstart	U	R	
House Sparrow	C	cities	
Western Meadowlark	C	SD	
Yellow-headed Blackbird	C	marshes	
Red-winged Blackbird	C	"	
Northern Oriole	C	R	
Rusty Blackbird	O	R	
Brewer's Blackbird	C	R	
Common Grackle	A	R	
Brown-headed Cowbird	C	R	X
Western Tanager	C	MC	X
Black-headed Grosbeak	C	R	X
Lapland Longspur	R	G	

Birds con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Indigo Bunting	R	R	
Lazuli Bunting	C	R,S	X
Green-tailed Towhee	C	S, P-J	X
Rufous-sided Towhee	C	S	X
Lark Bunting	O	SD	
Savannah Sparrow	C	G	
Grasshopper Sparrow	R	G	
Vesper Sparrow	C	S, SD	X
Lark Sparrow	C	S, SD	X
Sage Sparrow	U	S, SD	X
Dark-eyed Junco	C	MC	X
Gray-headed Junco	C	MC	X
Tree Sparrow	U	R	X
Chipping Sparrow	C	MC,P-J	X
Brewer's Sparrow	C	S,SD	X
Harris Sparrow	U	P-J	
White-crowned Sparrow	C	P-J	X
Fox Sparrow	K	R	X
Lincoln's Sparrow	U	R	
Song Sparrow	C	G	X
Black-throated Sparrow	U	S,P-J	X
Evening Grosbeak	C	MC	X
Cassin's Finch	C	MC	X
House Finch	C	All	X
Pine Grosbeak	U	MC	X
Rosy Finch	C	S	
Pine Siskin	C	MC	X

Birds con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
American Goldfinch	C	R,P-J	X
Lesser Goldfinch	C	P-J	X
Red Crossbill	U	MC	X
Mammals:			
North Water Shrew	C	R	
Merriam Shrew	U	S,MC	X
Vagrant Shrew	C	R	
Masked Shrew	C	R	
Dusky Shrew	C	MC	X
Little Brown Myotis	C	P-J	X
Fringed Myotis	U	SD, P-J	X
Long-Eared Myotis	C	MC	X
Long-legged Myotis	C	P-J	X
Yuma Myotis	U	P-J	X
California Myotis	C	"	X
Small-footed Myotis	U	"	X
Silver-haired Bat	C	MC	X
Western Pipistrelle	C	P-J	X
Big Brown Bat	C	"	X
Red Bat	U	MC	X
Hoary Bat	U	"	X
Western Big-eared Bat	C	P-J	X
Pallid Bat	C	SD	
Mexican Free-tailed Bat	C	SD	X
Pika	C	MC,P-J	X
White-tailed Jackrabbit	C	S	X

Mammals con't.

Species	Status	Habitat	Probable Occurence on UP & L Leases
Snowshoe Hare	C	MC	X
Black-tailed Jackrabbit	C	SD,P-J	X
Mountain Cottontail	C	S,G	X
Desert Cottontail	C	SD,P-J	X
White-tailed Prairie Dog	C	SD	
Red Squirrel	C	MC	X
Rock Squirrel	C	SD,P-J	X
Uintah Ground Squirrel	C	G, S	X
Golden-mantled Ground Squirrel	C	S,MC	X
Whitetail Antelope Squirrel	C	SD	X
Yellow-bellied Marmot	C	S,MC	X
Northern Flying Squirrel	C	MC	X
Least Chipmunk	C	S,SD,P-J	X
Uintah Chipmunk	C	MC	X
Cliff Chipmunk	U	P-J	X
Northern Pocket Gopher	C	G, S	X
Valley or Botta Pocket Gopher	C	G,S, P-J	X
Ord Kangaroo Rat	C	SD, P-J	X
Great Basin Pocket Mouse	C	SD	X
Beaver	C	R	X
Western Harvest Mouse	C	G, R	X
Canyon Mouse	C	P-J	X
Deer Mouse	C	All	X
Brush Mouse	C	P-J	X
Pinion Mouse	C	P-J	X
Desert Wood Rat	C	SD, P-J	X
Bushy-tailed Wood Rat	C	MC, P-J	X

Mammals con't

Species	Status	Habitat	Probable Occurence on UP & L Leases
Meadow Vole	C	S	X
Mountain Vole	C	S	X
Richardson's Vole	C	R	X
Longtail Vole	C	S, R	X
Black Rat	C	Mines	X
Norway Rat	C	"	X
House Mouse	C	"	X
Western Jumping Mouse	C	R	
Porcupine	C	MC	X
Coyote	C	All	X
Red Fox	C	MC	X
Kit Fox	U	SD	
Gray Fox	C	P-J	X
Black Bear	C	MC	X
Ring-tailed Cat	C	P-J	X
Raccoon	O	R	X
Short-tailed Weasel	R	P-J	X
Long-tailed Weasel	C	R	X
Mink	L	streams	
Black-footed Ferret	E	SD	
Marten	R	MC	X
Badger	C	S,MC,P-J	X
Striped Skunk	C	P-J	X
Spotted Skunk	C	R	X
River Otter	R	streams	

Mammals con't

Species	Status	Habitat	Probable Occurence on UP & L Leases
Bobcat	C	MC,P-J	X
Cougar	C	Mc,P-J	X
Mule Deer	C	All	X
Moose	L	R	
Rocky Mountain Elk	C	MC	X

TABLE I
KEY

Status - Population

C	-	Common, Widespread and Abundant
U	-	Uncommon, Widespread but not Abundant
R	-	Rare, Seldom Seen.
E	-	Endangered, Candidate for Extinction
T	-	Threatened, Candidate for Endangered
L	-	Limited, Restricted to a Specific Habitat
K	-	Status Unknown

Habitat

S	-	Sagebrush
G	-	Grassland
SD	-	Salt Desert Shrub
R	-	Riparian
P-J	-	Pinyon-Juniper Forest
MC	-	Mixed Conifer (Includes Aspen Groves)

TABLE II

Wildlife Rankings of Habitat within Mine Plan Area

Mine	Section	Ranking[a]	Principal Use
Deer Creek	T 17 S R 7 E Sec. 10	2	DWR
Des-Bee-Dove	T 17 S R 7 E Sec. 26	2	DWR
Wilberg	T 17 S R 7 E Sec. 27	2	DWR
Cottonwood Fan Portal Zone	T 17 S R 7 E Sec. 30	1	EWR[b] DWR
	T 17 S R 6 E Sec. 25 Sec. 36	 1 2	EWR[b] DWR DWR

[a] (Scott, 1977)
[b] No longer considered elk winter range

LAND USE INFORMATION (783.22)

Deseret-Beehive-Little Dove Mines are conglomerated into a single surface mining complex located in a dry wash contributary to Grimes Wash. Mining had its beginning about 1940 and has grown incrementally through the years. No information is available as to prior mining. Land use prior to mining was grazing and wildlife (local land users).

The vegetation communities adjacent to the disturbed area are classified as pinyon-juniper along the steep eroded sandstone ledges. Lower elevations are dominated by desert saltbush in Chapeta soils and Mancos shales (see Soils Information).

Topography of the general area dictated its uses; i.e., the lower valleys provided year-round farming and ranching and the higher sediments of the Wasatch Plateau are utilized for summer grazing as it is today.

Currently on the BLM lands in the permit area the livestock use is spring grazing with cattle on the benches (April 1 - June 10). The East Grimes and West Grimes allotments, divided east of Danish Bench, are stocked at 19.4 acres/AUM and 16 acres/AUM for a total of 317 and 263 AUM's respectively. These allotments are judged in fair condition with a downward trend (BLM letter, 1982).

Very little grazing by cattle occurs on the steep slopes above the benches because of the difficult access and scarcity of forage.

The grazing of the USFS lands is confined to East Mountain under an approved rest rotation system (USFS, 1979). Nine permittees graze 486 cattle from June 21 to September 10 for a total of 1,296 AUM's. The range condition is judged good with a static to upward trend. The stocking rate is 11 acres/AUM. All of the cattle use is restricted to the upper slopes and top of East Mountain.

Elk use East Mountain for summer range but winter on the western slopes in the Cottonwood Creek drainage. Mule deer also summer on the mountain and winter on the benches and slopes of the southern and eastern portion of East Mountain from the mouth of Cottonwood Creek around to Rilda Canyon in the Huntington Creek drainage. These ranges are rated as high priority winter range by Utah Division of Wildlife Resources. Current herd management levels are one deer/20 acres of winter range (UDWR, 1982) (Map 2-18).

The total forage productivity of the pinyon-juniper range on the benches is 100-324 lbs./acre, dry weight. The pinyon-juniper range on the rockland soils of the steep slopes is lower, estimated at 25-100 lbs./acre, dry weight. The desert shrub range productivity is 100-285 lbs./acre, dry weight. See Vegetation section for productivity details.

The BLM also recognizes the sand and gravel resources on these benches and has designated specific areas for excavation and processing to aid in community expansion. The BLM visual resource management system rates the benches as Class IV and the cliff faces as Class III. Both of these

classifications allow for modification of the land through man's activities. The USFS also rates the south end of East Mountain as modification or partial retention, a scenic value similar to BLM's Class IV and III respectively.

The Land Use Plan for the Wasatch Plateau designates no recreation development or timber sales on East Mountain but does specify the improvement of big game range, protection of watersheds and reconstruction of the Cottonwood Creek road for coal hauling. The south end of the mountain is not in a known oil or gas field and the reserve potential is judged as low.

REFERENCES

Bureau of Land Management June 1979. San Rafael Unit Resource Analysis and Management Framework Plan. Price, Utah.

Emery County Zoning Plat Books. Castledale, Utah.

U. S. Forest Service May 1979. Land Management Plan Ferron-Price Planning Unit. Manti-LaSal National Forest. Price, Utah.

Utah Division of Wildlife Resources May 1982. Utah Big Game Investigations and Management Recommendations 1981-1982. Publication #82.3.

See land use map in the map section (2-17).

A-1 Agricultural Zone, contains the primary farming areas of the county.

RA-1 Residential-Agricultural Zone, this is the area with the communities and the adjacent or intermixed agricultural lands.

M&G-1 Mining and Grazing Zone, all of the county lands outside of the communities, farming areas and forest service boundary.

I-1 Industrial Zone, specific areas near communities and highways reserves for industrial development.

Ce-1 Critical Environmental Zone, general designation for all private lands within the forest boundary.

Ce-2 Critical Environmental Zone, specific designation for certain land parcels especially those adjacent to recreation sites in the forest.

PRIME FARMLAND INVESTIGATION (783.27)

After investigating all the lands within the permit boundaries of the Des-Bee-Dove Coal Mine it is determined that these lands do not qualify as "Prime Farmlands" for the following reasons:

1. Historically the lands prior to construction were not used as crop land.
2. The slopes of and surrounding the portal area exceed 10 percent.
3. There is no developed water supply qualifying as an irrigation source.

Following is a negative determination from the U. S. Soil Conservation Service.

United States
Department of
Agriculture

Soil
Conservation
Service

P. O. Box 11350
Salt Lake City, UT 84147

Nobember 10, 1983

C. E. Shingleton
Director of Permitting,
Compliance and Services
Mining and Exploration
Utah Power & Light Company
P. O. Box 899
Salt Lake City, Utah 84110

Dear Mr. Shingleton:

Keith E. Beardall, District Conservationist, Price, Utah, has handled the field investigation concerning the area described in your letter of November 1, 1983.

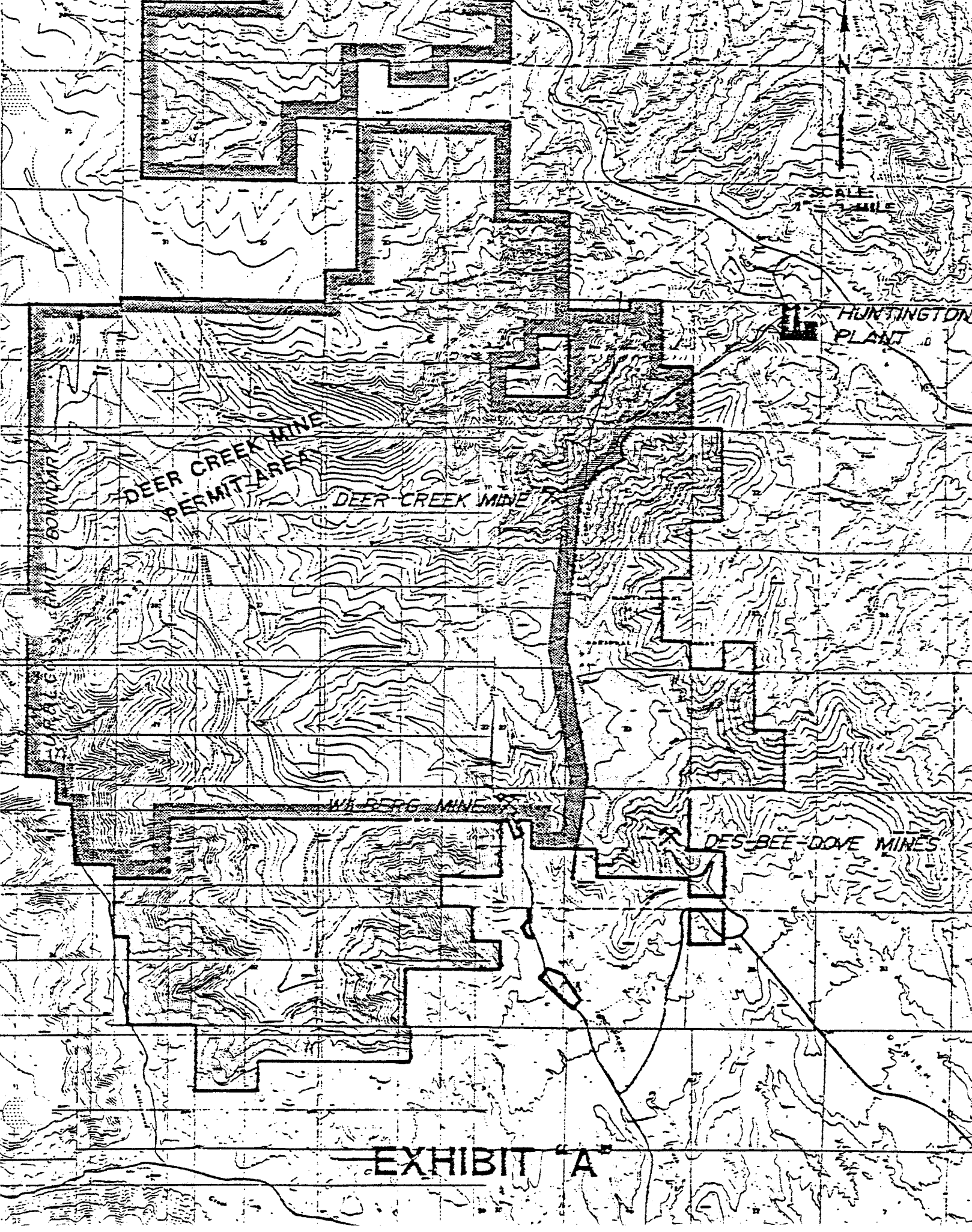
According to observations and data collected, there are no prime farmland soils in the sites A, B, and C (designated on the map you furnished). Soils in these sites are too steep or above established irrigation systems which eliminate the soils from the Prime Farmland category.

We are retaining the map and your correspondence in this office for future reference. Should you need additional information please call us.

Sincerely,

Ferris Allgood

FERRIS P. ALLGOOD
State Soil Scientist


SCALE
1" = 1 MILE
HUNTINGTON
PLANT
DEER CREEK MINE
PERMIT AREA
DEER CREEK MINE
BOUNDARY
WILBERG MINE
DES-BEE-DOVE MINES
EXHIBIT "A"

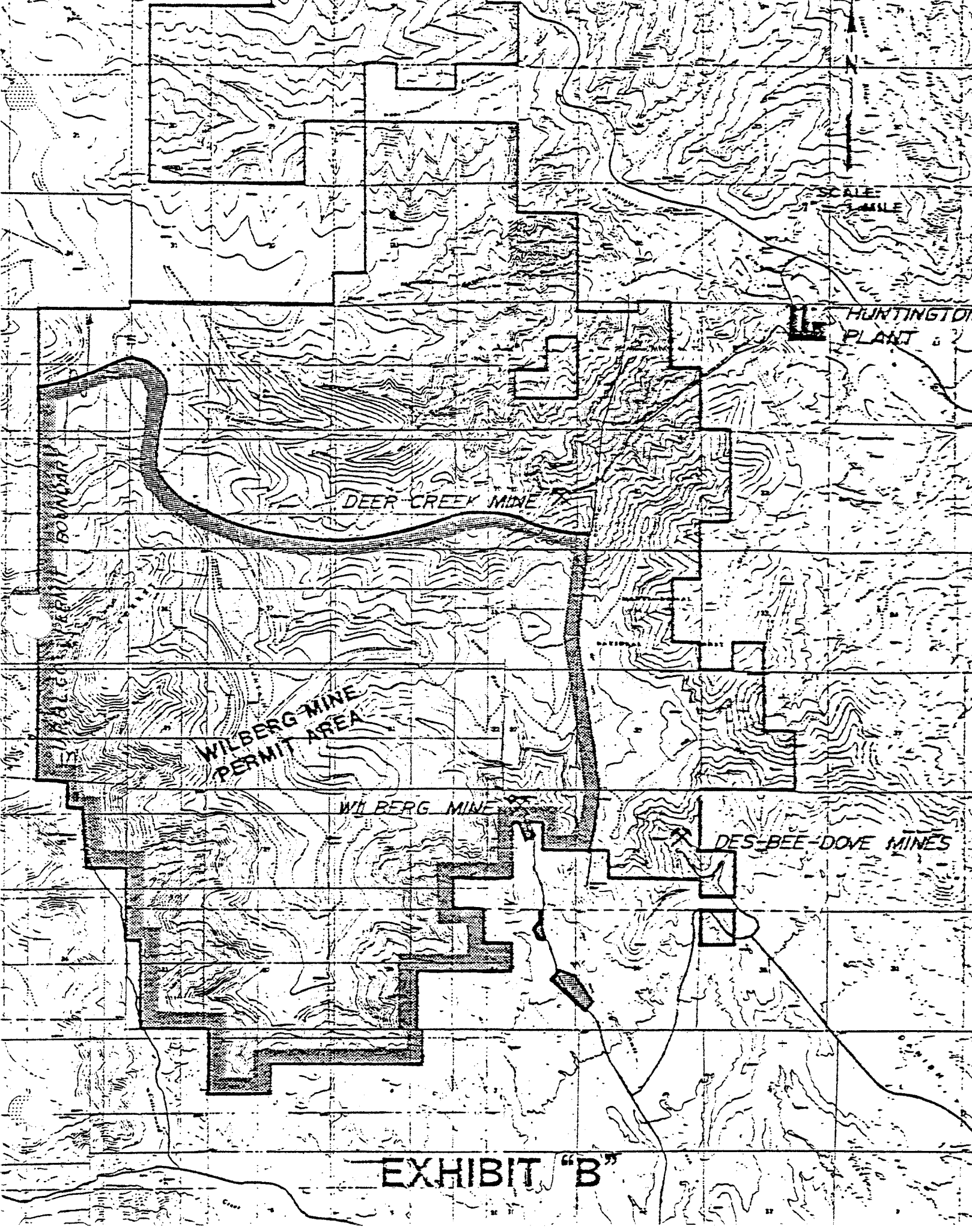

SCALE
1 MILE
HUNTINGTON
PLANT
DEER CREEK MINE
PERMIT BOUNDARY
WILBERG MINE
PERMIT AREA
WILBERG MINE
DES-BEE-DOVE MINES

EXHIBIT "B"

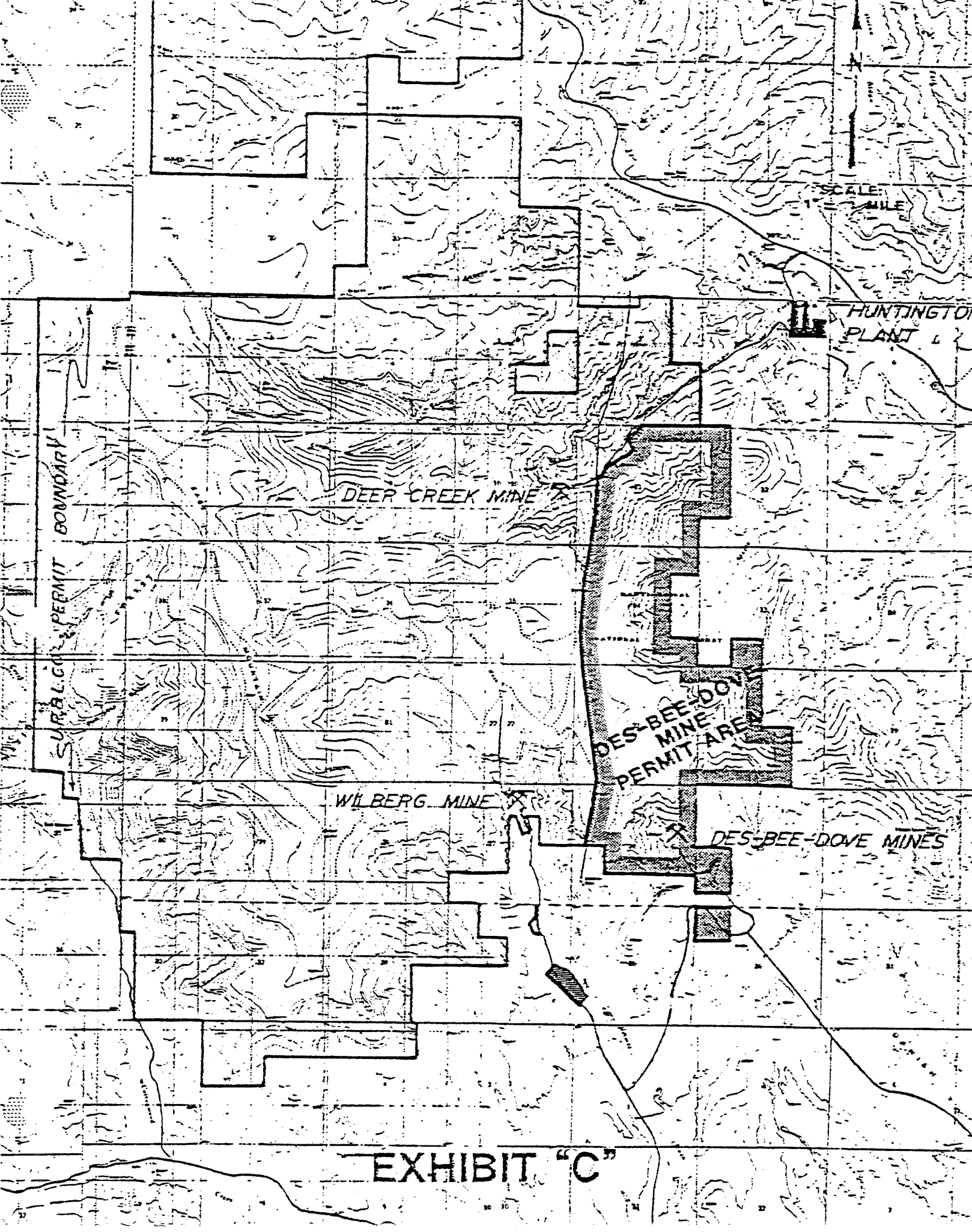

SCALE
HUNTINGTON
PLANT
DEEP CREEK MINE
SURFACE PERMIT BOUNDARY
DES-BEE-DOVE MINE PERMIT AREA
WILBERG MINE
DES-BEE-DOVE MINES

EXHIBIT "C"

ALLUVIAL VALLEY FLOORS (785.19)

The statutory definition of alluvial valley floors is as follows: "'alluvial valley floor' means the unconsolidated stream laid deposits holding the streams where water availability is sufficient for subirrigation or flood irrigation agricultural activities but does not include upland areas which are generally overlain by a thin veneer of colluvial deposits composed chiefly of debris from sheet erosion, deposits by unconcentrated runoff or slope wash, together with talus, other mass movement accumulation and windblown deposits." The surface facilities located at the Deer Creek, Wilberg, and Church underground mines are situated in relatively narrow canyons which slope up directly from the draining stream. The canyons lack any soil development and do not contain irrigatable land which could be used for agricultural purposes. The canyons in which the surface facilities are located contain deposits of mass movements, slope wash, debris erosion and sheet runoff. The area is classified as an upland and nonirrigation area and, therefore, cannot be considered as an alluvial valley floor. Furthermore, disturbance or interruption of aquifers within the underground mine complex will have no effect on downstream alluvial valley floors, insomuch as the water will eventually reach the downstream portions of the drainage system through one system or another.

DES-BEE-DOVE MINE OPERATION

Mining began as early as 1898 in the unnamed canyon where the Des-Bee-Dove Mine is located. The original mine workings, called the Griffith Mine, were limited in extent due to the rugged terrain and poor access. The Griffith workings were purchased in 1936 by two men, Edwards and Broderick, who fashioned a crude access road and mined until 1938.

Castle Valley Fuel Company purchased the Edwards and Broderick property in 1938. The L.D.S. Church purchased coal lands adjacent to Castle Valley Fuel Company in 1938 and began their operations in that year.

The Church Mine operated under contract to a Mr. Killian of Orangeville until it was closed in 1943 due to World War II. Castle Valley Fuel Company continued to operate until 1947. The L.D.S. Church purchased Castle Valley Fuel's operation in 1947 and combined operations to form Deseret Coal Company, a church welfare project.

Deseret Coal Company continued operations until Utah Power & Light Company acquired it in 1972.

Mining takes place in three main portals, Deseret, Beehive, and Little Dove. Hence the name Des-Bee-Dove Mine. Mine personnel and coal handling facilities are combined to service all three portals. Mine location is shown on Figure 1.

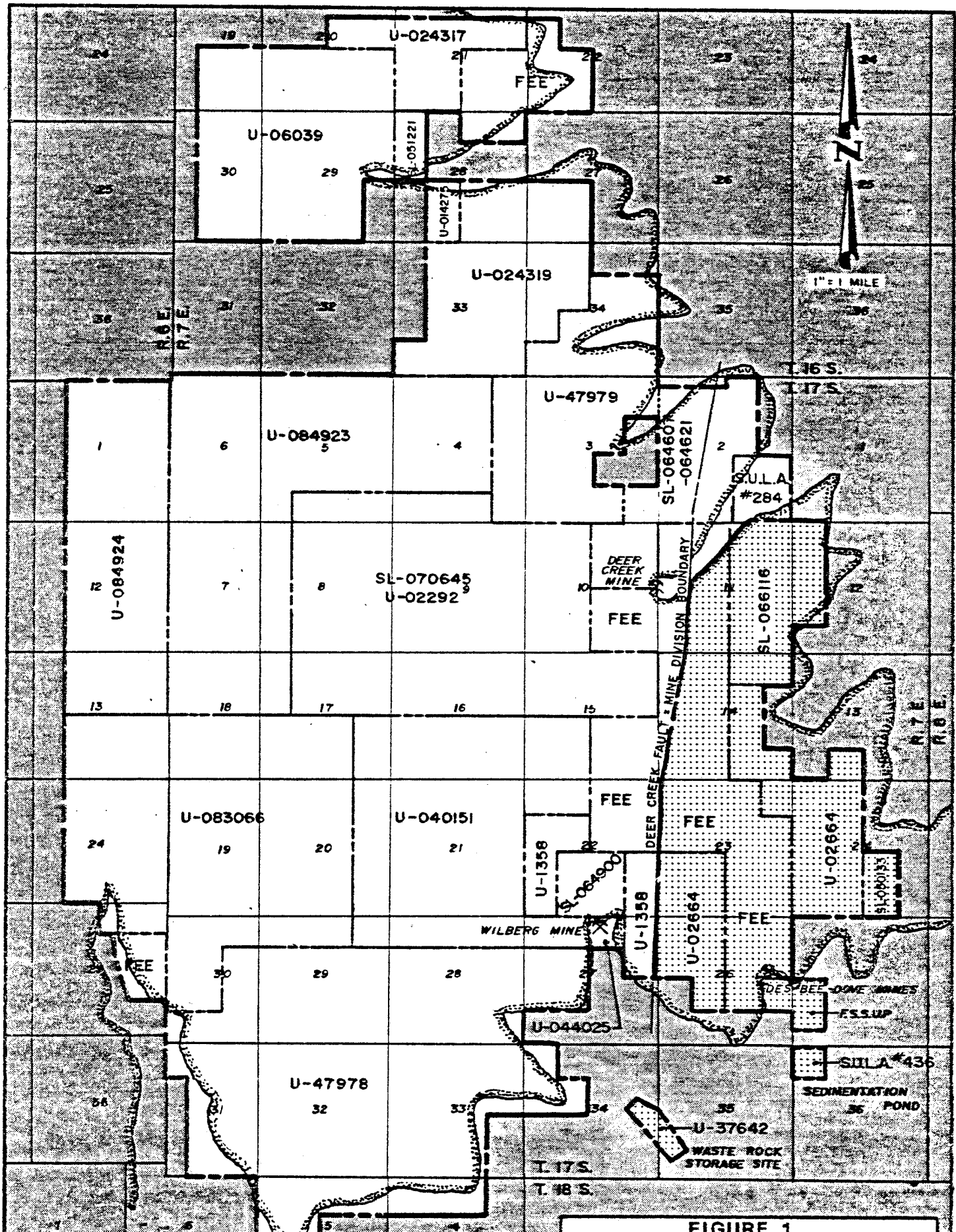


FIGURE 1
DES-BEE-DOVE
MINE PERMIT BOUNDARY

UTAH POWER & LIGHT COMPANY
DEPARTMENT OF MINING & EXPLORATION

Two minable seams exist in the Des-Bee-Dove Mine area. Hiawatha (lower Seam is mined through Deseret portal. Blind Canyon (upper) Seam is mined through Beehive and Little Dove portals. Approximately 558 acres of minable coal remain accessible in Blind Canyon Seam from Des-Bee-Dove Mine. Hiawatha Seam contains approximately 390 acres of minable coal reserve remaining accessible.

The anticipated Des-Bee-Dove life-of-mine production is near 8.3 MM tons. This anticipated production will be obtained by utilizing three continuous mining units, which are presently operating.

The basic Des-Bee-Dove mining plan consists of a system of mains and sub-mains connecting a series of room-and-pillar continuous mining sections. Relatively short mine life and limited remaining minable reserves discount the economics of applying alternate mining methods.

Extracted coal is sized in the Des-Bee-Dove coal handling facility and trucked predominantly to the Utah Power & Light - Hunter Power Plant, approximately 13 miles.

MINING PLAN (784.11)

The Des-Bee-Dove mining plan is based on the geologic information outlined in Geology Description. Good knowledge of the entire property is available from the outcrop and drilling. Detailed knowledge of a smaller part of the property is known from mining operations.

The mining areas are bounded by natural and imposed limits with varying degrees of confidence as to location and extent:

- Lease boundaries - definitely located and invariable in the short term
- Faults - may vary somewhat from currently assumed locations
- Stratigraphic thinning (pinchouts) - mining limits may vary hundreds of feet as information becomes available and as mining recovery economics and practicality are studied further.
- Underground burned areas - from a practical point of view are undeterminate prior to mining.

Permit boundary and approximate locations of faults affecting the Des-Bee-Dove Mine plan are illustrated in Maps 3-1 and 3-2. Faults influencing the mining plan are Maple Gulch Fault, Deer Creek Fault, and Bear Creek Canyon Fault.

Mining limits in Blind Canyon Seam include the 5 foot seam thickness. The underground mining machines now employed in the Des-Bee-Dove Mine are, by design, limited to a 5 foot coal seam. The Blind Canyon 5 foot thickness roughly parallels the Little Dove main entries for approximately one-half mile and effects only a small portion of the overall reserve. The northern extent of mining in Hiawatha Seam will be determined by either 5 foot seam thickness or underground burned area. The interburden in the minable area where the two seams overlap varies from 70 to 120 feet.

Since mining through Deseret portal is overlain by Beehive and Little Dove mining, detailed scheduling has been undertaken to ensure that the upper seam is mined prior to the mining the lower seam while still following good mining practices in generating the mine layout.

The mine layout, as illustrated in Maps 3-1 and 3-2 is an arrangement of room-and-pillar sections interconnected by a system of six-entry mains and sub-mains. This arrangement is predicated on geographical dedication of reserves and available geologic information. Better knowledge of the geology and quality parameters of the coal reserve through additional drilling, mine development work, and continued operating experience at Hunter Power Plant will influence mining techniques and mine plans.

The most recent mine plan comprises 3 sets of main entries, 4 sets of sub-main entries, and 32 room-and-pillar sections. The planned extraction sequence accommodates Beehive and Little Dove first. The sequence of mining at Des-Bee-Dove is shown on Maps 3-1 and 3-2.

Room-and-pillar sections are to be extracted in the order listed in Tables 1 thru 3. Approximate dates for these extractions are also listed. Section identifications in Tables 1 thru 3 refer directly to those shown on the mining plan. Pillars in mains and sub-mains will be extracted as needed to ensure maximum efficient extraction of the minable reserve.

TABLE 1

DES-BEE-DOVE MINE
TIMING FOR UNIT #1

Section	Start	End Advance	End Retreat
2nd North Bee	10-1-83		10-13-86
1st North Bee	10-13-86		12-25-87
9th West Bee	12-25-87		6-12-88
10th East Bee	6-14-88		12-6-88
Main North Bee	12-6-88		2-14-90
2nd North Des	2-22-90		5-7-90
11th East Des	5-7-90		8-17-90
10th East Des	8-17-90		1-15-91
1st Left Des	1-15-91		5-26-91
2nd Left Des	5-26-91		11-19-91
10th West Des	11-19-91		5-1-92
8th East Des	5-8-92		2-23-93
9th East Des	3-1-93		6-1-93
Main North Des	6-9-93		1-8-95
1st North Des	1-8-95		4-6-95
1st Right Des	4-6-95		9-5-95
2nd Right Des	9-6-95		3-2-96
3rd Right Des	3-2-96		9-23-96
4th Right Des	9-24-96		4-20-97

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TABLE 2

DES-BEE-DOVE MINE
TIMING FOR UNIT #2

Section	Start	End Advance	End Retreat
1st North LD	10-1-83		6-7-87
3rd North LD	6-15-87	12-26-87	
3 North Room 1 LD	12-26-87		3-23-88
3 North Room 2 LD	4-1-88		11-13-88
3 North Room 3 LD	11-21-88		7-22-89
3 North Room 4 LD	7-29-88		2-20-90
Main West LD	2-20-90		8-1-90
1st Right LD	8-1-90		2-30-91
2nd Right LD	3-1-91		8-21-91
3rd Right LD	8-22-91		2-22-92
4th Right LD	2-3-92		7-1-92
5th Right LD	7-1-92		1-11-93
Main West	1-11-93		3-19-93

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TABLE 3

DES-BEE-DOVE MINE
TIMING FOR UNIT #3

Section	Start	End Advance	End Retreat
9th West Des	10-1-83		12-6-83
6th East Des	12-14-83	3-10-84	
2nd North Des	3-17-84	6-4-84	
14th East Des	6-2-84		8-16-84
13th East Des	8-24-84		1-4-85
12th East Des	1-12-85		10-11-85
2nd North G Des	10-17-85		6-25-91
6th East Des	7-3-91		2-20-92
7th East Des	2-27-92		2-3-93
Main West Des	2-11-93		8-18-93
1st Left Des	8-18-93		4-21-94
2nd Left Des	4-29-94		2-6-95
3rd Left Des	2-14-95		12-27-95

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Plans for roof control, ventilation system, and methane and dust control have been submitted to MSHA and are in the appendix.

Coal Recovery

The maximum amount of economically recoverable coal will be extracted from this mine with the exception of protective coal, which must be left in place to insure the integrity of the mine. This protective coal can be broken into two separate categories of barrier coal and strata control coal.

One hundred (100) foot wide barrier pillars are left between room-and-pillar panels to provide effective strata control over each panel. These barriers also act as fire isolation barriers, should a combustible incident arise in a panel.

Additional barriers 300 to 500 feet wide are left between room-and-pillar panels and the main entries of the mine. These barriers protect the main entries which contain the major ventilation and transportation routes of the mine.

Upon exhaustion of the reserves in any particular area, the barrier pillars surrounding the main entries will be sequentially extracted along with the pillars of the main entries.

Strata control coal is left in the areas where the floor or roof rock is unstable and subject to failure. This coal will be left as a safety measure, during the development

of the section, and will be extracted during the retreat of the section if safely possible.

Using this method of room-and-pillar mining, it is our intention to recover the maximum amount of economically feasible coal in this mine.

It is anticipated that occasions will arise when resource recovery cannot be fully accomplished, as outlined by the mine plan, due to difficult mining conditions. However, before any modification is made, it will first be discussed with the appropriate BLM officials for approval.

Applicant will comply with all special terms and conditions of the federal coal leases.

The following table shows the number of acres affected by mining for each 5 year period.

In areas of seam overlap, only the first mining in the area is considered. Subsequent mining in the other seam is not considered since the area has previously been affected.

TABLE 4

ACRES AFFECTED BY MINING

Time Period	# Acres Affected
1983-1987	337
1988-1992	360
	12
TOTAL	709

Abandonment of the coal mine will be accomplished by a series of systematic sealings of worked out areas within the mine. As each section of the mine is extracted, the gob area left behind will be sealed off from the mine atmosphere by constructing seals. These seals will be constructed in accordance with MSHA regulations.

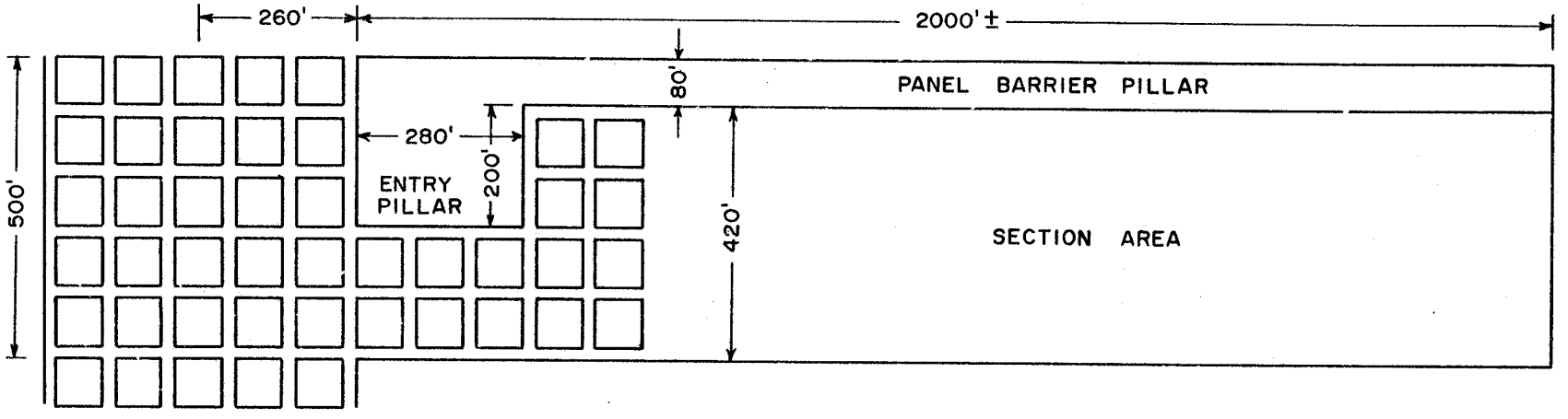
Upon final extraction of the mine, portal seals will be constructed. Prior to any construction, however, BLM officials will be notified and approval obtained.

MINING METHOD

Des-Bee-Dove Mine is limited strictly to room-and-pillar methods employing continuous mining units.

Figure 2 illustrates the basic configuration of the main entries. A six-entry system is planned for the main headings with openings driven 20 feet wide on 100 foot centers. The pillars created thereby measure 80 feet by 80 feet, a size which, in the past, has proven sufficient to support the overlying strata.

For development of room-and-pillar sections at Des-Bee-Dove Mine, three entries will be opened on advance with two or more developed on retreat in conjunction with pillar extraction. Openings are 20 feet wide on 100 foot x 100 foot centers. The sequence of pillar recovery is shown in Figure 3 (near the end of advance and beginning of retreat and pillaring). Figure 4 shows in detail the method planned for recovering individual pillars.

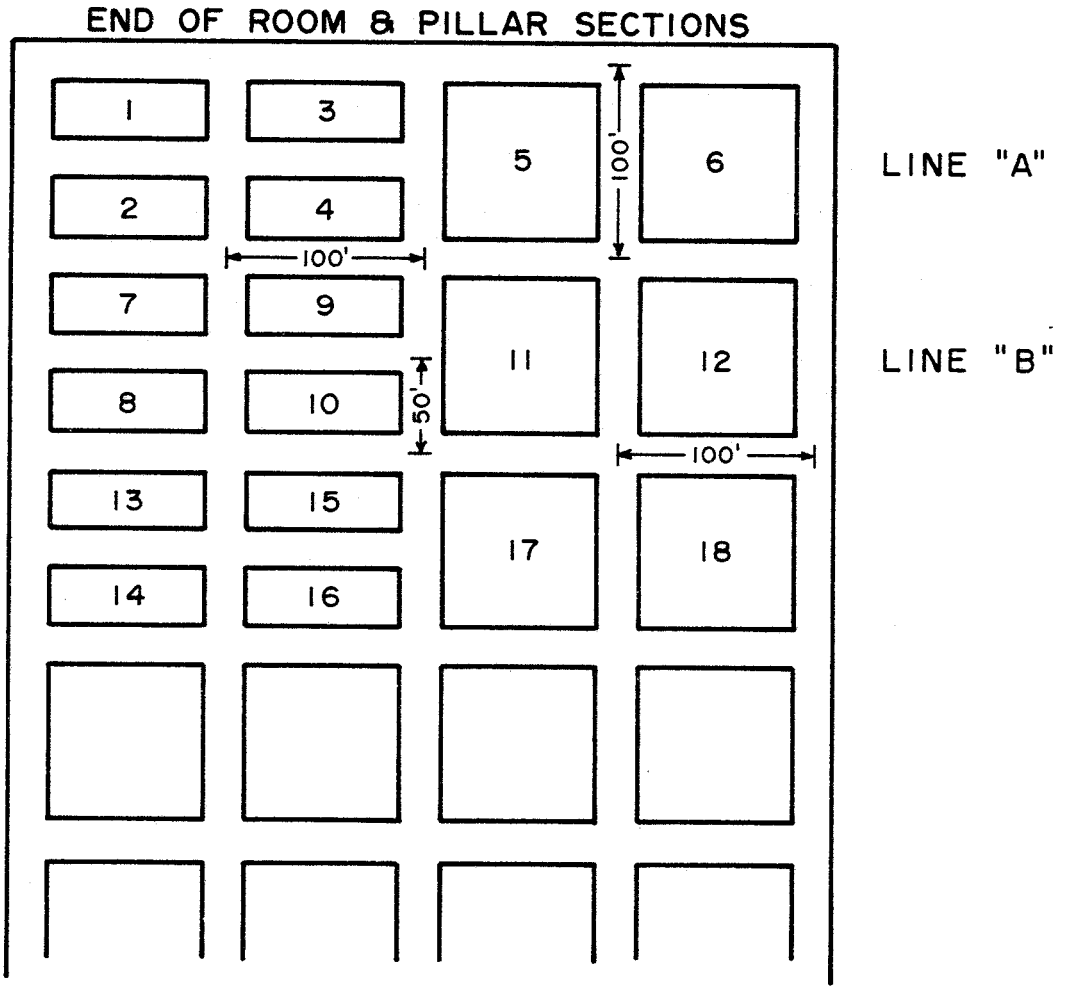


MAIN ENTRY AREA
ASSOCIATED WITH A GIVEN PANEL

FIGURE 2

CONFIGURATION OF EXTRACTION PLAN FOR
ROOM AND PILLAR SECTIONS AT DES-BEE-DOVE MINE

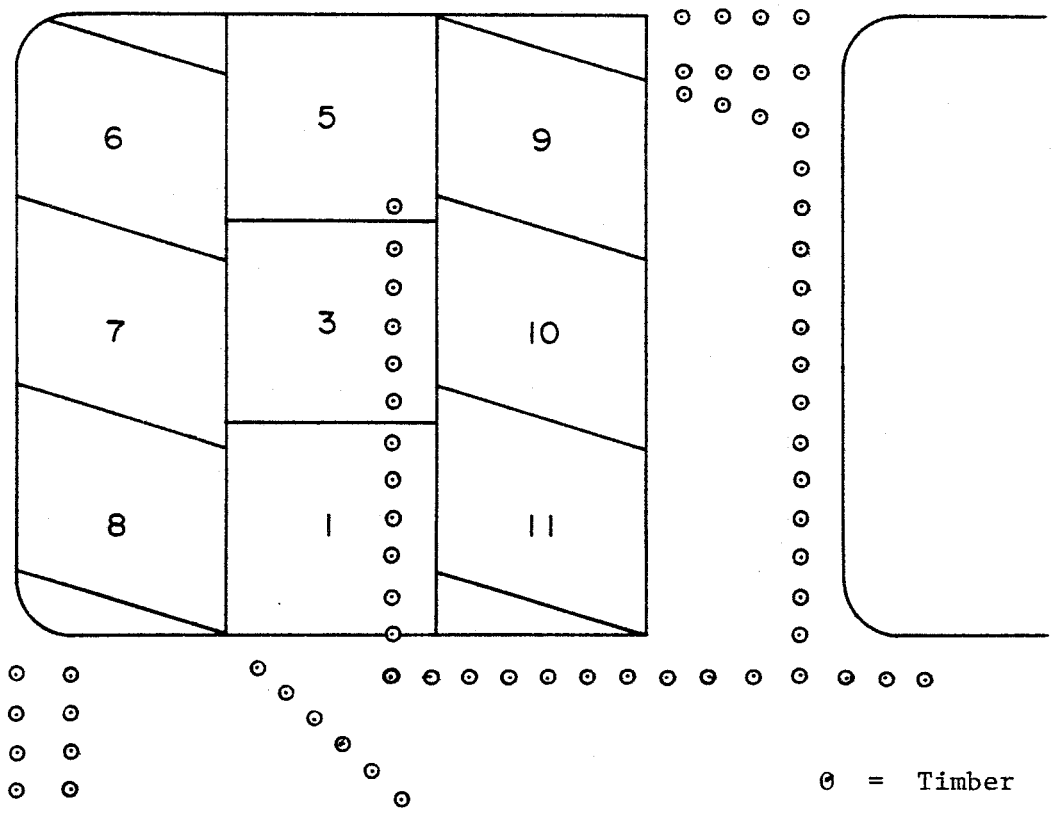
SCALE 1" = 300'



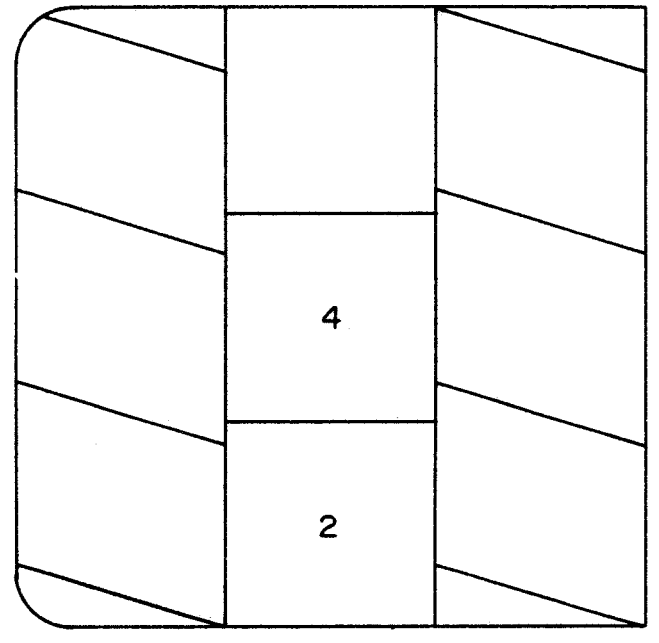
Pillars in Line A will be recovered first, starting at pillar #1 going to #6. Then the pillars in Line B will be recovered.

FIGURE 3

SEQUENCE OF PILLAR RECOVERY



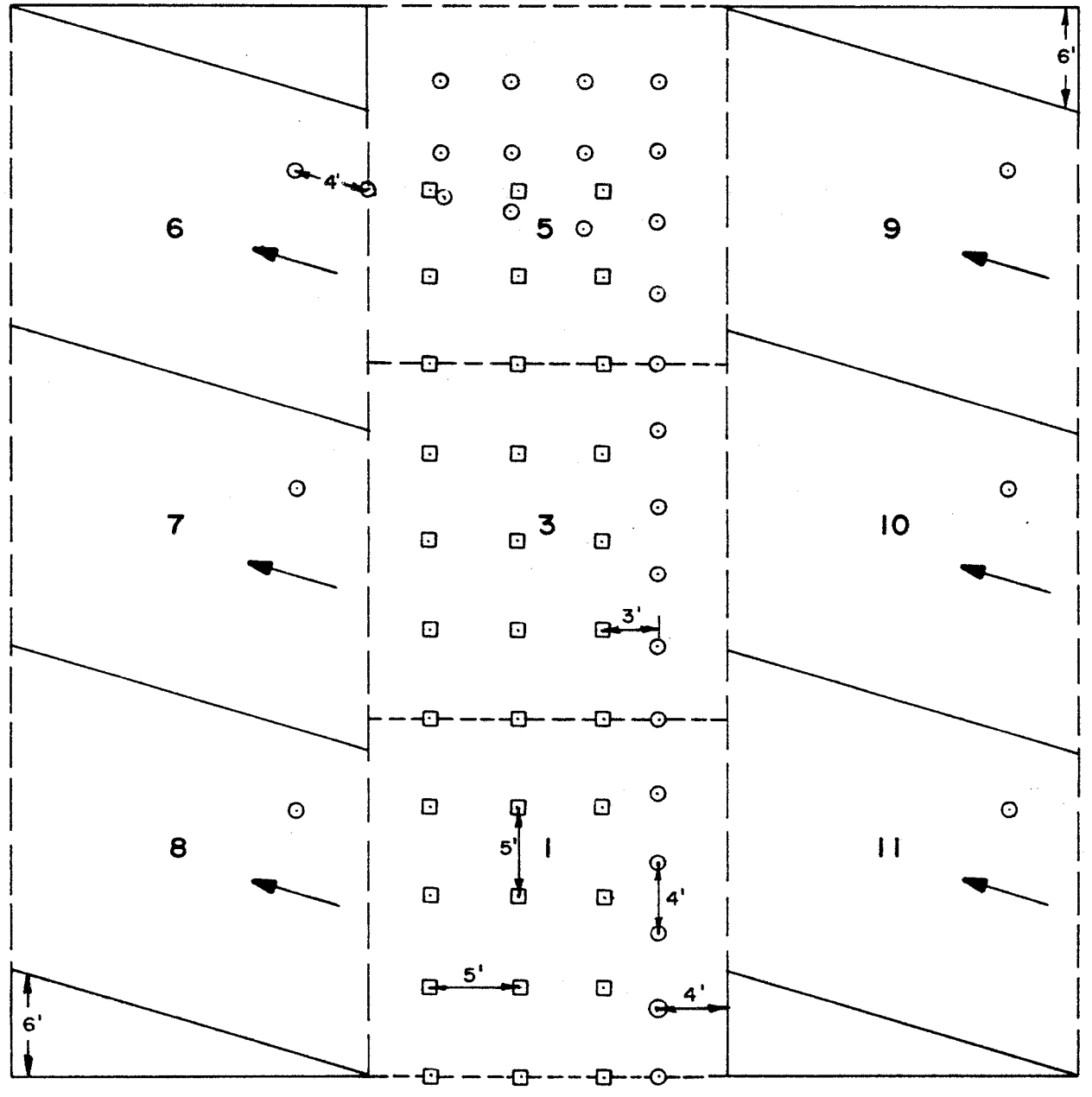
Θ = Timber



All cross cuts and entries are fully bolted.
Splits 6, 7, 8, 9, and 10, will be on a slight angle.
Have timber set on right side on 4 ft. centers, and 14 ft. roadways through splits 6, 7, 8, 9, and 10.
Have the option to split the pillar from either direction.

FIGURE 4

CUT SEQUENCE ADJACENT PILLARS



Bolt

Timber

Scale 1" = 10'

Bolts are 3' from timber that are set on right side of first split. The reason for this is because it is not feasible to remove timbers in a pillar split.

All entries and crosscuts are fully bolted.

The last 10' of the last cut (5) in the first split will not have to be bolted.

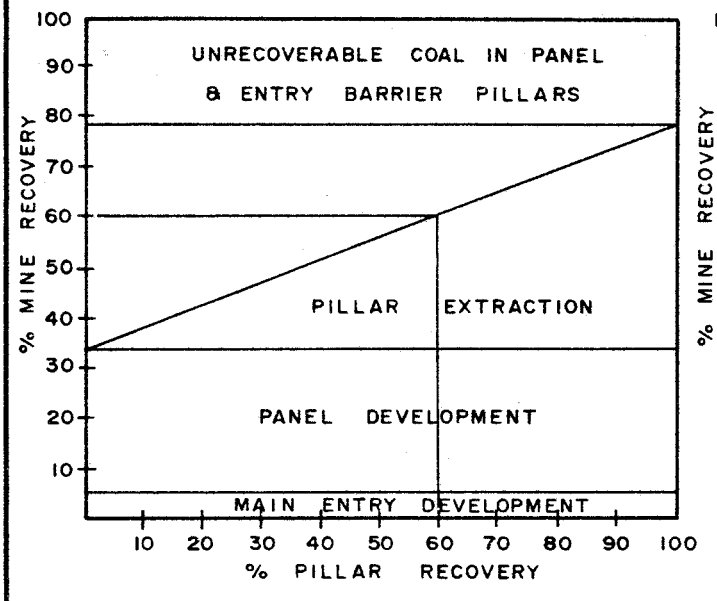
Have turn timbers on 4' centers on each push through.

Timbers set on 4' centers for whatever it takes to break through, not to exceed 12' from last row of bolts.

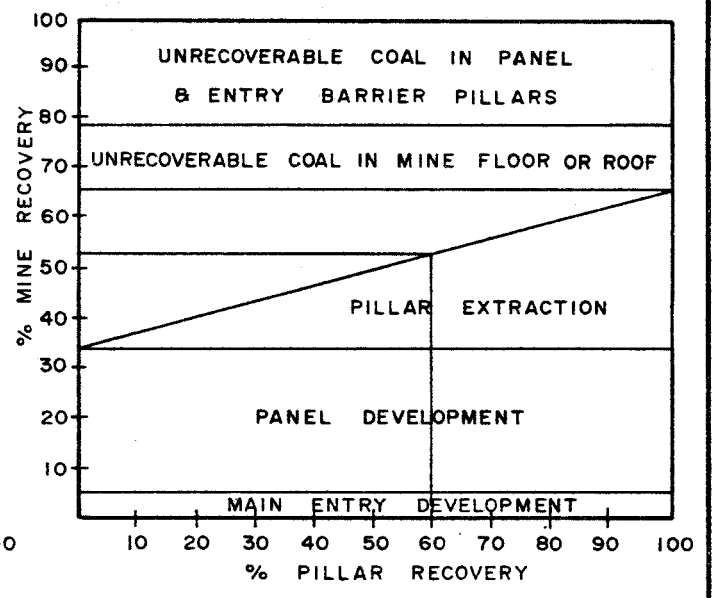
Miner cab not to exceed timber.

FIGURE 5

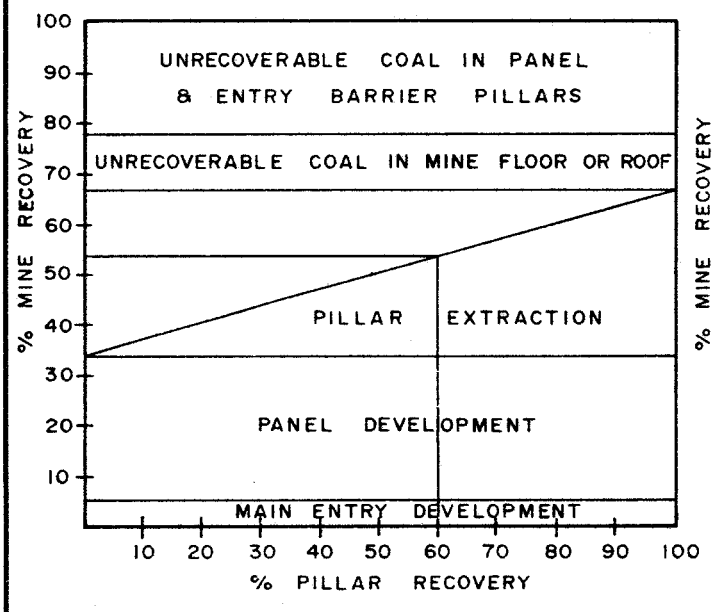
DETAIL OF RECOVERING INDIVIDUAL PILLARS



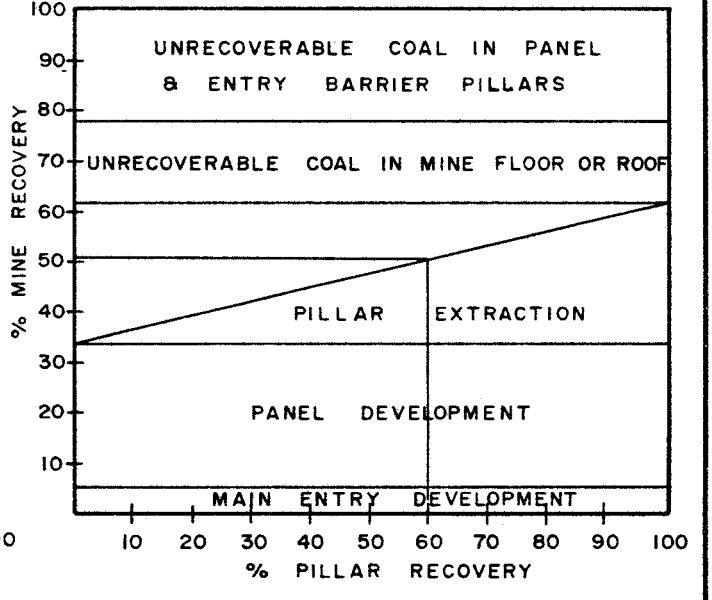
FULL SEAM MINING



6' MINING IN 7' SEAM



8' MINING IN 9' SEAM



10' MINING IN 12' SEAM

FIGURE 6

RELATIONSHIP OF OVERALL MINE RECOVERY TO PILLAR RECOVERY BASED UPON THE SYSTEMATIC EXTRACTION PLAN FOR THE DES-BEE-DOVE MINE

Figure 6 indicates that 60% pillar recovery, leaving a foot of top coal, results in just over 50% coal recovery for configuration planned at Des-Bee-Dove.

MINE PRODUCTION

Mine production is based on an annual requirement of 725,000 tons from Des-Bee-Dove Mine. Production requirements are fulfilled by employing three continuous miner units working 235 days per year at an average individual production rate of 515 tons per machine shift. Individual unit production rates vary from the average depending on mining conditions, seam thickness, and operational mode. (Operational modes include: (1) development advance, (2) production advance, and (3) production retreat.) Table 5 shows the anticipated annual and total production for Des-Bee-Dove Mine.

Total in-place reserves within Des-Bee-Dove Mine's boundaries are approximately 17,200,000 tons. Estimated overall minable reserve recovery is 48%.

MINE EQUIPMENT

Many pieces of major underground ancillary equipment are utilized at Des-Bee-Dove Mine to promote safe and efficient operation of the continuous mining units.

Des-Bee-Dove Mine is a trackless mine. Men and materials are delivered by rubber-tired diesel tractors and mantrips throughout the mine. All principal in-mine haulage of coal is by belt conveyor. Of the six entries in the main

TABLE 5

DES-BEE-DOVE MINE
ANTICIPATED ANNUAL AND TOTAL PRODUCTION

Year	Tons
1984	707,000
1985	720,000
1986	726,000
1987	713,000
1988	717,000
1989	729,000
1990	723,000
1991	724,000
1992	705,000
1993	527,000
1994	483,000
1995	472,000
1996	240,000
1997	79,000
TOTAL PRODUCTION	8,265,000

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entry systems, one entry is dedicated mainly to conveyor and one to roadways for diesel haulage.

Table 6 lists the major ancillary equipment used in Des-Bee-Dove Mine.

TABLE 6

DES-BEE-DOVE MINE -
MAJOR UNDERGROUND ANCILLARY EQUIPMENT

Continuous Mining Units	General Mine
4 - Continuous Miners	10 - Compressors
8 - Shuttle Cars	19 - Transformers
8 - Scoops	52,240' - 42" Conveyors
4 - Roof Bolters	20,800' - 36" Conveyors
25 - Rock Dusters	33 - Conveyor Drives
6 - Power Centers	6 - Foam Generators
5 - Feeder Breakers	8 - Welders
	8 - Battery Chargers
	8 - Diesel Personnel Tractors
	9 - Diesel Mantrips
	38 - Material and Equipment Trailers
	9 - Diesel Material Tractors
	13 - Tool and Material Carts

ENGINEERING PRINCIPLES AND TECHNIQUES

A variety of engineering principles and techniques are applied in the Des-Bee-Dove Mine operation. Principles of engineering employed are those associated with standard prudent mine engineering practice. Employment of knowledgeable, experienced personnel makes application of such principles possible. Engineering design techniques include computer simulation of coal extraction, ventilation, and pumping systems, along with research and testing in rock mechanics and subsidence.

Long-range mine planning by computer simulation plays an important role in design. Computer simulation of coal extraction assists the engineers in projecting annual tonnages and sequencing extraction in sections. Computer based long-range planning helps to maximize annual production and better utilize continuous mining units. The two seam nature of the property and consequent need to extract upper seam sections in advance of lower seam sections increases the value of these simulations.

Ventilation and dust suppression are essential in underground mining operations. Delivering air and water from their respective sources to fulfill these needs can become complicated in a large operation. Simulations of ventilation and hydraulic networks play a significant role in planning for future needs and installing systems for delivery.

Des-Bee-Dove Mine planning includes these ventilation and hydraulics simulations.

Rock mechanics studies are a necessary part of mine planning. The long-term stability of the entries directly affects mine integrity as well as a protection of property and mine production. Beehive Mine was the site of a U. S. Bureau of Mines sponsored study to measure the behavior of pillars under the effects of an approaching cave line. Results from this program, combined with on-going stress testing, indicates the possibility of reducing pillar size without significant stress increase. If this proposition proves valid, a greater proportion of coal can be extracted on development and overall resource recovery would be improved. Such changes in section widths and spacing should be coordinated with the main entry pillar spacings (and/or sizes) to effect straight line belt haulage from the sections to the mains while obviating the need to "trim" main entry pillars.

The determination of rock strengths and elastic parameters has been in progress since November 1976 by mechanically testing cores taken from roof and floor formations. Holes are drilled upward or downward from the entries existing within the Des-Bee-Dove Mine. Rock mechanics properties are being interpreted and used primarily in assessing the caveability of the overburden.

MINE FACILITIES

Introduction

Des-Bee-Dove Mine facilities are located on 20 acres in an unnamed wash on the perimeter of East Mountain. The natural terrain is rocky, dry and very steep with moderate vegetation. Surface facilities include the following: sediment pond, earthen structures, coal stockpile, tipple, facility conveyors, parking lot, office-bathhouse-warehouse, underground shop, materials storage areas, access and service roads, mine ventilation fans, power supply and substation, potable water system, sewer treatment system, and drainage systems.

Specific locations of mine facilities are shown on Maps 3-6 and 3-7.

All facility plans are on file at Utah Power & Light Company, Department of Mining and Exploration, 41 North Redwood Road, Salt Lake City, Utah. They are available for public inspection. Facility photographs are in Appendix IX.

With the exception of roads and conveyors, a narrative follows explaining the construction, use, maintenance, and removal of the aforenamed facilities.

Dams, Embankments, and Other Impoundments

Sediment Pond - A pond has been designed and constructed for sediment control at Des-Bee-Dove Mine. The pond design capacity is 19.4 acre-feet, 1.8 acre-feet for

sediment, 17.4 acre-feet for runoff, and 0.2 acre-feet free board. The pond design will impound runoff from the 10 yr.-24 hr. detention period. A grouted riprap spillway is installed in the dam to provide controlled release of runoff from storms in excess of the 10 yr./24 hr. precipitation event.

Construction and design of the ponds were under the direction of a registered professional engineer. Details of pond construction are in Appendix VIII.

Slopes constructed on fill have been revegetated to minimize erosion.

Maintenance of the sediment ponds includes quarterly inspections and discharge monitoring. Copies of inspection reports by a registered professional engineer are submitted to the Division following inspection. The pond will be dredged of sediment when sediment volume is 60% of design capacity.

Reclamation of the pond will complete the proposed Des-Bee-Dove reclamation process. The pond will be allowed to dry followed by backfilling and grading. Graded contours will be compatible with the natural surroundings. Revegetation will be performed as outlined in Reclamation Plan.

Earthen Structures - Five major earthen structures are utilized at Des-Bee-Dove Mine for support of facilities. They are identified as follows:

1. Tipple Area Structure
2. Bathhouse Area Structure
3. Coal Stockpile Structure
4. Deseret Portal Structure
5. Beehive Portal Structure

Construction details of earthen structures are included in Existing Structures.

Largest of the earthen structures is the tipple area structure providing 4.1 acres of working area. Tipple, material storage, fuel facility, auxiliary coal stockpile, and access road are supported by this structure.

The bathhouse area structure occupies 2.1 acres and supports office-bathhouse-warehouse, parking lots, and material storage shed. This structure is mostly asphalt surfaced.

Less than one-half acre is occupied by the coal stockpile structure. Short term stockpiles are repeatedly constructed here for surge control of the run-of-mine product.

Deseret portal structure, mostly cut and some fill, is founded on the Starpoint Sandstone. This 0.9 acre structure supports Deseret #1 ventilation fan, main substation, rock dust silo, coal transfer structure, conveyors, stacking tube (utilized as a coal transfer), main substation, material storage, fuel facility, trash bin, and portal access road.

Beehive portal structure occupies 1.1 acres and supports material storage, Little Dove conveyor, a coal transfer structure, Little Dove ventilation fan, a trash bin, and a fuel facility.

Some small road cut structures are utilized for support of the culinary water storage tank, Beehive ventilation, Deseret #2 ventilation fan, secondary substation, and auxiliary water storage.

Maintenance of the structures is minimal. Periodic inspections will be made to observe changes in stable structure condition. Resurfacing of parking areas and regrading of graveled surfaces will be done as needed. Surface drainage structures will be inspected and cleaned as needed to ensure proper drainage and promote stability.

Details of earthen structure reclamation are included in Reclamation Plan.

Overburden and Topsoil Handling and Storage

At present, no facilities existing specifically for overburden and topsoil handling and storage at Des-Bee-Dove Mine. All overburden removed in the mine area has been utilized as construction material for earthen fill structures.

Coal Handling Facilities

Des-Bee-Dove coal handling system is designed to collect coal on a conveyor and transfer system and prepare three separate facility products. A description of the coal

handling system follows. Components of the coal handling system are shown on Maps 3-6 and 3-7.

Facility Conveyors - All facility conveyors are separately identified and discussed in Transportation Facilities.

Transfer Structures - Three separate transfer structures are utilized in the Des-Bee-Dove coal handling system.

The 16" x 0" run-of-mine product from Little Dove Mine is conveyed approximately 100' to a transfer structure which passes the coal to a 150' long inclined conveyor.

An 80' stacking tube arrangement is utilized to transfer Little Dove coal to the Deseret portal area for transfer to the coal stockpile. The stacking tube transfer collects run-of-mine coal from the 150' inclined conveyor and delivers to a concrete surge bunker at the base of the tube. Coal is reclaimed via two vibratory feeders at the base of the bunker for transport to the Deseret portal transfer structure.

Deseret portal transfer structure receives run-of-mine product from Deseret portal and Little Dove portal. Coal flow is diverted past an adjustable flop gate onto main and/or auxiliary coal stockpile feed belts.

All transfer structures are steel frame construction on concrete foundations.

Standard mechanical maintenance procedures are applied on transfer structures to ensure smooth operation.

Transfer chutes are enclosed and inlets and outlets are rubber curtained to minimize contribution of fugitive dust.

All transfer structures will be dismantled and sold for salvage or scrapped during reclamation. Concrete foundations will be removed, broken up,and used for coarse backfill.

Coal Surge Bin and Stockpile - Coal is collected from the main stockpile feed conveyor in an 800 ton capacity coal surge bin which delivers directly to a reclaim feeder. The surge bin automatically overflows into auxiliary storage adjacent to the bin.

Run-of-mine product is diverted out the auxiliary stockpile feed conveyor for further stockpiling when the overflow stockpile is filled. Maximum coal stockpile capacity is 10,000 tons. Coal is moved to a reclaim feeder by rubber-tired front-end loader. Stockpiles are usually depleted within one month of original placement.

Maintenance of the stockpile area is minimal. Coal stockpiles are moved and cleaned up as soon as possible to minimize chance of spontaneous combustion. Drainage ditches are kept clear to ensure adequate drainage of the stockpile area.

Prior to final reclamation, all coal will be cleared from the stockpile area. The concrete surge bin will be demolished and used for coarse backfill. The earthen structure supporting the stockpile will be reclaimed as detailed in Reclamation Plan.

Coal Reclaim and Sizing - A single vibratory feeder is utilized to reclaim coal from the short-term stockpile onto a 36" tipple feed conveyor. The run-of-mine product passes two tramp iron magnets before entering the tipple for screening, sizing, and separating. The tipple sizing and separating circuit is illustrated in Figure 7.

Run-of-mine coal is screened of -1 5/8" size before crossing a picking table. Rock and trash are picked from the product stream on the picking table and separated. Rock drops to a bony bin and trash is swept to a trash pile beneath the tipple. The -1 5/8" size coal is delivered to a power plant feed bin (bin #1 on Figure 7).

Lump coal (+6") is screened from the product stream and collected in a lump coal bin or delivered for further crushing. All +1" coal from the second tipple screen (double-deck) and excess lump coal are fed through a Jeffrey Flextooth Crusher and recirculated to the double deck screen for further separation.

Two products are collected from the double-deck screen and removed from the product stream. Minus 3/16" size is delivered to a plant feed product bin (bin #2 on Figure 7). Minus 1" to plus 3/16" size is collected for L.D.S. Church stoker coal or diverted to plant feed bins when the stoker coal bin (#3 on Figure 7) is full.

All product bins are installed with overflow bypass systems except the lump coal bin. Using the identification

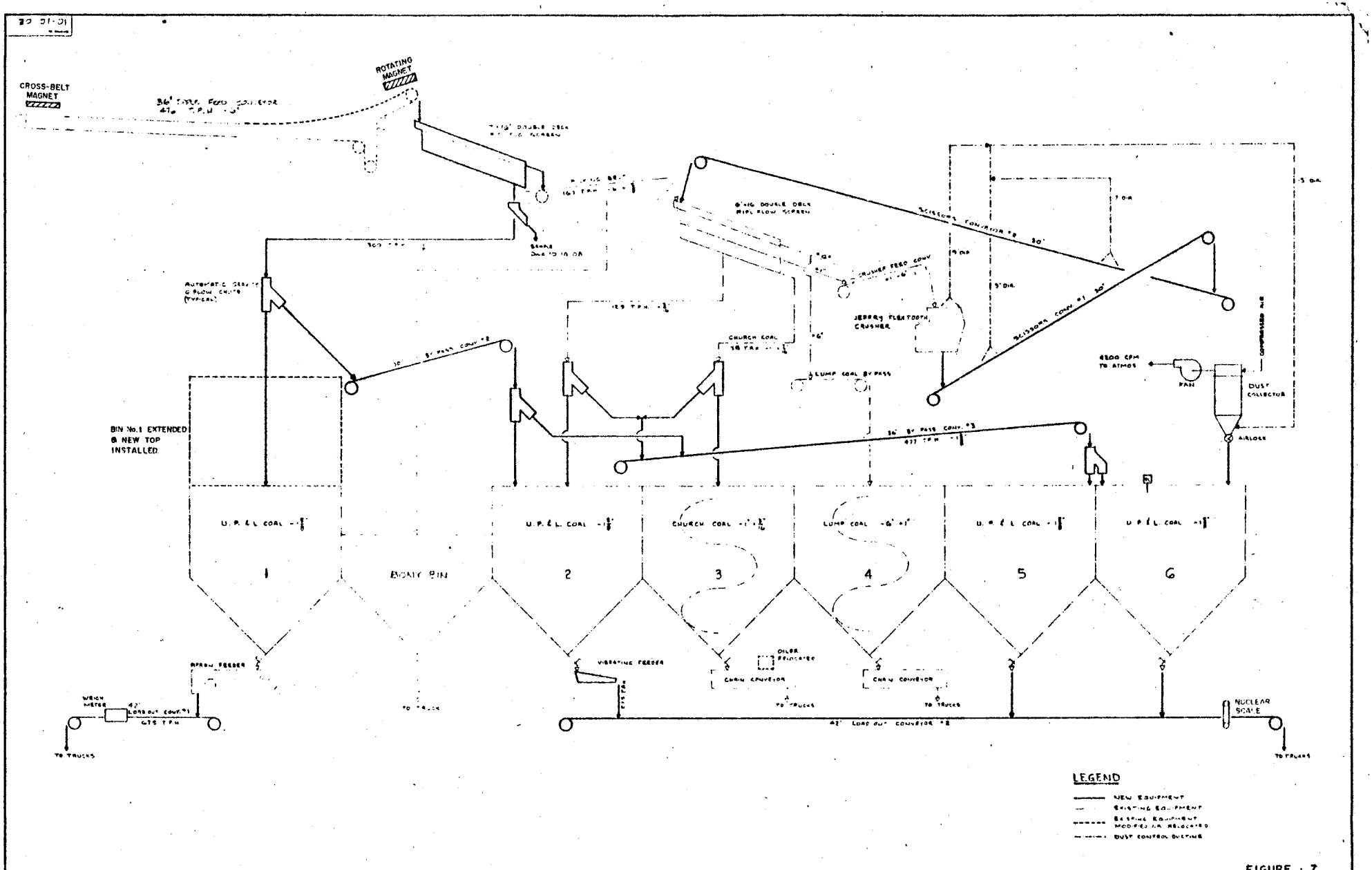
CROSS-BELT MAGNET
ROTATING MAGNET
BIN No.1 EXTENDED & NEW TOP INSTALLED
JEFFREY FLEXTOOTH CRUSHER
DUST COLLECTOR
FAN
AIRLOCK
BYPASS FEEDER
VIBRATING FEEDER
CHAIN CONVEYOR
NUCLEAR SCALE
BENTY BIN
LEGEND
NEW EQUIPMENT
EXISTING EQUIPMENT
DUST CONTROL DUCTING

FIGURE - 7

number of Figure 7, bin #1 overflows to bin #2. Bins #2 and #3 overflow to bins #5 and #6.

Bin #1 which collects power plant feed product -1 5/8") holds 285 tons maximum. All other bins, including the bony (waste rock) bin, hold a maximum 160 tons.

Plant products are generally gravity fed from the bins and conveyed out the base of the tipple into trucks for transport to various destinations. Power plant feed (-1 5/8") is trucked predominantly to UP&L-Hunter Power Plant. Some power plant feed is trucked from Des-Bee-Dove Mine to UP&L's Hale and Carbon Power Plants. Lump coal (+6") is sold to employees or to the L.D.S. Church. Stoker coal is sold to the L.D.S. Church.

Tipple construction is steel frame. Most tipple components are metal construction. Standard building maintenance procedures are applied on the tipple to promote safety and utility. Standard mechanical maintenance procedures are followed to ensure smooth operation and long life of moving parts.

During reclamation, the tipple will be dismantled. Metal and mechanical parts will be sold for salvage or scrapped. Concrete foundations will be broken up and used for coarse backfill.

When insufficient trucks are available to adequately deplete the run-of-mine coal stockpile, tipple processed coal is released and placed in a stockpile in the tipple yard. The tipple yard stockpile has a maximum capacity of 8,500

tons. Coal is stockpiled here only temporarily for periods less than a week. Coal is loaded from the stockpile by rubber-tired front-end loader.

The tipple yard stockpile requires no maintenance.

All coal will be removed from the tipple area prior to reclamation. Details of tipple area reclamation are included in Reclamation Plan.

Waste Rock and Non-Coal Waste Disposal

Plans for Underground Development Waste Rock disposal were submitted to OSM on December 31, 1980. Approval is pending. A copy of waste rock disposal plans for Des-Bee-Dove Mine were submitted to the Division and are included in Appendix V. See Wilberg application for reclamation.

Non-coal waste is hauled from the mine and placed in concrete trash bins near the mine portals. Two concrete bins are utilized at Des-Bee-Dove Mine. Locations of these bins are shown on Maps 3-7 and 3-8. Trash is removed from the coal product stream and stacked in a pile beneath the tipple.

Non-coal wastes are collected periodically from the trash bins and tipple trash pile and disposed of in a State approved disposal area.

The trash bins require no maintenance.

During reclamation, concrete trash bins will be broken up and used for coarse backfill.

Other Mine Facilities

Office-Bathhouse-Warehouse - A 210' x 80' steel frame building is utilized for office, bathhouse, and warehouse facilities at Des-Bee-Dove Mine. The basic building construction consists of steel reinforced concrete floor, pre-fab steel framing, and heavy gauge aluminum exterior (walls and roof).

Approximately 3,200 sq. ft. are occupied by offices for administrative, clerical, safety, and engineering personnel. Office area interior consists basically of wooden stud framing, sheet rock and wood paneled walls, linoleum floors, and acoustical tile ceilings.

The bulk of the building (8,800 sq. ft.) is dedicated to bathhouse space which includes showers, lockers, bathrooms, and lamp room facilities for miners and supervisors. Interior is basically concrete block walls, bare concrete floors, and open ceilings.

The remaining 4,800 sq. ft. of building space is utilized for storage of small parts, materials, and machinery requiring cover and security.

Standard building maintenance procedures are followed to maintain the office-bathhouse-warehouse.

During reclamation, usable interior components will be salvaged and the building will be demolished and removed from the premises. Concrete floors and foundations will be broken up and used for coarse backfill material.

Parking Lot - A 1.8 acre asphalt surfaced parking area is located near the office-bathhouse-warehouse for use by mine personnel. Approximately 75 designated parking spaces are provided. A 4 to 6 inch thick asphalt surface covers the parking area. Asphalt berms and steel guard rails line the outside edge of the lot.

Runoff from the parking areas is collected within the asphalt berms and directed through the surface drainage system to the sediment pond. The parking lot is cleared of snow and debris and resurfaced as needed.

Asphalt will be broken up and used for coarse backfill during reclamation.

Underground Shop - An underground maintenance shop is located at Des-Bee-Dove Mine. It occupies approximately 1,100 sq. ft. just inside the portal opening. The shop entrance is concrete block including an 8' x 15' roll-up steel door. Interior is roof bolted and shot creted walls and ceiling with concrete floor.

The underground shop is used for periodic maintenance and minor overhauls on small equipment such as tractors, scoops, and trailers.

Standard building maintenance procedures will be followed on the underground shop to ensure good housekeeping and order.

Reclamation for the shop will include salvaging of usable interior components, demolishing the entrance, and sealing and backfilling the portal.

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Material Storage Areas - Approximately one acre of the tipple fill structure is designated for material storage. Items stored in this area include new and used equipment and materials such as steel beams, sheet metal, conveyor belt, wood beams, timbers, and power cable. This material storage area is gravel surfaced.

All outside material storage areas are gravel surfaced.

South of the office-bathhouse-warehouse in the parking lot is a material storage shed. The shed is set on steel pipe stands about 3 feet off the ground. It is 150' long, 10' deep and 12' high with a gradually sloping roof. Shed construction is steel walls, roof, and shelving with concrete floors except for one small extension of the shed on the far south end which is wood with concrete floor set on the ground. Chain-link gates on the front of the shed provide the required security.

Items stored in the shed are materials and machine parts requiring limited security and cover.

Deseret storage area is located outside the Deseret portals and occupies space either side of the access road to Beehive portal. Materials stored here include crib blocks, timbers, concrete blocks, bagged rock dust, and roof bolts. A small area on the west side of Deseret portal area is utilized for storage of bulk rock dust in a 100 ton capacity rock dust silo.

Beehive and Little Dove storage area is just outside Beehive portal. Items stored here are the same as those stored outside Deseret portal.

Maintenance of the outside storage areas is limited to snow and debris removal and resurfacing as needed. The material storage shed will be painted as needed to maintain its outside appearance.

During reclamation, material storage areas will be cleared and reclaimed as outlined in Reclamation Plan. The material storage shed will be dismantled and removed from the premises.

Fuel Facilities and Oil Storage - Five separate fuel facilities are utilized at Des-Bee-Dove Mine. They are identified as follows:

1. Lower Fuel Facility
2. Main Office Gas Pump
3. Deseret Fuel Facility
4. Beehive Fuel Facility
5. Water Tanker Fuel Facility

Lower, Deseret, and Beehive fuel facilities have oil storage sheds associated with them.

Lower fuel facility is located on the west side of the tipple yard on a small rock and soil embankment. Three diesel fuel tanks are in use with 1,000, 500, and 500 gallon capacities. Two of the tanks are set directly on the fill and one is on a metal stand. One oil storage shed is located next to this fuel facility.

All oil storage sheds are constructed identically. The underframes are constructed of steel pipe fashioned into skids for portability. The sheds are set approximately three feet off the ground on the steel pipe frames. Walls and roof are steel. A set of locking steel mesh sliding doors are set in the front of each shed for security.

Oil storage sheds generally contain hydraulic oils and require lubricants stored in five gallon cans.

The mine office gas pump is located on the southeast outside corner of the warehouse. The electric pump draws gasoline from a 2,000 gallon buried tank.

Deseret fuel facility includes one 1,000 gallon diesel fuel tank on a metal stand. An oil storage shed is located next to the Deseret fuel tank.

Beehive fuel facility consists of one 1,000 gallon buried diesel fuel tank accessed by an electric pump. Two oil storage sheds are located near this facility along the portal access road.

Due to the dry nature of the mine, water was trucked and pumped to the mine for use in coal dust suppression. A 3,000 gallon diesel fuel tank is provided near the pump house for refueling of the water delivery truck. This facility is no longer used but is retained for emergency use.

All fuel facilities and oil storage sheds are clearly marked with signs identifying the flammable nature of their contents and warning against smoking. These facilities are

placed to eliminate the chance of collision with mobile machinery.

In conjunction with reclamation, all fuel facilities will be removed and sold for scrap or salvaged.

Mine Ventilation Fans - Four 150 HP, axial flow fans are utilized to ventilate the Des-Bee-Dove Mines. They are as follows:

1. Deseret #1 Fan
2. Deseret #2 Fan
3. Beehive Fan
4. Little Dove Fan

Each fan is electric motor driven. Each fan ventilates by exhausting air from the mine through a portal opening with the exception of Beehive fan which draws exhaust air through a shallow shaft. All these fan installations are set on concrete foundations.

The fans are inspected daily and greased as needed. Mechanical maintenance procedures are followed to keep the fans operational at all times.

During reclamation, the fan installations will be dismantled and salvaged. The fan portals will be sealed. The Beehive ventilation shaft will be plugged and capped. Concrete foundations will be broken up and used for coarse backfill.

Power Supply and Main Substation - Power is supplied to Des-Bee-Dove Mine from a 69 KV fed substation which transforms the utility service down to the utilization level

of the mine and surface facilities. The utility service line runs to the main substation along the hillside east of the surface facilities.

The power supply system was installed and is maintained by Utah Power & Light Company - Southern Division.

At the end of mine life, the system will be removed by Utah Power & Light Company - Southern Division. Gravel and foundation material from the substation will be used for backfill.

Water Pollution Control Facilities

Drainage System - Des-Bee-Dove drainage system is designed to adequately collect, pass, and control sediment from a 10 yr./24 hr. precipitation event. No perennial streams are located in the Des-Bee-Dove drainage. System collection and control are illustrated in Map 3-8.

Runoff is collected from Des-Bee-Dove drainage "disturbed" and "undisturbed" areas and either passed to the sediment pond or collected in Beehive Mine sump. The sediment pond and drainages are designed to adequately handle all runoff from the Des-Bee-Dove drainage.

The drainage system consists of open ditches, bermed roadways, and culverts which collect runoff and divert it into an unnamed tributary of Grimes Wash and ultimately into the Des-Bee-Dove sediment pond.

Because of the dry nature of the mine, water for in-mine coal dust suppression must be obtained from outside sources. Therefore, some water for mining is collected and

routed into Beehive Mine sump. Once in the mine, water is totally captive and is not discharged from the mine.

Disturbed areas of the Des-Bee-Dove mining complex totals only 21 acres including the sedimentation pond. The area considered disturbed and designed for collection and sediment control totals over 340 acres (see Sedimentation Pond design calculations Appendix VII). Based on the restrictive topography, this design encompasses nearly all of the canyon in which the mine area is located.

In the past Company has collected storm runoff waters in the Beehive Mine (upper seam) for purposes of mining, as the mines are virtually dry. This practice is still in effect and runoff is collected from the upper 137 acres (see drainage area map Appendix VII).

Runoff below the area is handled by an underground piping system together with ditching along access roads which traverse the mining area (refer to drainage Map 3-8). Diversions are sized and placed using a 10-year, 24-hour storm event (calculations included) peak flows approach 135 cfs.

The 24 and 36-inch culverts on pads No. 1 and No. 2 have the following flow characteristics with the head water depth to culvert diameter ratio equal to 1. Culverts are installed on a 2% slope.

Diameter (inches)	Velocity (fps)	Discharge (cfs)
36	4.2	30
24	3.2	10

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With as much as 100 acres of the upper drainage being collected and stored underground in the Beehive Mine water sump it reasons only half the anticipated peak flow will require handling in the lower reaches.

The mine area is divided by the access road to the truck loadout, or tipple. Runoff from the northern portion of the canyon walls will be collected and diverted using a two foot open ditch to a 36-inch culvert which directs the runoff past the road and back to its original channel.

Waters from beneath the Beehive Mine flowing off the southern canyon walls will be collected in the main mining surface drainage system. As the mine is situated in the canyon drainage and all corresponding aspects which determine runoff, such as slopes, distances and cover, appear equal, it is safe to assume peak flows per individual segments are proportional to the acres effected. With a yield of 135 cfs for a drainage of 170 acres, a ratio of .8 cfs per acre is established.

The area effecting the mine drainage system is located on the south slopes of the canyon. This 27 acre side hill will produce approximately 22 cfs which must be handled by the ditching and underground piping system. Approximately half, or 10 cfs, is contained by each facility.

The diversion for directing the collected waters is located across the major fill structure (#1). Water is released adjacent to the existing 36-inch culvert which drains the northern slopes. All waters drained from either

disturbed or undisturbed areas are pass through a 19 acre foot sedimentation pond located further down the dry wash channel.

Maintenance on the drainage system consists of annual inspection and cleaning of ditches and culverts. Trash and debris are removed and necessary repairs are made to ensure smooth operation of the system.

During reclamation, a revised drainage system will be installed and made operational. Details are included in Reclamation Plan.

Mine Water - Des-Bee-Dove Mine is a dry mine. There is no discharge from the mine. As previously stated, water must be obtained for use in the mine from outside sources. Sources include storm runoff collection and pumping from the adjacent Wilberg Mine.

In order to provide one source of water in the mine, a trucking and pumping system has been installed at Des-Bee-Dove Mine. A tanker truck collects and delivers irrigation water from the entrance to Danish Bench road (off State Highway 29) up to a 10,000 gallon buried water tank below the mine area. Water is pumped from the buried tank through a 4" line up to Deseret sump. Until recently, all mine water needs in excess of collected storm runoff were fulfilled by this system.

Storm runoff collection was previously described and is illustrated in Map 3-8.

A potentially stable source of mine water has recently been tapped through Deer Creek Fault from Wilberg

Mine into a sump. Wilberg Mine discharges excess mine water daily (see Wilberg Permit Application). To better utilize the excess mine water from Wilberg Mine, a connection has been made through Deer Creek Fault and water is being collected and used in parts of Des-Bee-Dove Mine. Potentially, this source could supply the needs of the entire mine (see Ground Water section, page 2-78).

Some of the water from Deseret sump is being utilized for dust suppression and washdown in the tipple.

The mine water system is maintained to ensure adequate supply to the mine and zero discharge from the mine. The trucking and pumping system will be maintained as a backup for the in-mine source and runoff collection.

During reclamation, exterior pipelines, tanks, and pumping systems will be dismantled and removed from the premises. Further reclamation will be performed as outlined in Reclamation Plan.

Culinary Water System - A system has been installed to treat water from the Deseret sump for the needs of the mine facility. The water treatment system treats 10 gpm of water for storage and use in the existing culinary water system. The system was designed and installed with approval from the Utah State Department of Social Services.

System maintenance is performed as needed to promote smooth operation of the system and to ensure compliance with State culinary water standards.

During reclamation, the culinary water system will be dismantled and sold for salvage or scrapped.

Sewer Treatment System - Sewage from the office and bathhouse is collected in a single 2,500 gallon septic tank located underground just south of the office-bathhouse-warehouse. Effluent from the septic tank is carried by a 6-inch diameter pipeline to an absorption field located in the tipple area fill structure. The sewer treatment provided fulfills State and local county health codes.

The sewer treatment system requires no maintenance.

For reclamation, the sewer line will be sealed and remain in place. The septic tank will be sealed off, backfilled and abandoned. The absorption field will be left to dry out.

UNDERGROUND DEVELOPMENT WASTE DISPOSAL (784.19)

Plans for underground development waste rock disposal are in Appendix V. Reclamation plans are in the Wilberg Mine application.

TRANSPORTATION FACILITIES (784.24)

Des-Bee-Dove Mine operation utilizes roads and conveyors in association with facilities described in Operation Plan. All portal facilities are shown on drawings 3-6 and 3-7. A description of the construction, use, maintenance, and removal of each transportation facility at Des-Bee-Dove Mine follows.

Roads

Des-Bee-Dove Mine operation utilizes two facility roads. They are identified as (1) Mine Access and Haul Road and (2) Portal Access Road.

Mine access and haul road is asphalt surface extending approximately 7 miles along Danish Bench between State Highway 29 and Des-Bee-Dove Mine office. Road width averages 20'. Road gradient is approximately 5% overall to the mine gate and approximately 8% overall from the mine gate to the mine office. Surfacing is 4" thick on standard gravel road base, crowned in the center and gently sloping to the sides. Roadways cut in steep embankments are bermed and guard railed in critical locations for safety and runoff control.

The mine access and haul road is used daily by mine personnel for access to the mine facilities. The road is also used for coal haulage by semi-trailer trucks. Twice yearly the road is utilized for cattle drives to and from East Mountain grazing areas.

Emery County Road Department is responsible for maintenance of the roadway from State Highway 29 to the mine gate. The remainder of this roadway is maintained by Emery Mining Corporation. The road is officially designated as a county road from State Highway 29 to the property boundary. Road maintenance consists of snow removal, periodic resurfacing, and cleaning of drainage ditches.

Portal access road is approximately 2,500' long winding from the mine offices past Deseret portal and ending near Beehive portal. Plans and selected cross-sections are included in Map 3-9. The portal access road construction consists of compacted soil and gravel surface. Road width averages 20'. Because of the steep terrain in the portal area, large soil berms or steel guard rails have been constructed to promote safety.

Portal access road gradient averages about 10% overall, due again to the steep natural terrain which allows no leeway for more gradual gradients without further extensive construction. On July 15, 1978, sufficient evidence was provided to OSM and the Division to make a determination whether a gradient variance should be granted. Correspondence regarding a determination seemed to concur with UP&L's findings that "major construction of complying roadways would increase environmental degradation". A determination of UP&L's submittal is still pending.

Portal access road is used daily for access by mine labor and service personnel. Like the mine access road, the portal access road is utilized twice yearly for cattle drives to and from East Mountain grazing area.

Maintenance on the portal access road includes periodic resurfacing, snow removal, and drainage inspection and cleaning as needed.

Details of road removal are included in Reclamation Plan.

Conveyors

Seven individual conveyors or sets of conveyors are utilized in the Des-Bee-Dove coal handling and sizing process outside the mine.

1. Little Dove Conveyor
2. Transfer Reclaim Conveyor
3. Deseret Conveyor
4. Main Stockpile Feed Conveyor
5. Auxiliary Stockpile Feed Conveyor
6. Tipple Feed Conveyor
7. Tipple Process Conveyors

All conveyors from portal to stockpile are 42" wide and are idler-supported with the exception of the Main Stockpile Feed Conveyor, which is wire rope-supported. Steel frames for the conveyor supports are anchored to concrete foundations.

Little Dove Conveyor is in two sections 100' and 150' in length broken by a transfer structure. The 100' covered section carries coal from the portal to the transfer structure. The 150' covered inclined conveyor receives coal from the transfer structure and delivers to the stacking tube transfer.

Transfer reclaim conveyor is 100' long and collects coal from the base of the stacking tube transfer and delivers to the Deseret transfer.

Deseret Conveyor delivers run-of-mine coal production from Deseret and Beehive mine operating sections to Deseret

transfer. An in-mine coal transfer delivers coal from Beehive Mine to Deseret Mine.

Main and Auxiliary Stockpile Feed Conveyors deliver coal to the run-of-mine stockpile area.

Tipple Feed Conveyor is 36" wide and delivers coal from the run-of-mine coal stockpile to the tipple for screening, crushing, separating, and loading.

Tipple Process Conveyors are incorporated in the tipple operation. Size details and tipple process association for these conveyors are illustrated in Figure 7 in Operation Plan.

Standard mechanical maintenance procedures are followed to ensure smooth operation and long life of the facility conveyors.

During reclamation, the conveyors will be dismantled and sold for salvage. Concrete foundations will be broken out and used for coarse backfill.

OFFSITE SUPPORT FACILITIES (785.21)

The only offsite support facilities are the underground development waste disposal site shared with the Wilberg Mine and the sedimentation pond which is detailed in the Existing Structures section.

Blasting Plan

Storage locations for blasting agent and primers are shown on Facility Maps 3-3A and 3-3B. A Blasting Plan is included in the appendix.

DIVERSIONS (784.22)

Des-Bee-Dove Mine operation will not require further runoff diversion in the permit area until reclamation. Specific procedures for diversion during reclamation are described in Reclamation Plan. Existing runoff diversions are described in Operation Plan.

IN-SITU PROCESSING (785.22)

There are no in-situ processing activities or plans for such activities associated with Des-Bee-Dove Mine.

EXPERIMENTAL PRACTICES (786.13)

No experimental underground mine practices are being conducted at Des-Bee-Dove Mine.

AIR POLLUTION CONTROL PLAN (784.26)

In accordance with UMC 817.95, air pollution control measures have been applied and will be applied throughout the life and subsequent reclamation of the Des-Bee-Dove Mine.

The main service road and parking lots are asphalt surfaced. Service roads to the mine portals are gravel surfaced. Vehicular traffic on these roads is controlled to minimize contribution of fugitive dust. Service roads are used daily at low speeds for access by service and labor personnel.

The steep natural terrain restricts unauthorized travel on other than established roads and limits vehicle speeds on roadways that are established.

Fugitive dust control procedures are implemented in the coal handling process. Little Dove run-of-mine belt conveyor is covered. Belt scrapers are installed on most conveyors to reduce coal dust generation. Coal sizing and handling from stockpile to truck are completely enclosed in the Des-Bee-Dove tipple. A vacuum system in the tipple helps reduce coal dust generation during crushing and screening plus assists in tipple housekeeping. Transfer points in the tipple are enclosed, rubber curtained at inlets and outlets, and are equipped with dust collection hoods.

The high moisture content of the coal at Des-Bee-Dove Mine provides dust control throughout the coal handling process. Analysis of samples taken during processing show an average 8.4% inherent and surface moisture content in 775 samples. Table 8 is a copy of the sample analysis data. Coal dust generation is reduced throughout the handling process by the dampening effect of this moisture.

The captive nature of the Des-Bee-Dove Mine product nearly eliminates the possibility of spontaneous combustion conditions developing. Long-term stockpiling within the permit area is unlikely. Maximum stockpile duration is approximately one month. Care is taken to ensure that short-term stockpiles are completely cleared away prior to restockpiling.

TABLE 8

STANDARD LABORATORIES INC.
UTAH POWER & LIGHT CO.

DATE 1/ 2/81

LOCATION NUMBER 1103 LOCATION DESCRIPTION DESERET,BEEHIVE,LITTLE DOVE BELT

	TIME PERIOD		NO. OF SAMPLES	MEAN	ST. DEV.	MINIMUM	MAXIMUM
LONG PROXIMATE (AS RECEIVED)							
%MOISTURE	12/15/80-12/20/80		10	7.10	0.65	5.82	7.91
	MONTH ENDING	12/20/80	43	7.33	0.79	5.59	8.64
	YEAR ENDING	12/20/80	775	8.45	1.53	4.94	25.05
%ASH	12/15/80-12/20/80		10	9.03	0.40	8.14	9.47
	MONTH ENDING	12/20/80	43	8.99	1.15	6.73	12.46
	YEAR ENDING	12/20/80	775	10.57	2.25	5.91	22.29
%VOL. MATTER	12/15/80-12/20/80		10	42.02	0.49	41.00	42.76
	MONTH ENDING	12/20/80	43	42.17	0.76	40.09	43.79
	YEAR ENDING	12/20/80	775	40.09	1.25	33.03	43.79
%FIX. CARBON	12/15/80-12/20/80		10	41.86	0.49	40.83	42.52
	MONTH ENDING	12/20/80	43	41.53	0.83	39.81	43.84
	YEAR ENDING	12/20/80	775	40.89	1.50	32.98	45.96
BTU/LB	12/15/80-12/20/80		10	12194.09	122.16	12060.00	12403.00
	MONTH ENDING	12/20/80	43	12147.48	245.20	11305.00	12593.00
	YEAR ENDING	12/20/80	775	11700.03	404.84	9360.00	12593.00
%SULFUR	12/15/80-12/20/80		10	0.54	0.03	0.48	0.58
	MONTH ENDING	12/20/80	43	0.54	0.04	0.48	0.64
	YEAR ENDING	12/20/80	775	0.59	0.07	0.40	1.04
% AIR DRY MOIS. LOSS	12/15/80-12/20/80		0	0.0	0.0	0.0	0.0
	MONTH ENDING	12/20/80	0	0.0	0.0	0.0	0.0
	YEAR ENDING	12/20/80	0	0.0	0.0	0.0	0.0

OPERATION PLAN EXISTING STRUCTURES (784.12)

Under the definition of Existing Structures, as found in Environmental Statement for the Surface Mining Control and Reclamation Act of 1977, is as follows:

Existing Structures

The types of structures which may be affected by the regulations in the preferred alternative concerning existing structures are roads and associated structures, fills, berms, benches, waste banks, discharge structures, diversions, rail loops, rail sidings, rail spurs, refuse areas, shafts, spoil pipes, utility lines, terraces, drains, wells, exploration holes, boreholes, barricades, fences, bridges, culverts, storage areas, mine buildings, tipples, storage or repair facilities, surge ponds, processing plants, slurry pipelines, conveyors, and other man-made structures or areas disturbed by mining.

"Existing Structures" by definition, as interpreted by applicant, means everything constructed by man for mining purposes.

To apply the stated provision of UMC 784.12 to all entities becomes somewhat confusing especially when addressing structural components such as buildings, warehouses, tipples and processing plants.

Monitoring and evidence of how such facilities meet Subchapter "K" seems irrelevant in that the performance standard has no specification to gauge structural worthiness. Unless Subchapter "K" regulates to the building itself but

rather the earthen structure upon which such building is situated (explanation by Hardaway).

Nevertheless, to complete the requirements of this subchapter, applicant chooses to identify all Existing Structures and shall describe the structure (earthen) on which such facility rests.

For the sake of organization and simplicity, we have decided to list the various structures by groupings of associated structures. Group I (Hydrological Association). This group association will list those facilities such as underground diversions, surface drainage systems and sedimentation ponds. Group II shall list and incorporate all surface facilities, building, conveyors, power lines, storage tanks, etc., and all facilities related with operations as they pertain to coal processing. Group III lists only earthen structures, i.e., fills, embankments, roads and earthen berms.

Group I (Hydrological)

Surface Drainage

With the exception of the parking lot and bathhouse-warehouse-office facilities, the Des-Bee-Dove Mines are located within a narrow, steep, dry wash and are connected by a single access road (see surface drainage Map 3-8).

Storm runoff water has been diverted from its normal channel to the access road which is bermed and ditched. The upper mines, Beehive and Little Dove, are graded to capture surface runoff from its portal area and portions of the

access road that leads to East Mountain. This water is collected and stored in an underground sump for mining purposes.

For information pertaining to surface water entering an underground mine UMC 817.55, see separate discussion following.

Bermed and ditched, the access road provides the only water course for storm runoff waters between the two mines, Beehive and Deseret. Bathhouse and parking lot are graded and ditched to direct runoff waters to a natural drainage away from the main wash drainage.

At the upper section of the loadout area (large fill) where the access begins, the grade reduces to 4½% and drainage is accommodated by a separate ditch that directs the water to a 36" culvert near the fill face. There are no drop drains or subsurface collection system associated with this mining facility. Arid conditions and the mine's limited life (11 years) outweigh the justification of an underground system.

Hydrological assumptions and calculations are included in the final reclamation section (see 10-year, 24-hour event). Peak flows of 173 cfs are anticipated to swell beyond the access road ditch capacity, thus the access road itself will serve as a channel for brief periods of 10 or 15 minutes during heavy precipitation.

Historically, the mine area has controlled surface runoff for forty years and, with the addition of the sediment

pond, no surface water is expected to pass the system's capacity of a 10-year, 24-hour storm event.

Sedimentation Pond

Because of limited space and the precipitous land forms surrounding the Des-Bee-Dove Mines complex, the sedimentation pond was located off the permit area and placed at the mouth of the dry wash that drains the mine site.

Approved and constructed in late 1979, the 19.4 acre foot pond was sized to accommodate a 10-year, 24-hour storm event from not only the disturbed mine area but also the head of hollow drainage above the mine site. It was reasoned that the increased pond size was less environmentally harmful than diversion facilities necessary to divert the head of hollow drainage waters above the mine area.

Pond design criteria, geotechnical information, and hydrological computations are included in the appendix.

Capacity and dam height are less than the stated minimums of 30 CFR 77.216(a); therefore, are exempt from 30 CFR 77.216-1 and 30 CFR 77.216.2.

Location of the pond is sited on State of Utah land under Utah Land Lease #436 (reference, drainage Map 3-8).

The Des-Bee-Dove's sedimentation pond has been issued an N.P.D.E.S. discharge permit whose identification number is UT-0023591. Only one outfall is associated with the permit.

Structure is monitored quarterly and an annual report of its condition shall be submitted to the regulatory

authority. Relevant construction maps are included in the Appendix.

Approval of the sedimentation pond by appropriate state and federal agencies has been given. Company states the sedimentation pond meets the performance standards of Subchapter "K" and requires no modification.

Group II (Surface Facilities and Structures)

To aid the reviewer in understanding how the mines are interrelated, refer to Maps 3-6 and 3-7.

Des-Bee-Dove is an abbreviation for Deseret, Beehive and Little Dove Mines. Two mines, Beehive and Little Dove Mine, the upper seam (Blind Canyon), and the Deseret Mine is located in the lower seam (Hiawatha). Separated vertically by 140 feet, the portal facilities are literally one upon the other.

Individual photographs of each major surface facility, showing its current condition and its structure, are included in the Appendix.

Mine development over the past forty years has seen a constant change of surface facilities. Tipple, loadout, and conveyors have undergone changes from modification to complete rebuilding. Specific dates of construction and completion are not possible in all cases and shall be noted as such.

Utah Power & Light Company purchased these mines in 1972. Since that time major reconstruction of the certain

facilities has taken place, most notably, the bathhouse, parking lot, and their structures.

The following list includes the major surface facilities located at the Des-Bee-Dove Mines, their approximate date of construction, mine association and other relevant information.

Excepting the two large structures that support the bathhouse and loadout facilities, most surface structures are located on three small platforms cut on sandstone ledges located astride the drainage, or wash, and will be further discussed in Group III of this chapter.

Plans and drawings for each structure are on file in Company's office at 41 North Redwood Road, Salt Lake City, Utah, for review by the regulatory authority.

Company states each facility used for handling, processing and transporting coal has been designed by a registered professional engineer. Also, the bathhouse-shop-warehouse building was engineered to meet acceptable state and federal building codes. Facilities meet applicable regulations of Subchapter "K" and require no modifications.

DES-BEE-DOVE MINE FACILITIES

Facility	Photo	Approx. Construction* Date
Office-Bathhouse-Warehouse	Included	Mid-1972
Material Storage Shed		Early 1978
Underground Shop	Included	Early 1981
Tipple	Included	1952-1978
Beehive Trash Bin		Aug. 1980
Deseret Trash Bin	Included	Aug. 1980
Culinary Water Storage Tank		1972
Pump House and Mine Water Storage System		1972
Parking Lot	Included	Mid-1977
Main Substation	Included	1975
Deseret Fan #1	Included	1977
Deseret Fan #2	Included	1972
Beehive Fan	Included	1972
Little Dove Fan	Included	1976
Conveyors -		
Little Dove	Included	1977-78
Deseret		1975
Transfer Reclaim		1975
Main Stockpile Feed		1975
Aux. Stockpile Feed		1975
Coal Surge Stockpile	Included	1952
Material Storage Areas	Included	Varied
Fuel Facilities & Oil Storage	Included	Jul. 1980
Rock Dust Tank		1978

* Note: Many construction dates are based on the most recent facility modification.

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DISCHARGE OF WATER INTO AN UNDERGROUND MINE (817.55)

As the mines are virtually dry, water for drinking and mining must be diverted into the mine.

It is expedient to capture surface runoff water when possible. All captive water is stored underground where sedimentation and filtration occurs prior to its use in the mining machinery. No water is discharged to the surface at any time.

Water quality meets provisions of section 817.42 and does not disrupt the hydrological balance of the underground water regime as no water exists. Company requests the regulatory authority to grant this variance as provided in UMC 817.55.

Group III (Earthen Structures)

The mining complex consists of five (5) major earthen structures (refer to Map 3-10). They are (1) the underground development waste structure (tipple, coal storage pile and storage yard); (2) bathhouse-warehouse-office building, parking lot structure; (3) Deseret portal area; (4) upper coal storage area structure; (5) Beehive and Little Dove portal area.

Structure No. 1 (Loadout and Material Storage Area)

Of the five sites, the loadout area is largest with 4.1 acres of working space. This structure is the result of forty years of development. Waste rock, boney coal and coal fines which, at that time, had no commercial value, were

systematically disposed of by end-dumping over a spoil pile resulting in what is now the loadout, coal storage and material storage areas.

Volume calculations show approximately 200,000 cubic yards make up this structure which is located in a small wash drainage within the permit area. Structure will be unaffected by subsidence as the fill is situated below the elevations of both coal seams.

Methods used to construct this fill do not necessarily meet stated design standards of section 817.81 of the regulations but under 30 CFR 701.11(d) said structure qualifies as a pre-existing structure with exemption from design requirements if structure can demonstrate compliance with the performance standards of Subchapter "K".

Applicant requests from the regulatory authority approval of the structure based on the following compliance information.

Stability analyses performed indicates the structure approaches the required static factor of safety (Rollins) (see Appendix). Limiting factor is the face outslope which measures 1.6h:1v. Rollins recommends an outslope of 1.7h:1v to meet the 1.5 safety factor. To achieve this slope approximately 10 feet additional slope length is required. At this writing, slope-face stability is still being investigated.

As company plans to leave the fill in place in the final reclamation plans and based on the fact that the

structure was constructed without a subdrain system, the following geological report is submitted as a demonstration that the area is void of springs and seeps and request a variance to UMC 817.83 as published in the Federal Register/ Volume 45 No. 226, page 76932, November 20, 1980.

Area Geology

The Des-Bee-Dove waste dump area is located in a dry wash which has been naturally eroded into the bedrock. The walls of this wash are steep near its bottom and slope upward to rock ledges and cliffs which surround the mine waste dump area. The rock walls which form the abutments for the waste dump consist of alternating zones of sandstone, siltstone and mudstone along the contact of the Starpoint Sandstone and Masuk Shale. The floor of the wash consists of thinly bedded mudstone. All of these rocks form a competent foundation for the waste dump material.

Although no hydrologic mapping was made of the wash prior to its filling with waste rock, the available data overwhelmingly supports the conclusion that ground water does not flow from the bedrock into the mine waste area. The outcrop escarpment at the stratigraphic horizon of the waste dump (Starpoint-Musuk contact) has been hydrologically mapped for miles on each side of the waste dump and no springs have been located or associated with this horizon. The waste dump and Des-Bee-Dove Mines are located in an area void of ground water, primarily because of existing faults and escarpments that circumvent the area isolating it from the ground water

flow present throughout other areas of East Mountain. The mining in the Des-Bee-Dove Mines has yet to intersect any ground water. Geologically, the rock formations in the area of the waste dump dip in a northwest direction into the mountain. Any water which might flow into the strata would flow down the dip away from the fill structure.

From a geologic and hydrologic standpoint, the area of the Deseret waste dump is table. The rock outcrops in the wash form competent abutments for the waste dump.

Test borings have shown the structure is largely composed of coal waste and covered with a 10-foot mantle of subsoil material excavated from the parking lot structure. This covering seals the coal from surface water and possible spontaneous combustion. Covering material was analyzed for acceptance as a plant growth medium (see soils section) and found acceptable.

Surface water is presently directed away from the slope face and directed through a 36" culvert to intersect the natural drainage channel below the fill structure.

Chemical analyses of the overburden and coal indicates only trace amounts of iron and sulfur. Present coverings meets UMC 817.103 (covering coal and acid and toxic forming materials).

As no ground water exists and surface waters are protected from penetrating the coal core, company states no pollution of water occurs. During operations, sedimentation

shall be collected and controlled by an existing sedimentation pond located down drainage from this structure.

Taking into account present knowledge of the physical nature of the structure, land form morphology, hydrological characteristics and forty years of on-site climatological history, company requests the regulatory authority to approve this structure as meeting the regulations with stated exemption and demonstrated provisions of meeting the performance standards of Subchapter "K".

Monitoring has been in the form of visual inspections throughout the years and no reports were written.

Structure No. 2 (Bathhouse and Parking Lot)

Constructed in 1972, this structure is not a balanced cut and fill section. Excess material was hauled to the spoil fill (site 1) and was used as a covering. Measuring 350 by 190 feet and with the parking lot which measures 400 by 65 feet combined, provides working space of 2.1 acres.

This platform (structure) was constructed using acceptable earth work design practices, i.e., fill portion was built in wetted layer and compacted with a mechanical compactor. Company plans to reconstruct this structure on final reclamation. Stability meets stated factor of safety in UMC 817.101. A stability analysis is provided in the Appendix (Rollins).

No monitoring is planned for this structure. No ground water affects the fill itself (see Geological Report Structure No. 1) and surface waters are drained by ditching.

No modification is planned as structure meets performance standards of Subchapter "K".

Structure No. 3 (Deseret Portal)

A strip of level ground, whose base is the basal member of the Hiawatha Coal Seam, which is a massive sandstone outcrop formed by weathering of the dry wash. A 170 by 250 feet landing serves as the Deseret portal area which supports the mining facilities such as access road, shop area, fan portal installation, power substation and some material storage.

Structure No. 4 (Coal Storage and Surge Pile)

A small, natural semi-circle sits on bedrock formed by the dry wash channel measures approximately 180 feet. A spur road serves as its only access.

Structure No. 5 (Beehive and Little Dove Mine Portals)

This flat pad sits approximately 140 feet vertically above the Deseret Mine. Both mines (Beehive and Little Dove) are level entry mines located at the coal outcrop (Blind Canyon Seam).

Constructed from stripped materials along the coal seam and anchored with down-sloped bin walls, this area measures 400 feet long by 140 feet wide. Drainage is gravity flow into the Deseret Mine portal where water is stored in an underground sump. Structure is located on sandstone outcrops again weathered by the drainage within the dry wash.

Structures 3, 4 and 5 are all small disturbances interconnected by one access road that serves as their drainage (except Deseret portal).

Stability is unquestionable in that all are located on solid sandstone foundations. The upper area (Structure No. 5) is susceptible to subsidence only after final mining and pillar removal from the lower seam. It is proposed to leave sufficient entry barriers and pillars within the Deseret portals to support the reclamation work of the Beehive and Little Dove portal areas.

No monitoring is proposed for these three structures. No modification is planned for the three active sites as company states they meet the performance standards of Subchapter "K".

Roads - Haul Road, Access Road and Mountain Access (Cattle Drive)

Haul Road

As previously described in the Existing Structures introduction "roads" are considered existing structures (SMERA-EIS).

The haul road is an extension of a county road which is maintained by the county to the permit boundary line. Provision for mining within 100 feet of a public road is given by definition of UMC 761.5 and UMC 761.114(i). As the road was evolved over years of upgrading no engineering maps

or cross-sections are available. Company submits instead a 100'=1" topography map (3-7).

Company, as directed by the Division of Oil, Gas and Mining, submitted information at public hearings held in Salt lake City about August 1978, concerning roads associated with this mining complex. As of yet, no determination has been made as to the variance requested. Company, therefore, states the roads, all, are pre-existing with existing valid rights and are exempt from design standards as stated under UMC 700.11(e)i if company can demonstrate they meet performance standards of Subchapter "K".

Stability analyses were not conducted on road beds, cut slopes or embankments as stability has been proven by time and use.

Hydrological balance for the road includes hard surfacing, berms and ditching to accommodate a 10-year, 24-hour storm event. No streams are crossed and road pitch does not exceed the stated maximums of UMC 817.152.

The mine area is in excess of five (5) miles from any live or perennial stream, fishery or fee property owner. Adjacent ownership is controlled by both the Bureau of Land Management and the U. S. Forest Service who reviewed this operation under 30 CFR 211.

Mines Access Road

A short, steep, winding and unpaved road that runs from the tipple area up a bulldozed grade to the warehouse building exist, then switches to run upward along a blasted

grade, past Coal Storage Pile No. 1 to the Deseret portal area where it crosses the drainage to traverse southerly along the outcrop of the Hiawatha Seam for 650 feet to another switch back. The base of the coal seam forms the road bed against the near-vertical bluffs. Above the switch back, the road follows a grade partially against a natural cliff and partly against a blasted bank. At 650 feet on this tangent, it intersects the access road to the top of the mountain. The Little Dove-Beehive portal area begins 150 feet beyond this intersection.

Hydrological protection of the road is described in the surface drainage section. Actually, the road serves as the major drainage channel during peak flows from a 10-year storm event. All sediment carried from this road is recovered in the sedimentation pond located down drainage from the mine site.

Road beds, cut slopes and embankments are proven stable after two decades of use. Road covering consists of crushed rock.

Company states that soil siltation and water quality and quantity have been protected by use of a sedimentation pond, temporary revegetation, limited use and speeds afforded to this road.

East Mountain Access Road and Cattle Drive

Constructed in 1971, this steep, dirt, four-wheel drive access road provides the only other access to the East Mountain plateau besides the Cox dugout road located in

Cottonwood Canyon which normally remains snow-bound until mid-June or later.

Access via the mine road permits limited access to the eastern region of East Mountain where Utah Power & Light Company owns 920 acres of fee land. Need of this road goes beyond the life of the Des-Bee-Dove Mines. This two-mile long road also provides the only year-around access to a recently installed remote weather station located between the Des-Bee-Dove and Wilberg Mines. Other uses include twice a year cattle drive for cattle ranging on the east face of the plateau.

Though steep and narrow, it is applicant's intent to maintain this road in its present condition for access to its properties until such time that mining of the Deer Creek and Wilberg Mines is completed or such properties are disposed of. Barriers have been installed to prevent inadvertent use by the general public. Road maintenance is planned yearly.

Company contends that this access road is exempt from the regulations based on usage and purpose which is unrelated to mining.

EXISTING STRUCTURES - STABILITY

Of the five (5) separate and independent earthen structures used for mining purposes only fill structure #1, or the tipple pad fill, will remain after mining has ended.

Final reclamation of this structure includes a major drainage channel diversion to route the required 100 year storm event around the fill and back into its natural channel. Provisions have been made to control water velocity and erosion (see Final Reclamation map).

This fill structure was built mostly during active mining during the early "forties" and covered with a heavy soil mantle in 1977.

Stability analyses of both major file structures #1 and #2 were conducted in 1980 and 1981. Site #2, the bathhouse area, was determined to have a 1.47 safety factor which is sufficient to claim compliance. Site #1, the large tipple and loadout structure, was assigned a 1.3 to 1.4 safety factor.

Given the nature and the age of this fill and its consequences applicant feels justified in requesting an exemption under UMC 700.11(7)(e)(1)(i) which states that an existing structure which meets the performance standards of Subchapter "K" of UMC regulations but does not meet design requirements may request such exemption. Therefore, the following are facts by which this exemption can be made:

1. Historically, the fill was constructed in the early "forties" and modified in 1977. No mass

stability problems have evidenced since its origin.

2. This structure is a dry embankment and failure would certainly not cause risk or harm to the environment or to public health and safety.
3. Hydrological protection is afforded in any event including slope failure.
4. Safety factors exceed stated minimums for final reclamation embankments.
5. Remaining life of mine is approximately ten years.
6. Remedies to meet required safety factors are in excess of $50,000, an unjustifiable expense for benefits gained.

Showings of compliance of Subchapter "K" are discussed throughout the application:

1. Geology description of the fill siting.
2. Hydrological protection, surface runoff control.
3. Interim revegetation plan.
4. Picture of the structure in its present condition.

To insure document completeness, Company submits, in the event exemption is denied, a plan by which this structure's stability safety factor will be increased to exceed stated minimums of 1.5.

STABILITY OPERATION PLAN: EXISTING STRUCTURE (784.12)

Structure #1 (Loadout and Material Storage Area)

Original stability analysis by Rollins, Brown and Gunnell stated that the slope in its existing state had a stability of the order 1.3 - 1.4. However, existing structures are required to have at least a 1.5 static safety factor.

Additional analysis was done on the slope using the "Simplified Bishop Method of Slices" to determine what modifications need to be made to modify the slope to meet the 1.5 criterion.

Changing the slope to 1V-2H and building a rock toe buttress as shown on a typical cross-section a minimum safety factory of 1.7 was obtained (see Appendix X for cross-sections).

Assumptions were:

Existing material:

ϕ = 27°

c = 100 psf

γ = 70 pcf

no ground water

Added material:

ϕ = 40°

c = 0

γ = 120 pcf

no ground water

A toe failure above the interface between the original canyon floor and the existing structure was assumed. The assumptions for the material to be added were based on the data acquired for the Wilberg existing structures. The material to be added will be excavated from an area adjacent to the slope where the access road is to be realigned by cutting into the slope on the east side of the road. This material is very similar to that at the Wilberg Mine.

Three radii were used in the analysis,

r = 300' SF = 1.74

r = 250' SF = 1.68

r = 165' SF = 1.70

Therefore SF = 1.7 1.5 OK

Therefore, based on the above data and calculation it is proposed to modify the slope as shown on the typical cross-section to a 1V:2H slope with a rock toe buttress.

The slope will be left as is for final reclamation.

Construction of the modified slope:

Estimated Quantities: 5,350 c.y.

Equipment: D8K Dozer, 2 each
988B Loader
Air Track

Labor: 1 - Foreman
4 - Equipment Operators
2 - Laborers (flagmen)

Production:

The material is to be blasted from the rock outcrop on the east side of the access road, an average distance of 500 feet. One D8K Dozer will be used to push the material to the 988B, which will load and carry the material across the road and dump it down to the second D8K Dozer, which will place the material in compacted lifts of 18" maximum height. No material larger than 3 feet in diameter will be used in the fill.

Because of the inaccessibility of the area and the delays that will be necessary to maintain traffic on the access road estimated production is 500 c.y. per day.

Construction Days: 16 Days

Estimated Cost: $53,500.00

SIMPLIFIED BISHOP METHOD OF SLICES

(Lambe & Whitman 1969, p. 365)

To analyze a slope for stability, a trial and error process is used to determine the safety factor against failure. A diagram is prepared of the slope and a proposed failure mass with a circular arc failure line is drawn and then broken up into a series of vertical slices. The forces and moments on each slice are summed to determine the total moments acting on the failure mass and the factor of safety is taken as the ratio of the moments resisting movement to the moments initiating movement. The equation for the factor of safety F is

$$F = \frac{\sum_{i=1}^{i=n} [\bar{c}\,\Delta x_i + (W_i - u_i\,\Delta x_i)\tan\bar{\phi}][1/M_i(\theta)]}{\sum_{i=1}^{i=n} W_i \sin\theta_i}$$

where n = # of slices

$\bar{c}$ = effective cohesion kips per square foot

Δx_i = width of ith slice

W_i = weight of ith slice, kips

= width x average height x density

u_i = pore pressure or neutral stress

ϕ = angle at internal friction of soil, degrees

θ_i = angle of base of ith slice

F = Factor of safety

Where the slopes are not saturated and are in a drained condition with long term loading, the neutral stresses are 0, then

$$F = \frac{\sum (c\, x_i + W_i \tan \phi)\ [1/M_i(\theta)]}{\sum W_i \sin \theta_i}$$

Because F is present on both sides of the equation (M_i (θ) is a function of F), then a value of F in $M_i(\theta)$ is assumed and the equation is then solved to obtain a value for F. If the assumed value equals the result, then the assumption is correct. If the assumed value does not equal the result, then a new value is used in $M_i(\theta)$ and the process is repeated until it closes on the correct answer.

A computer program was developed to solve for F when certain basic parameters are given, using the equation above and assuming the failure would be a toe failure, because the fill slopes are located on firm bases.

The basic parameters required are cohesion, density, angle of internal friction, the width of each slice, the average height of each slice, and the angle at the base of each slice.

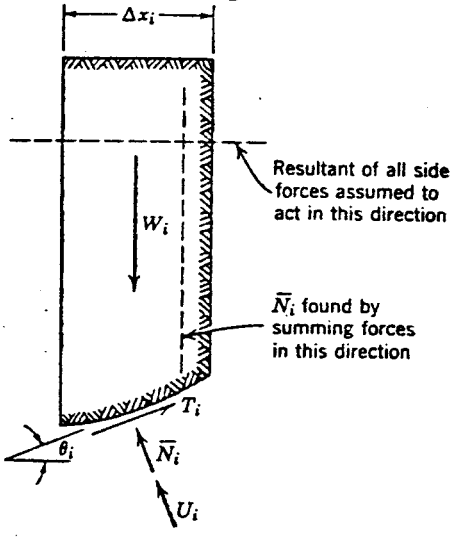

Fig. 24.13 Forces considered in simplified Bishop method of slices.

FINAL RECLAMATION PLAN (UMC 784.13)

Structural Removal

Following completion of mining, work will begin on demolition of the surface facilities. All structural steel, metal siding and other building materials except concrete will be dismantled and disposed of off the permit area. All foundations and structures built of concrete are to be broken up and buried on the bathhouse-warehouse pad as shown on the cross-sections. The asphalt material will also be buried here and then covered with at least 4 feet of non-toxic material.

Portal Sealing

After mining has ceased and the surface structures have been removed the portals will be sealed with a double row of concrete block as shown on Figure 1. The backfilling will be done during the backfilling and grading step.

The portal entries are up dip and the mines are virtually dry, therefore, no hydrological seals are necessary.

Backfilling and Grading

General:

As structural removal is completed the backfilling and grading phase will begin.

All backfilled areas will be constructed in 18" maximum lifts. The lifts will be constructed with an 826B compactor with at least three passes to accomplish the compaction.

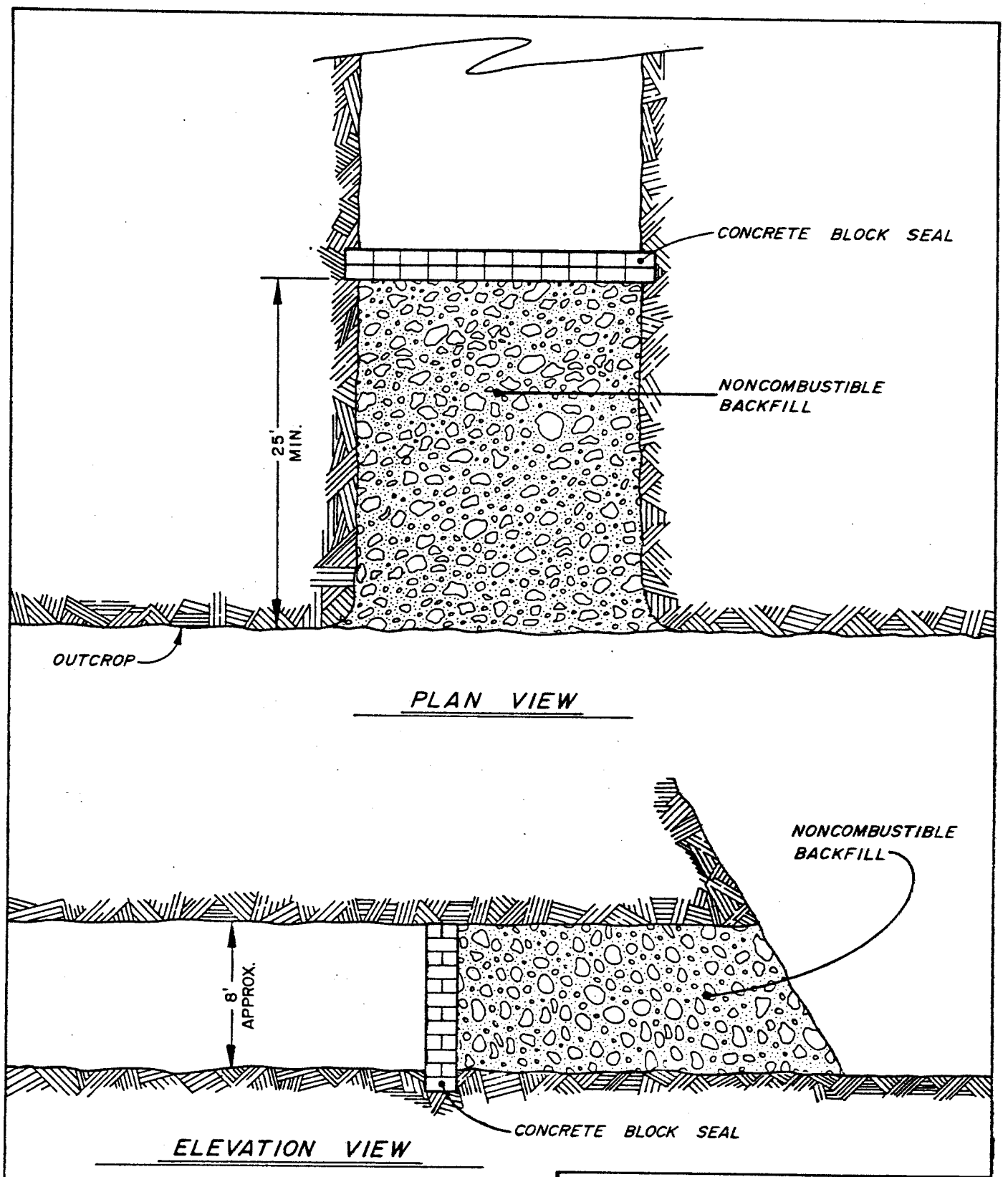

FIGURE 1

DES-BEE-DOVE COAL MINES EMERY COUNTY, UTAH		
TYPICAL PORTAL SEAL		
UTAH POWER & LIGHT COMPANY	SCALE: NONE	DATE: SEPTEMBER 2,1980 DWG. NO.: CM-10319-WB

Maximum fill slopes will be 2H:1V.

Following is the list of equipment to be used and their appropriate rates. These rates are taken from the Rental Rate Blue Book:

	Weekly	Hourly
988B Loader, 375 HP, 7 yd. bucket	$4,255.00	$106.38
769B Off-Highway Truck, 35 ton	1,755.00	43.88
621B Scrapers, 330 HP, 14 c.y.	3,905.00	97.63
826B Compactor, 300 HP	2,405.00	60.13
D8K Dozer with straight blade	3,500.00	87.50
D6D Dozer with angle blade	2,070.00	51.75
235 Excavator, 195 HP, standard bucket	4,800.00	120.00
Tractor-Truck	615.00	23.00
Trailer, flat bed, tandom axle	290.00	12.10
JD 500 Backhoe	1,200.00	30.00
Crane, 40 ton	3,230.00	93.25

The labor rates used are as follows:

Supervisor	$18.00/hr.
Operator	$15.00/hr.
Laborer	$10.00/hr.

The overall reclamation plan is to remove all fills from the canyon invert to original bedrock. This will form the permanent drainage diversion channel down to the tipple yard. Then, based on hydrological calculation, a channel will be built to by-pass the tipple yard fill to a riprap fan that will carry the water off the fill down to original ground below the toe of the fill.

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Beehive-Little Dove:

Material from the fill section of the pad will be used as backfill across the portal highwall of the Little Dove Mine. The fill will be constructed on a 2H:1V slope, 15 feet high. (See Quantity Summary sheet)

Parking Lot Extension:

The south addition of the parking area will be back-filled as shown on the typical cross-sections. Maximum slope 3H:1V. The remaining fill from the Little Dove-Beehive area plus material from the Deseret pad fill area will be used.

Asphalt Removal:

The access road beginning where the road meets the tipple yard will be stripped of asphalt. Both parking areas will be stripped. This material will be placed and compacted against the highwall as shown on the appropriate cross-sections.

Bathhouse-Warehouse:

The fill section of the pad is to be pulled back and terraced as shown on the cross-sections. Additional material from the Deseret Pad and the #1 Stockpile Pad will be used to finish the fill as shown.

Diversion:

Two small diversions, A and B, and the large diversion is to be built as shown on the fill sections of the reclaimed areas to carry storm waters through the canyon.

It is estimated that 10% of the rip-rap needed for the diversion will be taken from the existing fills as they are pulled out. The remaining fill material will be purchased from local contractors. The gravel liners will be excavated from the roadbase and parking lot base. The clay liner will be purchased from local contractors.

Rip-Rap Fan:

To carry the water from the fill down to the original ground a rip-rap fan will be built as shown. Material to build the fan will be purchased and hauled to the site by local contractors.

Rills and Gullies

During the bonding period it can be expected that erosion will take place over the reclaimed area of the permit.

During the late summer, each year maintenance work will be done to stabilize these areas.

Sediment Pond

After the bonding period is complete and vegetation is satisfactory the sediment pond will be dried out and material from the excess spoil sites, from the pond construction, will be used to backfill the pond to approximate the surrounding topography.

East Mountain Access Road

The main road which serves the mine is also an access road for local cattlemen who, twice each year, herd cattle through the mine area to reach East Mountain.

As this road is an established cattle drive and the only road to East Mountain on the east side, it is desirous to maintain this road independently from the mine's final reclamation plan.

As an owner of lands on East Mountain, applicant plans to maintain this roadfor purposes of access.

The road will be water-barred and stabilized each year as a maintenance program.

Toxic or Acid Forming Material

All concrete above ground and all asphalt is to be buried on the bathhouse-warehouse pad with four feet of non-toxic material.

Any other material found to be toxic or acid forming and all coal cleaned up from surface areas are to be handled in the same manner.

Stability

Final reclaimed slopes will be built at 2H:1V or less. Material used for the backfill will be less than 3' diameter. The material will be selectively placed in 18" lifts and compacted.

No ground water is located in any of the backfilled areas, therefore, no pore water pressure is used in the analysis.

Slope stability analysis was calculated on the bathhouse fill. The soil parameters used by Rollins, Brown and Gunnel were used because the material is the same.

c = 400 pcf

ϕ = 32°

γ = 80 psf

H = 184

Slope = 2H:1V

Calculated Safety Factor SF = 1.74

All other reclaimed slopes are less in height and have the same strength parameters, therefore, the safety factor is the same or greater.

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(5)

The one exception is the storage yard fill which is not changed for final reclamation, therefore, existing and final stability are the same.

Following is an explanation of the methodology used for the analysis.

SIMPLIFIED BISHOP METHOD OF SLICES

(Lambe & Whitman 1969, p. 365)

To analyze a slope for stability, a trial and error process is used to determine the safety factor against failure. A diagram is prepared of the slope and a proposed failure mass with a circular arc failure line is drawn and then broken up into a series of vertical slices. The forces and moments on each slice are summed to determine the total moments acting on the failure mass and the factor of safety is taken as the ratio of the moments resisting movement to the moments initiating movement. The equation for the factor of safety F is

$$F = \frac{\sum_{i=1}^{i=n} [\bar{c}\,\Delta x_i + (W_i - u_i \Delta x_i) \tan \bar{\phi}][1/M_i(\theta)]}{\sum_{i=1}^{i=n} W_i \sin \theta_i}$$

where n = # of slices

$\bar{c}$ = effective cohesion kips per square foot

Δx_i = width of ith slice

W_i = weight of ith slice, kips

= width x average height x density

u_i = pore pressure or neutral stress

ϕ = angle at internal friction of soil, degrees

θ_i = angle of base of ith slice

F = Factor of safety

Where the slopes are not saturated and are in a drained condition with long term loading, the neutral stresses are 0, then

$$F = \frac{\sum (c\, x_i + W_i \tan \phi)\ [1/M_i(\theta)]}{\sum W_i \sin \theta_i}$$

Because F is present on both sides of the equation (M_i (θ) is a function of F), then a value of F in $M_i(\theta)$ is assumed and the equation is then solved to obtain a value for F. If the assumed value equals the result, then the assumption is correct. If the assumed value does not equal the result, then a new value is used in $M_i(\theta)$ and the process is repeated until it closes on the correct answer.

A computer program was developed to solve for F when certain basic parameters are given, using the equation above and assuming the failure would be a toe failure, because the fill slopes are located on firm bases.

The basic parameters required are cohesion, density, angle of internal friction, the width of each slice, the average height of each slice, and the angle at the base of each slice.

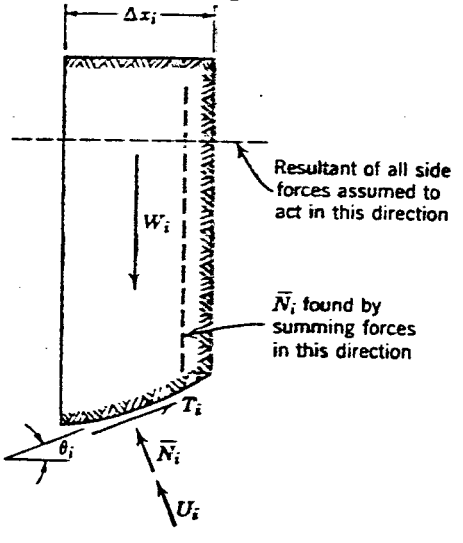

Fig. 24.13 Forces considered in simplified Bishop method of slices.

QUANTITIES SUMMARY SHEET

FINAL RECLAMATION BACKFILLING AND GRADING

Little Dove-Beehive Area #5		
Total Excavation		6,000 c.y.
Little Dove Highwall Embankment	3,677 c.y.	
Little Dove-Beehive Portals	900 c.y.	
10% Rip-Rap	600 c.y.	
Parking Lot Extension Embankment	823 c.y.	
Deseret Area #4		
Total Excavation		7,333 c.y.
Parking Lot Extension Embankment	4,274 c.y.	
Deseret Portals Embankment	900 c.y.	
10% Rip-Rap	730 c.y.	
Bathhouse-Warehouse Embankment	1,429 c.y.	
#1 Stockpile Area #3		
Total Excavation		6,525 c.y.
Bathhouse-Warehouse Embankment	5,869 c.y.	
10% Rip-Rap	656 c.y.	

FINAL RECLAMATION

Hydrological Balance

Upon final reclamation a permanent diversion drainage channel will be constructed through the mining area. The storm event and corresponding channel will accommodate the runoff and peak flows from a 100 year storm event. Assumptions, calculations and methodology can be found in Appendix XII. Routing of the drainage channel is depicted on the final reclamation Map 4-1 and 4-2.

It is the intention of applicant to place the drainage channel, for the most part, in its original configuration with the exception of the fill structure #1 crossing.

The access road and drainage channel are parallel along the fill. Their location is such as to take advantage of permit material adjacent to a realigned road bed. When the channel crosses the fill structure a clay filter layer will be required in addition to the regular gravel filter and riprap layers.

Hydrologic and riprap design calculations are listed in the following tables.

Construction and design of riprap cascading dissipation fan structure is shown on the final reclamation map also, with a fording to allow a permanent crossing.

Cross-sectional and plan views of the road ford as well as design details are shown on the Des-Bee-Dove Final Reclamation map. Flow velocity vector analysis shows a

maximum change in water surface elevation at the bend of 0.3 feet. With an adjusted total depth of 1.6 feet there is a designed freeboard of 1.9 feet.

Presently, design procedures aren't available to facilitate riprap design for slopes greater than 50%, yet slopes at the lower end of the Des-Bee-Dove Mine pad range from 60 to 70 percent.

The following is the combined results of a meeting held between the Company, OSM, and the DOGM concerning acceptable practices for channelization and energy dissipation.

1. The stream channel would be conveyed as far as possible downstream of the mine pad fill before entering the cascading rock fan. This would help eliminate direct erosive contact of the water with the fill material.
2. Large diameter riprap would be placed down the slope to act as a cascading energy dissipator. A D_{50} riprap size of 3 feet will be used down the slope.
3. An energy dissipating pool of water would be built at the bottom to return the water to the natural channel.

The general conclusions discussed above reflect a practical solution to a difficult problem. Design details and parameters for the channel, fan, and energy dissipator are shown on the Final Reclamation map.

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The channel inlet at the upper end of the mine pad is not meant to be an energy dissipator, although some head loss will be encountered. Backwater analysis showed that a smooth constricting transition will convey the upstream supercritical flows smoothly into the normal water depth for the downstream section. Transition location, design details, and riprap requirements are shown on the Des-Bee-Dove Final Reclamation map and Cross-Section Profile Map 4-3. The stream calculations for sections above and below the transition are shown below. The difference in normal flow velocity head between the two sections equals 4.8 feet.

	Natural Channel Above Transition	Riprapped Channel Below Transitiion
Bottom Slope (ft/ft)	.37	.04
Bottom Width (ft)	20	15
Side slope (M:1)	2	2
Mannings n	.035	.04
Flow Depth (ft)	0.8	1.8
Area (ft^2)	16.3	33.1
Perimeter (ft)	23.4	23.0
Hydraulic Radius (ft)	0.7	1.4
Mean Velocity (fps)	20.3	10.1
Froude Number	4.3	1.5
Riprap D_{50}	-	1.0
Riprap Thickness (ft)	-	2.0

VAUGHN HANSEN ASSOCIATES
CONSULTANTS / ENGINEERS

COMPUTED DH CLIENT [illegible]
CHECKED _____ PROJECT [illegible]
DATE _____ FEATURE [illegible]

CHANNEL DESIGN

Q = 222 cfs

H:V	Deg
2:1	26.6
2.5:1	21.8
3:1	18.4

D50	Manning's n
.25-.5	.031-.035
.75-1.0	.038-.040
1.25-1.5	.041-.042
1.75-2.0	.043-.044
2.5-3.0	.046-.047

STATION FROM	TO	SLOPE Sf (ft/ft)	BOTTOM WIDTH B (ft)	SIDE SLOPE H:V	MANNINGS n	FLOW DEPTH Y_o (ft)	AREA (ft²)	PERIMETER (ft)	HYDRAULIC RADIUS (ft)	MEAN VELOCITY V_o (fps)	FROUDE NUMBER Fr	RIPRAP D_{50} (ft)	D_{max} (ft)	
0+00	2+50	.044	15	2:1	.040	1.8	33.3	23.0	1.4	10.0	1.4	1.0	1.5	2
2+50	8+40	.051	15	2:1	.041	1.7	32.2	22.8	1.4	10.3	1.6	1.25	2.0	2
8+40	10+00	.219	20	2:1	.044	1.0	22.4	24.5	0.9	14.9	2.7	2.0	—	2

(riprap design for x=8+40 to 10+00 is based on the Surface Mining Water Diversion Design Manual with Hydraulics calculated using the Mannings equation.)

DITCH A

Q_{100} = 24 cfs

0+00	1+00	.12	2	2:1	.042	0.8	3.0	5.7	0.5	8.0	1.6	1.5	1.0	2.
1+00	2+00	.08	2	2:1	.040	0.9	3.4	6.0	0.6	7.2	1.3	1.0	1.0	1.
2+00	3+00	.10	2	2:1	.041	0.9	3.1	5.8	0.5	7.6	1.5	1.25	1.0	1.
3+00	5+00	.15	2	2:1	.042	0.8	2.8	5.5	0.5	8.7	1.7	1.5	0.8	2
5+00	6+00	.10	2	2:1	.041	0.9	3.1	5.8	0.5	7.6	1.5	1.25	1.0	1.
6+00	10+75	.02	2	2:1	.035	1.2	5.1	7.2	0.7	4.7	0.8	—	—	—

DITCH B

Q_{100} = 15 cfs

		.077	2	2:1	.038	0.7	2.3	5.1	0.5	6.4	1.4	0.75	0.8	1.

TABLE B1. DES-BEE-DOVE Mine Watershed Runoff Characteristics

Watershed Subarea	Area (acres)	Average Slope (%)	Curve Number	Hydraulic Length (ft)	2-Yr Runoff (cfs)	10-Yr Runoff (cfs)	100-Yr Runoff (cfs)
IIIA	170	63.5	85	4,000	-	136	332
IIIB	11.7	166	85	2,330	-	-	24
IIIC	6.9	31.6	87	980	-	-	15

DES-BEE-DOVE DRAINAGE AREA IIIA

10-YEAR 24-HOUR PEAK DISCHARGE

AREA= 170.0 ACRES
AVERAGE BASIN SLOPE= 63.5 PERCENT
INCREMENT OF RAINFALL EXCESS= .0230 HOURS
CURVE NUMBER= 85.
DESIGN STORM= 2.00 INCHES
STORM DURATION= 24.0 HOURS
HYDRAULIC LENGTH= 4000. FEET

TP= .1139 HOURS QPCFS= 1129.00 CFS QPIN= 6.5861 INCHES C3= 32.462
ITERATIONS= 8

TIME HOURS	ACCUMULATED RAINFALL INCHES	RUNOFF INCHES	RAINFALL EXCESS INCHES	UNIT HYDROGRAPH CFS	OUTFLOW HYDROGRAPH CFS
11.89	1.1602	.2534	.0183	.0	115.12
11.91	1.1952	.2721	.0187	.0	119.37
11.94	1.2301	.2912	.0192	.0	123.43
1.96	1.2651	.3108	.0196	.0	127.31
11.98	1.3000	.3308	.0200	.0	131.02
12.01	1.3277	.3468	.0161	.0	134.33
12.03	1.3343	.3507	.0039	.0	135.48
12.05	1.3410	.3546	.0039	.0	130.99
12.07	1.3476	.3585	.0039	.0	119.98
12.10	1.3542	.3624	.0039	.0	104.68
12.12	1.3608	.3664	.0039	.0	88.19
12.14	1.3674	.3703	.0039	.0	72.95
12.17	1.3741	.3743	.0040	.0	60.27

HYDROGRAPH PEAK= 135.73 cfs
TIME TO PEAK= 12.02 Hours

REVEGETATION (UMC 817.111-.117)

Interim Stabilization and Vegetation Plan

There are five major fills at the Des-Bee-Dove Mine with bare open slopes generally with a south or southeast aspect. With the proposed reclamation plan one fill would provide some soil material for the final contouring and grading. Because no topsoil was stockpiled and the native soils on these steep slopes provide very little topsoil material the fill material would need to become the planting medium. An off-site source is impractical. The fill material was tested in 1980 and again in 1983 for its physical and chemical properties.

The soil material in the fills was originally derived from sandstone and shale parent materials. The soil material particles are mostly sand with textures from sandy clay loams to sandy loams (Table I). The water holding capacity is low, typical of sandy soils.

They are calcerous soils as indicated by ph's of 7.5-8.5 and calcium carbonate equivalents above eight percent (Table II). Salt content is too low for any harmful affects on plants. Potassium, phosphates and nitrogen, important plant nutrients, are very low indicating the need for fertilization to insure plant growth. The organic material is principally coal debris, the nitrogen percentage ratio is too low.

TABLE I: SOILS PHYSICAL PROPERTIES

Sample #	Year	Identification	Sand	Silt	Clay	Texture	pH	Saturation %	Ece
1107[1]	1980	0-4"	52	33	15	SL	8.3		0.8
1108	1980	4-12"	50	33	17	SL	8.1		0.5
1109	1980	12-24"	54	31	15	SL	8.3		0.4
1110	1980	Surface Wash	52	33	15	SL	8.1		0.3
1111	1980	Subsoil	59	27	14	SL	8.0		2.1
1117	1980	Coal Waste					10.0		2.1
1118	1980	Coal Waste					7.1		2.5
1119	1980	Coal Waste					7.5		2.5
DBD#1[2]	1983	Upper Fill	65	13	22	SCL	8.2	30	.40
DBD#2	1983	Bathhouse Fill	59	11	30	SCL	8.8	20	.70
DBD#3	1983	Tipple Fill	65	17	18	SL	8.5	30	.72

[1] Soil and spoil from Des-Bee-Dove Mine

[2] Fill soil material samples collected on subsurface layers in fill (4"-20"). Sample composited from ten sub-samples on each fill slope.

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TABLE II: SOILS PRODUCTIVITY ANALYSIS

Sample #	SAR	OM %	N %	Ca %	(Ca+Mg)	Mg %	Na (Meg/L)	K %	P ppm	$CaCO_3$ Equivalents %
1107	0.7	2.6			6.8		1.2	.01	1.9	
1108	0.7	3.9			3.9		1.0	.01	2.3	
1109	0.9	1.3			2.9		1.1	.006	.3	
1110	0.8	2.5			2.4		.9	.006	1.2	
1111	1.0	5.1			20.2		3.2	.02	2.6	
1117	0.8				23.3		2.7	.01	1.2	
1118	0.8				26.5		2.9	.01	.3	
1119	0.7				28.8		2.6	.01	.2	
DBD#1	3.03	13.88	.088	9.85		2.75	.076	.087	.125	17.9
DBD#2	3.28	9.24	.056	9.00		2.00	.077	.056	.064	16.5
DBD#3	2.76	15.29	.240	11.38		3.41	.075	.114	.059	16.9

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Interim Vegetation Establishment

Fill Slopes

The fill slopes at the tipple area, bathhouse, coal stockpile area, Deseret pond and Beehive portal require stabilization. Seed was previously spread on these slopes but this effort produced only a few scattered wheatgrass and sweetclover plants. These slopes are steep and suffer erosion from wind, precipitation, surface water flows and sloughing. The interim vegetation plan will control these forces by:

1. A vegetative cover to protect the soil surface.
2. A well developed root system to retard soil movement.

The interim vegetation plan will also provide the basis for developing a final revegetation plan by:

1. Testing various plant species adaptability to these soil materials. Introduced species also tested for their possible role in final revegetation.
2. Testing and developing planting techniques with the highest probability of success.
3. Developing some fill material as a substitute for topsoil by establishing a root system in the top layers along with organic material buildup and an environment suitable for micro-organism colonization.
4. Provide a detailed analysis of soil productivity with a series of tests over the life of the mine. This would be the basis for fertilization and soil handling at the final revegetation.

The upper 18-24" fill layer would then become the "topsoil" by nature of its established plant community with micro-organisms, organic deposition, nutrient soil cycles, root zone, etc. At final reclamation this "topsoil" would be removed and stored during the redistribution of fill and grading. Then the temporarily stored "topsoil" would be placed on the newly graded and prepared surfaces 6-12 inches deep at random locations. This would increase the variability of the soil surface and provide areas of established growing medium with its own plants, roots and seeds to speed plant establishment the following spring. This will serve as a catalyst for the final seedings and plantings.

The seed mix and plantings were designed more for soil stabilization than to provide wildlife food or livestock forage. The plant species were selected on the basis of their drought tolerance, alkalinity tolerance, vegetative growth form (cover soil surface), root systems (both taproot and spreading) and nitrogen fixation potential. Because the slope's aspects emulate the pinyon-juniper plant community on steep slopes most species selected were native to the reference area. Some faster growing species were utilized to provide plant cover while the slower native species become established.

Common Name	Scientific Name	Lbs/Acre Equivalent PLS*
Grasses		
Thickspike Wheatgrass	Agropyron dasystacyum var. Critana	5
Western Wheatgrass	Agropyron smithii var. Rosanna[1]	6
Salina Wildrye	Elymus salinus	2
Indian Ricegrass	Oryzopsis hymenoides var. Paloma	4
Squirreltail	Sitanion hystrix[2]	3
Forbs		
Pacific Aster	Aster chilensis	0.2
Northern Sweetvetch	Hedysarum boreale	10
Yellow Sweetclover	Melilotus officinalis[2]	2
Alfalfa	Medicago savtiva var. Nomad[2]	2
Eaton Pentstemon	Penstemon eatonii[2]	1
Test Plantings		
Shrubs		
Big Sagebrush	Artemisia tridentata var. tridentata	
Four-wing Saltbush	Atriplex canescens	
Oldman Wormwood	Artemisia abrotanum	
Cliffrose	Cowania mexicana	
Green Mormon Tea	Ephedra viridis	
Utah Juniper	Juniperus osteosperma	
Kochia	Kochia prostrata[2]	

*PLS - Pure Live Seed
1 - Sod-forming variety
2 - Faster growing species

Mechanics of Interim Revegetation

Fill Slopes

The fill slopes are relatively small areas and because of the steepness all of the seeding and planting work will be done by hand. These slopes are severe planting sites and successful establishment of a vegetation cover will require close attention to details, some favorable growing conditions and repeated efforts. The criteria for success will be the

establishment of a reproducing plant cover on the majority of the slope. This may require a three to seven year period. Fast-growing cover crop species were not included in the seed mixture for fear they would consume the soil moisture on these arid sites during the germination and seedling growth of the perennials. The shrub test plantings purpose is to determine what species will be most likely to succeed in the final revegetation phase to establish a shrub cover on the slopes.

Seeding - (Fall)

1. Clean the slopes of debris.

2. Broadcast the seed mixture at the predetermined rate with "hurricane spreaders".

3. Broadcast the fertilizer mixture with "hurricane spreaders" at the rate determined by soils analysis:

   Approximately:

ammonium nitrate	50 lbs/acre
triple superphosphate	75 lbs/acre

4. The slope will then be covered with a ½" layer of green alfalfa hay for mulch (2 tons/acre).[1]

---

1. During recent revegetation trials in Utah the author has determined that the greatest single positive influence on seed germinations and growth was mulching with green alfalfa hay. Apparently the hay begins decomposing in soil and building a micro-organism population. Thus the soil nutrient cycle is enhanced providing additional nutrients, especially nitrogen, to the seedlings. Also, the retention capability of the soil is increased with the increased organic matter.

   Alfalfa hay also brings in foreign forb seeds common to cultivated sites. These forbs become established in the first year but quickly fade in the second year and were completely gone by the third year in our trials.

5. Rake up the slopes to turn the soil surface but not to smooth out the irregularities. The worker's footprints will be left as micro-niches for seed.

6. The mulch and seed will then be covered with "Vexar" netting. This netting will be secured at the toe and lip of slope and also on the slope with staples. The net will retain the seed and mulch on the slope.

7. The seeding operation will be completed in the late fall to take advantage of the winter moisture. During any snow plowing operations on the parking lots and equipment yards the snow will be stockpiled at the lip of the slope to allow maximum snowmelt to seep into the slopes. All slope drainage will be channeled to the sedimentation pond.

8. Irrigation will not be scheduled the first growing season following seeding and planting. Should the initial effort fail then the slopes would be reseeded and planted and irrigation utilized. The water would be sprinkled from a water truck to soil surface saturation at two week intervals during May, June, July, and August.

Shrub Test Plantings

1. The following spring early (March) small container stock of the several shrub species (12 ea.) will be hand planted on a 20 x 25 foot test strip. Each vertical planting row will be on 2 foot centers with 12 plantings per row from the toe to the lip of the slope. Each species will be rotated in the planting order so they are randomly scattered in the rows.

2. Each planting site in the row will have a basin where the planting can be located to receive maximum soil moisture.

3. A 20-10-5 fertilizer tablet will be placed adjacent to each planting at the root zone depth.

4. Each shrub plant will be enclosed in a "Vexar" net tube for protection from animals.

5. Each planting will be hand watered and marked with a stake.

Maintenance and Monitoring

1. Signs will be placed around the planted slopes for their protection.

2. The slopes will be hand cultivated for two years to remove "weeds" primarily Russian thistle (Salsola kali).

3. A licensed applicator will be employed each spring for three years to place poison for the rodents.

4. A site visit will be scheduled each spring to check on fitness of the sites and check progress of the plant growth for three consecutive years.

5. A site visit will be conducted in August to record plant growth. Two photo stations will be located on each slope to record yearly progress. The shrub plantings will be tallied for the survival rate and health of each species (survival judged as 50% of crown alive). A permanent 100' line intercept transect would be located on each slope to record species composition and ground cover.

6. An annual report that summarizes the year's work will be placed in the Company's files and forwarded to D.O.G.M.

7. The soil materials on the fill slopes would be sampled at five year intervals to record productivity changes. Ten samples at 4-20" depths would be compiled from each of the five fill slopes for analysis. Analysis would include:

    Phosphorous (ppm)
    Potassium (%)
    Calcium (%)
    Magnesium (%)
    Nitrogen (%)
    Sodium (%)
    Organic Matter (%)
    Sodium Absorption Ratio
    Electrical Conductivity (mmhos/cm)
    pH

    The final soil sampling period during interim will be core samples to specifically detect aberrant SAR levels. One core per fill with samples at 2 foot intervals.

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Final Revegetation Plan

The final revegetation plan may be revised to incorporate the results of the interim revegetation plan.

Seed Mixture

Common Name	Scientific Name	Lbs/Acre Equivalent PLS*
1. Pinyon-Juniper		
Grasses		
Western Wheatgrass	Agropyron smithii var. Rosanna	6
Salina Wildrye	Elymus salinus	2
Indian Ricegrass	Oryzopsis hymenoides var. Paloma	4
Squirreltail	Sitanion hystrix	3
Thickspike Wheatgrass	Agropyron dasystachyum var. Critana	5
Forbs		
Pacific Aster	Aster chilensis	0.2
Northern Sweetvetch	Hedysarum boreale	10
Louisiana Sage	Artemisia ludouiciana	2
Eaton Pentstemon	Penstemon eatonii	2
Corymbed Eniogonum	Eriogonum corymbosium	1
	TOTAL	35.2

* Pure Live Seed

Shrubs		Plants/Acre
Utah Serviceberry	Amelanchier utahensis	80
Big Sagebrush	Artemisia tridentata var. tridentata	80
Four-wing Saltbush	Atriplex canescens	80
Curleaf Mahogany	Cercocarpus leoifolius	80
Green Rabbitbrush	Chrysothamnus viscidiflorus	80
Trees		
Utah Juniper	Juniperus osteosperma	50
	TOTAL	450
	REFERENCE SITE	238

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2. Desert Shrub

Common Name	Scientific Name	Lbs./Acre PLS*
Grasses		
Salina Wildrye	Elymus salinus	2
Indian Ricegrass	Oryzopsis hymenoides var. Paloma	4
Squirreltail	Sitanion hystrix	3
Forbs		
Corymbed Eriogonum	Eriogonum corymbosum	2
Eaton Penstemon	Penstemon eatonii	2
Yellow Sweetclover	Melilons officinalis	2
Shrubs		
Cuneate Saltbush	Atriplex cuneata	15
	TOTAL	30

Shrubs, Container Stock		Plants/Acre
Fourwing Saltbush	Atriplex canescans	400
Shaldscale	Sarcobatus vermiculatus	400
Greasewood	Sarcobatus vermiculatus	100
	TOTAL	900
	REFERENCE SITE	773

* PLS - Pure Live Seed

Planting Techniques

The fill material at the bathhouse fill will be the planting medium after grading. The revegetated slope material will be used as planting medium, as explained in interim plan. The larger scale plantings will be less susceptible to wildlife damage and the shrubs will be planted in protectors. Grazing will not be allowed on the lands until after bond release. Fencing will be installed if necessary to preclude grazing. The plantings will be randomly spaced and clumped for wildlife enhancement. The species selection is based on reference site species list and ability to provide wildlife food and cover with several layers

of vegetation. Grazing will be enhanced by establishment of the perennial grasses.

Procedure

1. The newly graded sandy loam soils will not require any seedbed treatment to accommodate broadcast seeding. Hand methods will be utilized for revegetation work because most of the slopes will be too steep for machinery. The level fills will be ripped and disked after removal of contaminated surface layer for seedbed preparation. A tractor will be used on these level areas to broadcast the seed and fertilizer and to turn in the hay mulch. The newly exposed soil material on each pad will be sampled per #7 in interim maintenance and monitoring for determining fertilizer requirements.

2. The seed mixture will be broadcast with "hurricane spreaders".

3. The fertilizer mixture would be broadcast by "hurricane spreaders". Application rate would be dependent upon soils analysis especially of the "topsoil".

   Approximately:

Ammonium Nitrate	50 lbs/acre
Triple Superphosphate	75 lbs/acre

4. The green alfalfa hay would then be spread upon the soil surface ½" thick or 2 tons/acre.

5. The soil surface and mulch will then be turned with a horizontal drag. The steepest slopes will be hand raked up the slope. This technique would not remove the irregularities in the soil surface but only lightly cover the mulch, seed and fertilizer. Workers footprints on the slopes would serve as micro-niches for germination. Partially burying the alfalfa hay mulch would increase micro-organism activity.

6. On the steep slopes (3:1+) the soil surface would be covered with "Vexar" netting to retain the mulch, seed and fertilizer. The netting will be secured at the toe and lip of the slopes and stapled on the slope.

7. The following spring (March-April) small container stock of the shrub and tree species will be hand planted. At each planting clump a catch basin will be formed. A 21 gram 14-14-14 fertilizer tablet will be inserted at the root zone. Then each basin will be hand watered. Each planting will be protected by a "Vexar" tube.

Pinyon-Juniper

a. Species clumping by size to give a three layer affect to clumps.

1. Spacing approximaely 23 feet randomly 80 clumps/acre.

2. Clump size 4'x4', 2' spacing for plantings.

Lower Layer: Artemisia tridentata
Chrysothamnus viscidiflorus

Middle Layer: Amelanchier utahensis
Atriplex canescens
Cercocarpus ledifolius

Upper Layer: Juniperus ostrosperma

3. Clump Composition:

Lower: 2 Shrubs
Middle: 3 Shrubs
Upper: 1 Tree (50 of 80 clumps)

Total: 6 Shrubs + Trees/clump

Desert Shrub

a. Species clumping by size to give a three layer affect to clumps.

1. Spacing approximately 20 feet randomly 100 clumps/acre.

2. Clump size 4' x 4', 2' spacing for plantings.

Lower Layer: Atriplex confertifolia

Upper Layer: Atriplex canescens
Sarcobatus vermiculatus

3. Clump Composition:

   Lower: 4 Shrubs
   Middle: 5 Shrubs

   Total: 9 Shrubs/Clump
   Includes Atriplex cuneata which was seeded.

8. The sedimentation pond will be revegetated with the above techniques at end of ten year responsibility period.

9. Irrigation by water truck will be utilized should the initial seedings and plantings fail. Following the second effort, sprinkle irrigation to soil surface saturation will be scheduled at two week intervals during May, June, July, and August.

Maintenance and Monitoring

1. Signs will be placed around the planted slopes for their protection.

2. The slopes will be hand cultivated for two years to remove "weeds" primarily Russian thistle (Salsola kali).

3. A licensed applicator will be employed each spring for three years, or as required, to place poison for the rodents.

4. A site visit will be scheduled each spring to check on fitness of the sites and check progress of the plant growth.

5. Annual monitoring will include inspection for rills and gullies. Should these be present, they will be filled and replanted as required.

6. The reference areas will be checked to detect any changes from man-induced activities. The BLM and Emery Mining Corporation will have maps with these areas marked to preserve in management of respective lands.

Sampling for Ten Year Responsibility Period and Bond Release

1. All sampling will be undertaken in the late summer for maximum plant growth.

2. The line intercept method will be used to measure aerial cover and species composition.

3. The point-center quarter method based on the line intercept transects will be used to measure shrub and tree density.

4. Sample size for aerial cover will be tested at the 90 percent confidence level and density sample size at the 80 percent confidence level. This will equate with the sampling tests for reference site measurements, see Vegetation section.

5. Productivity measurements will be a double sampling procedure of clipped plots and ocular estimates. Five each 6.27"x100" rectangular plots at five random points would be located in reference areas and revegetated sites. Sampling confidence at the 80% level.

6. Revegetation Success:

   a. Inventory of reference sites at end of ten year responsibility period according to methods used at initial inventory and approved by D.O.G.M.

   b. Ground cover is established for two consecutive years at the end of responsibility period at 70 percent of reference site ground cover.

   c. Shrubs and trees will be in place for at least two growing seasons, the tree or shrub is alive and healthy and the tree or shrub shall have at least one-third of its length in live crown.

   d. The woody plants aerial cover is 90 percent of the reference site at the 80 percent confidence level.

RECLAMATION COST (784.13)

Estimated costs for reclamation are based on 1983 values and include all lands having been disturbed for the purpose of handling, crushing, storing and transporting coal extracted through the Deseret, Beehive and Little Dove Mines.

The following are the estimated total costs for reclamation:

1.	Total Reclamation Costs	$418,235.90
*2.	Mobilization and demobilization	10,000.00
	1983 Total Reclamation Cost	$428,235.90

* It is customary for contractors, who must move men and equipment from job site to job site, to charge additional monies to their competitive bids for such purpose. This charge is usually in the form of mobilization and demobilization. On very large projects these charges are usually built into the unit costs of work. Applicant states no costs are built into the reclamation work and will provide a lump sum of $10,000 for such purpose. It is felt this sum is sufficient to transport the needed equipment from any of the three major cities along the Wasatch front.

In addition, applicant has applied an escalator equal to the U. S. Government's price indexing based on the last five years, as shown.

Upon approval, and before receiving the mining permit, Utah Power & Light Company will submit a surety bond payable to the State and the Regulatory Authority in the amount as determined under section UMC 806.12.

The following are the cost changes for the preceding five years as provided by the U. S. Department of Labor, Bureau of Labor Statistics:

Industrial Commodities Index

1979	-	16.5%	
1980	-	13.2%	
1981	-	8.4%	
1982	-	1.6%	
1983	-	.9%	(annualize)
1979-1982	=	8.1%	

Using the 1983 reclamation costs of $428,235.90 this compounds to $632,137.48 for reclamation costs in the year 1988.

The performance bond will be conditional upon the faithful performance of the requirements of the act, the regulatory program and the reclamation plan.

Applicant reserves the right to request self-bonding under provisions of the State's UMC regulations at a later date.

DES-BEE-DOVE COAL MINES
RECLAMATION SCHEDULE

#	1st YEAR RECLAMATION	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	STRUCTURE REMOVAL												
2	CLOSURES-PORTALS & VENTILATION												
3	HAULING, BACKFILLING, COMPACTION, & GRADING												
4	ACID & TOXIC MATERIAL HANDLING												
5	INSTALL RIP RAP DRAINAGE CHANNELS												
6	TEMPORARY SEDIMENTATION CONTROL FACILITIES					NONE REQUIRED							
7	SOIL SAMPLING & SEED BED PREPARATION												

DES-BEE-DOVE COAL MINES
RECLAMATION SCHEDULE
(cont.)

#	1st YEAR RECLAMATION (cont.)	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
8	FERTILIZING & MULCHING									■			
9	SEEDING & PLANTING										■		

#	10 YEAR REVEGETATION & MONITORING	1st YEAR	2nd YEAR	3rd YEAR	4th YEAR	5th YEAR	6th YEAR	7th YEAR	8th YEAR	9th YEAR	10th YEAR
10	PLANT MONITORING- DISEASE & PEST CONTROL		■	■		■		■			■
11	SOIL STABILIZATION- RILLS & GULLIES		■		■		■		■		■
12	CONTINGENT SEEDING & PLANTING		■								
13	REVEGETATION INVENTORY FOR BOND RELEASE										■
14	SEDIMENT CONTROL STRUCTURE REMOVAL										■

DESERET-BEEHIVE-LITTLE DOVE MINES
RECLAMATION COSTS
SURFACE FACILITIES REMOVAL

Item #	Description	Equipment Manpower	Quantities	Total Cost	Constr. Days	Comments
1-A	Office-Bathhouse-Warehouse Building	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 14,496	8 Days	Structure is sheet metal over steel frame.
1-B	Tipple Building	225 Tons Truck/Trailer 5-Man Crew	225 Tons	$ 43,488	24 Days	
1-C	Conveyor System and Stacking Tube	Crane Truck/Trailer 5-Man Crew	1,000 ft.	$ 18,120	10 Days	Overhead and underground.
1-D	Deseret Fan #1	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 3,624	2 Days	
1-E	Deseret Fan #2	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 3,624	2 Days	
1-F	Beehive Fan	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 3,624	2 Days	
1-G	Little Dove Fan	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 3,624	2 Days	

SURFACE FACILITIES (CONTINUED)

Item #	Description	Equipment Manpower	Quantities	Total Cost	Constr. Days	Comments
1-H	Culinary Water Tank	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 1,812	1 Day	
1-I	Material Storage Shed	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 3,624	2 Days	
1-J	Water System Water Tank, Pump House and Water Line	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 3,624	2 Days	
1-K	Underground Shop	988B Truck/Trailer 5-Man Crew	1 Lot	$ 3,722	2 Days	Tear down portal and bury.
1-L	Fuel and Oil Storage Tanks	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 1,812	1 Day	All above surface.
1-M	Concrete Trash Bins	988 Loader 769B Truck 4-Man Crew	2 Each	$ 2,630	2 Days	Broken up and hauled to bathhouse site for disposal.
1-N	Rock Dust Storage Tank	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 3,624	2 Days	
1-O	Power Substation Lower	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 5,436	3 Days	

SURFACE FACILITIES (CONTINUED)

Item #	Description	Equipment Manpower	Quantities	Total Cost	Constr. Days	Comments
1-P	Power Substation Upper	Crane Truck/Trailer 5-Man Crew	1 Lot	$ 5,436	3 Days	
1-Q	69 KV Transmission Line	REMOVED BY OTHERS (UTAH POWER & LIGHT COMPANY) -- NO COST CHARGED TO MINING.				
1-R	Footer Removal and Clean-up	988B Loader 769 B Truck 5-Man Crew	1 Lot	$ 6,575	5 Days	Small footers, culverts, and misc.
			Subtotal	$128,895	73 Days	

RECLAMATION COSTS
PORTAL SEALING

Item #	Description	Equipment	Quantities	Total Cost	Construction Days	Comments
2-A	Portal Seals	4-Man Crew	17	$34,000	34 Days	3 Little Do 4 Beehive 10 Deseret
			Subtotal	$34,000	34 Days	

BACKFILLING AND GRADING

Item #	Description	Equipment	Hrs.	Labor	Hrs.	Total	Construction Days
3-A	Beehive-Little Dove	235	19.6	4 Operators	19.6	$ 6,426.64	2.5
		769B, 2 ea.	19.6				
		826B	19.6				
3-B	Parking Lot Extension	235	35.8	4 Operators	35.8	11,736.46	4.5
		769B, 2 ea.	35.8				
		826B	35.8				
3-C	Parking Lot-Bathhouse-Warehouse	235	75.9	3 Operators	101.0	33,706.53	12.6
		769B, 2 ea.	101.0	1 Operator	75.9		
		826B	101.0	2 Operators	25.1		
		D8K	25.1				
		988B	25.1				
				Subtotal		$51,869.63	19.6

TOXIC AND ACID FORMING

4-A	Asphalt Disposal	988B	28.2	2 Operators	28.2	$5,989.07	3.5
		769B, 2 ea.	3.8	2 Operators	3.8		
		826B	28.2				
				Subtotal		$5,989.07	3.5

INSTALL DRAINAGE CHANNELS

Item #	Description	Equipment	Hrs.	Labor	Hrs.	Total	Construction Days
5-A	Diversion, A and B	235	21.9	4 Operators	21.9	$ 8,193.67	2.7
		769B, 2 ea.	21.9				
		988B	21.9				
		Clay Liner 318 c.y. x $8.00				2,544.00	
5-B	Large Diversion	D8K	15.7	1 Operator	15.7	18,476.65	9.2
		826B	57.5	2 Operators	57.5		
		235	57.5	3 Operators	15.2		
		988B	15.2	2 Laborers	57.5		
		769B, 2 ea.	15.2				
		Riprap 3,169 c.y. x $11.00				41,747.00	
		Clay Liner 861 c.y. x $8.00					
5-C	Riprap Fan	988B	28.6	1 Operator	28.6	3,471.47	3.6
		Riprap 2,402 c.y. x $11.00				26,422.00	
				Subtotal		$100,854.79	15.5

6 Note: No additional work is required to provide sedimentation control. Existing sedimentation pond will remain in service during extended bonding period for final reclamation.

SOIL SAMPLING & SEED BED PREPARATION

Item #	Description	Equipment	Hours	Labor	Hours	Total Cost	Construction Days
7-A	Soil Sampling 10 Tests	Drill Truck @ $300/Day	8.0	1 Operator 1 Helper	8.0	$ 500.00	1 Day
7-B	Laboratory Analysis (10 Samples)	Laboratory		Lab Cost (10 ea.)		1,000.00	4 Days
7-C	Redistribute Topsoil	988B - 2 ea.	24.0	1 Operator	24.0	2,604.00	3 Days
7-D	Seed Bed Preparation			1 Supervisor 4 Laborers	40.0	2,320.00	5 Days
	Hand Till	None					
	Tractor Till	Tractor	22.0		22.0	440.00	2 Days
	TOTALS					$6,864.00	15 Days

FERTILIZING AND MULCHING

8-A	Fertilize 20 Acres	Flatbed Tractor	40.0	1 Supervisor 3 Laborers	40.0	$2,600.00	5 Days
8-B	Mulch 20 Acres	Flatbed	40.0	1 Supervisor	80.0	5,200.00	10 Days
	Net 10 Acres	Truck	40.0	3 Laborers			
	TOTALS					$7,800.00	15 Days

SEEDING AND PLANTING

9-A	Seeding 20 Acres	Flatbed Tractor	40.0	1 Supervisor 3 Laborers	40.0	$2,600.00	5 Days
9-B	Transplanting 10,300 each	Flatbed Truck	21.0	1 Supervisor 3 Laborers	21.0	1,339.00	3 Days
9-C	Seed, Mulch, Fertilizer, Plants and Netting	None - Material		None - Material		23,200.00	Material
	TOTALS					$27,139.00	8 Days

PLANT MONITORING
DISEASE AND PEST CONTROL

Item #	Description	Equipment	Hours	Labor	Hours	Total Cost	Construction Days
10-A	Revegetation Monitoring	None		1 Supervisor 1 Laborer	20.0	$ (560.00)	(3 Days)
	Monitoring on 2, 3, 4, 5, 7, 10 Years = 6 Years @ $560/Year =					$3,360.00	18 Days
10-B	Disease and Pest Control	None		1 Supervisor 1 Laborer	10.0	(280.00)	(1 Day)
	Control applied 2, 5, 7 10 Years @ $280 = 4 Years @ $280 =					$1,120.00	4 Days
10-C	Water Sampling (NPDES)	None		1 Supervisor	4.0	(72.00)	(1 Day)
	Monitoring 4 times each year for 10 years = 10 years @ $72 =					720.00	10 Days
10-D	Water Analysis (160 Samples @ $25)	Lab		1 Supervisor		4,000.00	(30 Days)
	TOTALS					$9,200.00	32 Days

SOIL STABILIZATION - RILLS AND GULLIES

11-A	Soil Stabilization Rills & Gullies	510 Backhoe	24.0	1 Operator 1 Laborers	24.0 24.0	$(1,320.00)	(3 Days)
	Repeat work on 2, 4, 6, 8, 10th year = 5 years @ $1,320.00 =					$6,600.00	15 Days
	TOTAL					$6,600.00	10 Days

CONTINGENT SEEDING AND PLANTING

Item #	Description	Equipment	Hours	Labor	Hours	Total Cost	Construction Days
12-A	Contingent Planting	Flatbed Truck	6.0	1 Supervisor 1 Laborer	8.0	$ 390.00	1 Days
	TOTAL					$ 390.00	

REVEGETATION INVENTORY FOR BOND RELEASE

13-A	Vegetation Inventory	None		1 Supervisor 2 Laborers	54.0	$2,052.00	7 Days
	TOTAL					$2,052.00	

SEDIMENT CONTROL - STRUCTURE REMOVAL

14-A	Sediment Pond	D8K 621B, 2 ea. 826B	90.8 90.8 90.8	4 Operators	90.8	$36,582.41	11.4 Days
				Subtotal		$36,582.41	
				TOTAL FINAL RECLAMATION		$418,235.90	245 Days

STEEL STRUCTURES

Labor

Wrecking Contractor Prices:

1 - Working Foreman	$ 18 Hr.
1 - Heavy Equipment Operator	15 Hr.
3 - Laborers (skilled helpers)	30 Hr.
	$ 63

$63 x 8 = ---------- $504/Day

Equipment

Rental prices are 1983 Blue Book.

1 - Diesel 50 Ton Crane	$ 746
1 - Diesel Truck and Trailer (flat-bed)	425
	$1,171

Equipment Per Day	$1,171
Labor Per Day	504
Wrecking Per Day	$1,675

Demolition rate estimated at 20 ton/day.

$1,675 ÷ 20 = $83.75 per ton ---------- $83.75

Loading and Hauling @ $16.25 ton ---------- $16.25

Total Cost Per Ton $100

Unit price quoted in application = Cost Per Ton $100

PORTAL SEALING

Material		Labor			Equipment		
Construction Blocks		1 - Blocklayer	@	$15 Hr.	1 - Flat-Bed Truck	@	$ 50 Day
400 @ .61 ea.	$244	1 - Helper	@	$10 Hr.	1 - Crawler Tractor	@	$800 Day
Mortar - 1 lot	16	1 - Equip. Operator	@	$15 Hr.			
Soil Backfill							
150 cu. yds. @ $2 c.y.							
(on-site material)	$300						
Total Material	$560 ea.			$37 Hr.			$850 Day

Laying Block 2 Days @ $250 Per Day ----------	$500
Material ----------	560
Backfilling 150 yards 1 Day @ $850 Per Day ----------	920
	$1,980

FOR ESTIMATES USE $2,000 Portal

REVEGETATION PER ACRE
BEDDING, MULCHING, PLANTING
ESTIMATE OF COSTS

Material		Labor		Equipment	
35# Seed @ $10 lb.	$ 350	1 - Working Foreman	$18	1 - Flat-bed Truck	$50 Day
450 Containerized Plants @ $.50 ea.	225	3 - Laborers @ $10/Hr	30	1 - Farm Tractor	80 Day
2-Ton Hay Mulch	200		$48		
150# Fertilizer	50				
	$ 825	8 x $48	$384/Day		$130 Day
* Netting & Staples	$1,000	Total Labor Day	$384		
Per Acre	$1,825	Total Equipment/Day	130		
			$514 Day		

Production Per Acre

Seed Bed Preparation	4 Hours
Fertilizing	2 Hours
Broadcast Seed	2 Hours
Transplant Seedlings (400)	1 Hours
Mulch 2" Cover	2 Hours
	11 Hours
11 ÷ 8 Hours (1.4 Days)	
*Netting & Staple	4 Hours
15 Hours ÷ 8 = 1.9 Days	15 Hours

Production/Acre

*With Netting	$2,800
Without Netting	$1,540

Deer Creek Mine Revegetation Cost

1. Flat Areas (no netting) 11 Acres	$16,940
2. Steep Slopes (with netting) 10 Acres	28,000
TOTAL COST	$44,940
TOTAL COST/ACRE	$2,140

* Netting Including Labor and Material.

RECLAMATION COSTS

BACKFILLING AND GRADING

Item 3

A. Beehive-Little Dove Area #5

Description: Using a 235 excavator and two 769B trucks, material from the fill section of the pad area is loaded and hauled to make a fill against the highwall on the Little Dove section of the pad. Slope is 2H:1V 15' high and 30' wide, built with 826B compactor. Included is portal seals.

Equipment: 235 Excavator

2 - 769B Truck

826B Compactor

Labor: 4 Operators

Quantities: 3,677 c.y. highwall backfill

Portal Seals, 900 c.y. (6 seals)

Production: Haul distance 500' @ 15%

Cycle Time 6 min./18 c.y. (From Caterpillar Handbook)

2 units x 180 c.y./hr. = 360 c.y./hr.

65% efficiency = 234 c.y./hr.

4,577 ÷ 234 = 19.6 hrs.

B. Parking Lot Extension Area #1

Description: Using 235 excavator and two 769B trucks, the remaining fill material from the Beehive-Little

Dove pad is loaded and hauled to the extension and placed as backfill. Fill material from the Deseret yard is loaded and hauled to finish making the fill. An 826B compactor is used to build the fill on a maximum 3H:1V slope. Included is sealing of Deseret level portal seals.

Equipment: 235 Excavator

2, 769B Trucks

826B Compactor

Labor: 4 Operators

Quantities: Beehive-Little Dove 823 c.y.

Deseret 4,274 c.y.

Portal Seals (6 ea.) 900 c.y.

Production: Beehive-Little Dove

Average haul distance 3,300' @ 15%

Average cycle time 11 min./18 c.y.

2 units x 99 c.y./hr. = 198 c.y./hr.

65% efficiency = 129 c.y./hr.

823 ÷ 129 = 6.4 hrs.

Deseret (Included seals)

Average haul distance 1,600 @ 15%

Average cycle time 8 min./18 c.y.

2 units x 135 c.y./hr. = 270 c.y./hr.

65% efficiency = 176 c.y./hr.

5,174 c.y. ÷ 176 = 29.4 hrs.

Total time 6.4 + 29.4 = <u>35.8 hrs.</u>

C. Remove and Bury Asphalt

Description: Using a 988B loader and two 769B trucks, the asphalt is to be removed from the access road from the tipple yard to the bathhouse level. The loader will only be used on the bathhouse level An 826B compactor will be used to place and compact the asphalt.

Equipment: 988B Loader

2, 769B Trucks

826B Compactor

Labor: 4 Operators

Quantities: Access Road 510 c.y.

Parking Lot 2,317 c.y.

Production: Access Road

Average haul distance 1,200' @ 12%

Cycle time 6.3 min./10 c.y.

2 units x 95 = 190 c.y./hr.

70% efficiency = 133 c.y./hr.

510 ÷ 133 = 3.8 hrs.

Parking Lot

Average haul distance 200' @ 0%

Average cycle time 2.2 min./7 c.y.

50% efficiency x 190 c.y./hr. = 95 c.y./hr.

2,317 ÷ 95 = 24.4 hrs.

Total Time 3.8 + 24.4 = <u>28.2 hrs.</u>

D. Parking Lot - Bathhouse - Warehouse - Area #1

Description: Using the 235 excavator and two 769B trucks, the fill material is to be terraced back as shown on the cross-sections. To complete the terraces, additional material from the Deseret level (area #4) and the #1 Stockpile (area #3) will be hauled. Placement of the fill and compaction will be done with a 826B compactor.

Equipment: 988B Loader

235 Excavator

2, 769B Trucks

826B Compactor

D8K Dozer (#1 Stockpile only)

Labor: 5 Operators

Quantities: Bathhouse Level 16,296 c.y.

Deseret 1,429 c.y.

#1 Stockpile 5,869 c.y.

Production: Bathhouse Level

Average haul distance 600' @ +15%

Cycle time 5.5 min./18 c.y.

2 units x 196 c.y./hr. = 392 c.y.

60% efficiency = 235 c.y./hr.

16,296 ÷ 235 = 69.3 hrs.

Deseret Yard to Bathhouse Terraces

Average haul distance 1,100' @ 15%

Average cycle time = 6.4 min./18 c.y.

2 units x 168 c.y./hr. = 336 c.y.

65% efficiency = 218 c.y./hr.

1,429 ÷ 218 = 6.6 hrs.

#1 Stockpile

Average haul distance 800' @ 12%

Average cycle time 6 min./18 c.y.

2 units x 180 c.y./hr. = 360 c.y./hr.

65% efficiency = 234 c.y./hr.

5,869 ÷ 234 = 25.1 hrs.

Total time 69.3 + 6.6 + 25.1 = 101 hrs.

Item 4

A. Construct Diversions A and B

Description: Two small diversions will be built, as shown on Drawing, to carry water across fill areas. Use the 235 Excavator to dig channel. 235 Excavator and two 769B trucks will be used to place rip-rap.

Equipment: 235 Excavator

769B Truck, 2 each

988B Loader

Labor: 5 Operators

2 Laborers

Quantities: Rip-Rap 850 c.y. (from the site)

Gravel liner 212 c.y. (from parking lot)

Clay liner 318 c.y. (off-site)

Production: Excavation

Cross-section of ditch 12 ft^2 = 0.5 c.y./lin. ft.

Cycle time 0.5 min./2 c.y. = 8 lin. ft./min.

200 lin. ft./hr.

60% efficiency x 200 = 120 lin. ft./hr.

1275 ÷ 120 = 10.6

Line Ditch

2.5 c.y./min. for rip-rap

Double time for liners

75 c.y./hr.

850 ÷ 75 = 11.3 hrs.

Total 11.3 + 10.6 = 21.9 hrs.

B. Construct Large Diversion

Description: Using a D8K Dozer the trench will be cut across the yard area as shown. The excavated material is spread over the adjacent area. The liners and rip-rap will be purchased from a local contractor and delivered to the site as needed. An 826B compactor will be used to place the liners. A 235 excavator will be used to place the rip-rap.

Equipment: D8K Dozer

826B Compactor

235 Excavator

988 Loader

769B Truck,, 2 each

Labor: 6 Operators

2 Laborers

Quantities: 1136 c.y. rip-rap (from site)

3,169 c.y. rip-rap (off site)

574 c.y. gravel (from parking lot)

861 c.y. liner (off site)

3,407 Excavation

Production: Excavation

Average haul distance 200'

450 c.y./hr. (.75)(.80)(.67)(1.2) = 217 c.y./hr.

3,407 ÷ 217 = 15.7 hrs

Line Ditch (based on rip-rap)

75 c.y./hr.

3,169 ÷ 75 = 42.3 hrs.

On site material

1,136 ÷ 75 = 15.2 hrs.

C. Rip-Rap Fan

Description: Part of the final diversion drainage system is to build an energy dissipator, to channel the water off the large fill onto natural terrain. Rip-rap will be purchased from a local contractor and hauled to the site.

Equipment: 988 B Loader

Labor: 1 Operator

Quantities: 2,402 c.y.

Production:

Cycle time 5 min./7 c.y.

84 c.y./hr.

2,402 c.y. ÷ 84 = 28.6 hrs.

Item 5

Rills & Gullies

Description: During the 10 year bonding period it is expected that yearly maintenance will be required to stabilize erosion that develops on the reclaimed areas. Costs are based on past history.

Equipment: JD500 Backhoe

Labor: 1 Operator

2 Laborers

Production: 24 hrs.

Item 6

Backfill Sediment Pond

Description: Using material from the spoil piles developed during construction of the pond will be backfilled after the bonding period is complete.

Equipment: D8K Dozer

621B Scraper, 2 each

628B Compactor

Labor: 4 Operators

Quantities: 30,976 c.y.

Production:

Average haul distance 500' @ +10%

Average cycle time 3.7 min./14 c.y.

2 units x 227 c.y./hr. = 454 c.y./hr.

75% efficiency = 341 c.y./hr.

30,976 ÷ 341 = 90.8 hrs.

Item #7

Soil Sampling and Seed Bed Preparation

A. Soil sampling per D.O.G.M. guidelines. All areas of existing embankment that will be redistributed as top soil. This includes soils excavated for channel construction.

B. Scarification of old road beds for knitting topsoils or regrading.

C. Upon asphalt removal, redistribution of clean gravels for channel reconstruction (filter beds).

D. Surface preparation, steep slopes slopes exceeding 25% (15°) is handwork. Slopes less than 25% will utilize a tractor and drag implement to accomplish surface preparation.

Equipment: Soil Drill, Tractor and Implements

Labor: 1 Operator, 4 Laborers

Production: Soil Samples 8 Hours

Seed Bed Work:

a. Hand Tilling @ 4 Hours/acre - 10 Ac. 40 Hours

b. Tractor tilling @ 2 Hrs./Ac - 11 Ac. 22 Hours

Total Hours 62 Hours

Item #8

Soils, Fertilization, Mulching

A. Fertilize - Broadcast 21 Acres

B. Planting Seed and Plants (see Item #9)

C. Mulch - Spread Hay Bales - 21 Acres

D. Spread and Staple Netting - 10 Acres

Equipment:	Flat-bed Truck	
Labor:	1 - Working Foreman 3 - Laborers	
Quantities:	Fertilize (hand-work) 21 Ac. Mulch 2" cover - 2 Tons/Ac. Install Nylon Netting 11 Ac.	
Work Time:	Haul, Spread and Rake Fertilizer. 125#/Ac - 21 Ac. 2,625 lbs.	42 Hours
	Haul, Spread, Mulch 2 Tons Per Acre - 21 Acres	42 Hours
	Haul, Spread and Staple Nylon Netting 10 Acres	40 Hours
		124 Hours

Item #9

Seeding and Planting

A. Broadcast and rake 750 lbs. of mixed seeds.

B. Transplant 9,000 each containerized plants.

Equipment: Flat-Bed Truck
Farm Tractor & Implements

Labor: 1 - Working Foreman
3 - Laborers

Quantities:

Pinyon-Juniper	Desert Shrub
20 Acres	1.5 Acres
Seeding 35 lbs/acre	Seeding 30 lbs/acre
Transplants 450/acre	Transplants 900/acre

Production: Broadcast seed @ 2 acres/day
Transplant 1,000 each/man-day

Pinyon-Juniper		Desert Shrub	
20 Acres		1.5 Acres	
Seeding	80 Hrs.	Seeding	8 Hrs.
Transplanting	18 Hrs.	Transplanting	4 Hrs.
	98 Hrs.		12 Hrs.

Item #10

Five-Year Monitoring and Pest Control

Monitoring:

a. Revegetation

b. Water Discharge - NPDES

c. Disease and Pest Control

Equipment: None

Labor: 1 - Supervisor

1 - Laborer

Monitoring: Des-Bee-Dove Mine

Revegetation	208 Hrs. x 1 x 6 =	180 Hrs.
Water Samples	2 Hrs. x 4 x 10 =	80 Hrs.
Disease & Pest Control	10 Hrs. x 1 x 4 =	40 Hrs.
		300 Hrs.

Total monitoring days over the 10 year extended bonding period - 37 Days.

Item #11

A. Rills and Gullies

Description: A rubber-tired JD520 backhoe and two laborers are used. The time required is based on our past history and expanded to cover the increased acreage.

Equipment: JD510 Backhoe

Labor: 1 - Operator

1 - Laborer

Production: 24 Hours, 3 Days

Work will be coordinated with vegetation monitoring years 2, 4, 6, 8 and 10.

5 Years x 3 Days = 15 Days Work = 120 Hours

Item #12

Contingent Plant (replanting)

A. Reseed and Replant Unsuccessful Areas (estimated 1%).

Equipment: None

Labor: 1 - Foreman

1 - Laborer

Quantities:

.01% Replant

Spread 10 lbs. Seed

Replant 100 Transplants

Production:

1,000 Plant/Man/Day - 4 Hrs.

Seeding - 4 Hrs.

8 Hrs.

Item #13

Inventory for Bond Release

A. Inventory Reference Sites and Revegetated Areas.

Equipment:	None	
Labor:	1 - Supervisor	
	2 - Laborers	
Quantities:		
	2 Reference Sites	
	2 Revegetated Areas	
	a. Pinyon-Juniper	19.0 Acres
	b. Deseret Shrub	1.5 Acres
	TOTAL ACRES	20.5 Acres

Production:		
	Site Inventory - 2 ea.	24 Hrs.
	Each Reference Site - 2 ea.	24 Hrs.
	TOTAL HOURS	54 Hrs.

Because the Des-Bee-Dove Mine workings are dry, no special provisions will have to be made to insure that water wouldn't flow from the mine portal after the mine is abandoned. The portals, however, will be sealed with a double-block wall 25 feet in from the surface. The area between the block wall and the surface will then be back-filled. This, along with the fact that the mine is dry, will insure that no water will flow from the portal after the mine is abandoned. Representatives of the BLM will be notified when the portal sealing will begin. Recommendations made by the BLM will be followed when sealing these portals.

The Des-Bee-Dove Mine complex is located in a small, dry wash. Water in limited quantities flows down the wash only during storms. These waters are all diverted into a 19 acre feet sediment pond. The size of the pond is adequate to retain water from a storm exceeding 1.5 inches in a 24-hour period. Accumulated sediment will be dredged from the sediment pond as required to retain the pond's water holding capacity. This sediment will be disposed of in the waste rock disposal site. The amount of sediment accumulated in the pond in 1982 was 2.39 acre feet.

The land surface above the Des-Bee-Dove Mine workings is generally dry. A few springs have been identified along the west border of the mine area but only two springs are present above the existing or proposed mine workings.

Because coal has been mined in both seams below the two springs and the monitoring of those springs has shown no mining induced changed it is felt highly unlikely that mining will have any effect on the hydrologic regime of the area.

Hydrologic Balance: Water Quality Standards and Effluent Limitations

Throughout the life of the mine and following its reclamation after mining is completed, measures will be taken to insure that the surface water which flows through and adjacent to the mine area meet the effluent limitation set forth in Section 817.42 of the Utah Mining Code.

A sedimentation pond has been constructed to settle out the suspended solids which might be present in the surface waters flowing within the disturbed area. When water is discharged from the sediment pond into the drainage, it will be monitored to insure that the effluent limitations aren't exceeded.

RECLAMATION PLAN: POSTMINING USES (784.15)

The disturbed area (portal area of the Des-Bee-Dove Mines) lies within a small, steep, dry wash. Reclamation work identified within this wash states that disturbances shall be placed back to approximate original contours. Regraded and compacted fills of the three small structures requiring reclamation in the wash after revegetation should provide equivalent cover and grazing that existed prior to mining.

Reclamation of the bathhouse structure incorporating terraces provides level areas where revegetated cover would be increased as compared to the premining steep slopes.

The waste dump structure with an area of 4 acres is additional land now usable which, before mining, were eroded, steep cliffs, for the most part, void of vegetation.

A key element of the reclamation plan as envisioned, is the leaving of the road system as is to allow greater use of the area by the general public.

A protective barrier will be placed across the dirt road (see final reclamation map) to prohibit casual users of the area from proceding further than the mine area. Only Utah Power & Light Company and cattlemen who use the upper access road, will have permission to pass the barrier. Federal land agencies wishing access may secure permission on request.

Maintenance of the road system will be divided. Utah Power & Light Company and cattlemen shall maintain the upper private road, whereas, the county road maintained by the county. The majority of the county road would remain in either case as it is the only access to the county land fill located just below the mine site.

Land use after reclamation primarily would be the same as before mining, that is, grazing and wildlife habitat. The revegetation plan includes basically the same species and cover of the adjacent areas. A pinyon-juniper community would reestablished.

Revised 11/21/83

Alternate land uses besides grazing and wildlife habitat would include recreation, such as hunting. The absence of water limits the potential of other uses.

Applicant feels that the ten years following mining (bond period), there is sufficient time to manage the vegetational establishment and growth to meet the requirements of the postmine land use as stated.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES (784.17)

No public parks are located in or adjacent to the permit area.

Cultural resource information contained in this application was based on field surveys contracted to A.E.R.C. (Archeological-Environmental Research Corporation) and conducted under the auspices of Richard Hauck.

For lands within the permit area not covered by planned surface disturbances, but yet could be affected by subsidence, a general 15 percent random survey was conducted. Basis of this survey was extrapolated from requirements mandated by OSM for authorization to mine coal from the Des-Bee-Dove Mine. Results of this survey are contained the report found in the Environment section.

RELOCATION OF PUBLIC ROADS (784.18)

The Des-Bee-Dove Mine portal requires no further action for public review concerning mining within 100 feet of public road, as exemption 761.11(a)(4)(i) applies.

Subsidence Control Plan

This section describes in further detail the Applicant's design of mine plan ensuring minimal environmental impacts, specifically surface subsidence effects of the ongoing Des-Bee-Dove Mine. Operation Plan describes in detail the proposed methods of coal resource extraction and mine development. Geology Description presents the detailed geological information, site specific and general, which provides an analytical base for mine plan and subsidence control design. The following subsections describe the principal factors involved in controlling subsidence impacts resultant of the proposed mining operations.

Economic oil and gas occurrences have never been encountered within the permit boundary. Within the permit boundary there exists no known oil, gas or water wells. However, if any of these types of wells are intersected, the Mining Supervisor (MMS) will be notified immediately and the applicant will follow his recommendations and guidelines to protect the well.

Subsidence Damage Probability Survey

A survey has been conducted on that portion of East Mountain surface which could possibly be affected by the mining of coal from the Des-Bee-Dove Mine.

It has been determined that there are renewable resources present in the area in the forms of springs and grazing land.

A survey to locate structures on East Mountain that could be affected by subsidence has been completed and none were located above Des-Bee-Dove Mine.

Mining Methods

Utah Power & Light Company intends to minimize surface effects of subsidence by mining the coal deposit as completely as safety conditions allow. All areas within the mine limits will be mined by continuous miner in order to extract the maximum amount of the coal reserve possible. No area within the mine limits is planned to remain unmined.

Methods of room-and-pillar mining as outlined in Operation Plan are specifically designed to maximize pillar extraction and promote safety. Systematic methods of pillar extraction ensures an average of 60% removal of pillars. The majority of remaining pillars eventually crush out to allow a generally even relaxation of the overlying strata.

Full extraction areas (room-and-pillar panels with pillar removal) are, by definition, planned and controlled subsidence areas. It is anticipated that this 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. The extent of these full extraction areas is shown on Maps 3-1 and 3-2. Subsidence prediction work has shown the expected maximum planned and controlled subsidence will vary from 0 to 10 feet assuming

that the total cumulative extraction from the two minable seams will not exceed 20 feet.

The applicant has initiated an ongoing subsidence monitoring plan. The First Annual Report of Finding was submitted to various government agencies in 1982, including the MMS. Subsequent reports will continue to be submitted annually to the MMS and various government agencies.

Subsidence Damage Prevention Measures

The proposed mining plan has been designed in such a way as to align the full extraction panels parallel to the margin faults and joints. This alignment with respect to jointing will prevent the formation of irregular sawtooth subsidence cracks in the overlying surface lands.

In order to more accurately forecast the overall extent and the amount of subsidence, Utah Power is currently conducting two separate subsidence studies, similar to those done by the NCB and Abel and Gentry, in cooperation with the U. S. Bureau of Mines.

The results of these studies will develop data which, when interpolated into proven existing formulas and models, allow the particular characteristics of the overburden on East Mountain to be analyzed as to probable behavior during and after mining.

Subsidence monitoring plans have been submitted for the Des-Bee-Dove Mine and are included in the appendix.

A site specific room-and-pillar section has been monumented and is being monitored by conventional survey

methods. Results of this survey will, in the future, provide a base on which predictable subsidence can be forecasted.

Until these base line data are formulated, surface monitoring will continue.

Regarding the seeps and springs, Utah Power has been actively monitoring these, together with water generated within the mines, for over five years to date and has set up an organization with the full intention of monitoring them throughout the mining period and after mining until the bond is released.

The summary of Utah Power's annual hydrological monitoring program has been submitted to the Division and OSM yearly.

The hydrologic report indicates that mining under the seeps and springs at the depths of cover of Des-Bee-Dove Mine, up to 1,600 feet does not dry up the seep or spring. This phenomenon is most probably due to the presence of bentonitic shale layers in the overburden which swell when wet forming an impervious clay layer. This healing characteristic is expected to seal subsidence cracks to prevent downward migration of water and subsequent loss of springs and other water sources.

The Des-Bee-Dove Mine will be mining some 16 feet of coal from two seams at average depths of 1,300 to 1,600 feet. Therefore, it is Utah Power's belief that the seeps and springs on East Mountain will not be adversely affected.

Mitigation of Subsidence Damage Effects

Any roads which are materially damaged by subsidence will be repaired and regraded to restore them to their pre-subsidence usefulness.

All structures that could be effected by subsidence on East Mountain have been surveyed and none are located above Des-Bee-Dove Mine.

Subsidence Control

Utah Power & Light Company 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.

The applicant has made a practice of submitting, each year, copies of both lithologic and geophysical logs of all drill holes completed within the year on the property. This includes all holes, surface and underground, which are drilled within the federal leases or on fee land. At the time the mine permit was completed, copies of all logs had been submitted to the Minerals Management Service. This practice will continue throughout the lifetime of the Des-Bee-Dove Mines.

PROTECTION OF FISH AND WILDLIFE (817.97)

The portal facilities of the Des-Bee-Dove Mine are located in a small dry wash, a tributary to Grimes Wash. This active area (portal facilities) consists of about 20 acres and is physically separated from the remaining permit area by imposing and inaccessible mountain slopes that rise over 1,600 feet vertically from the active portal area.

Excepting the occasional use for exploration, the wildlife inhabitants on top of East Mountain are relatively unaffected during the mining operation and require no special plans other than the hydrological and subsidence monitoring now initiated.

There are no prime fisheries located on the East Mountain plateau within the permit area.

In contrast to the lush mountain top environment above the mines the portal acres are situated within a transition zone of the plateau with a southeastern facing aspect. Vegetation and wildlife are sparse in comparison.

An on-the-ground review was made in consultation with the U. S. Fish and Wildlife Service, Division of Oil, Gas and Mining and Division of Wildlife Resources. No critical habitat of threatened or endangered species was identified.

A 69 KV line serves as the power source for the Des-Bee-Dove complex. Mostly single pole and suspension insulators, this transmission line provides sufficient phase to phase and phase to ground clearances to preclude electrical contact of raptors including eagles. The

structure types are approved as eagle-safe by the U. S. Fish and Wildlife Service by letter dated 11/10/82 to the DOGM.

Many raptors nest on the east escarpment face of the Wasatch Plateau. This habitat has been designated as a raptor nesting zone and so mapped (Land Use Map 2-17). The plans for any future proposed developments in the raptor zone will be discussed with the USFWS for mitigation. No development will take place prior to this consultation.

Raptor nests at Des-Bee-Dove Mine

#87 Golden Eagle, inactive.

Any nest initiated adjacent to the existing facilities would not require cessation of operations because this nesting action signifies acceptance of the present situation. All golden eagle nests will be reported to the USFWS, Salt Lake City.

Although Grimes Wash is not a fishery it is a tributary to Cottonwood Creek (Straight Canyon) which is a limited fishery.

Protection from coal dust and increased sediments to these waters is by a sedimentation pond installed for control of sediment and coal dust from storm runoff waters. Coal is transported by trucks on hard-surfaced roads. Truck covers are not necessary as the moisture of processed coal is sufficient to prevent blowing coal dust; plus the loaded coal trucks negotiating the 12% grade are limited to slow speeds.

To reduce the undue disturbance and killing of wildlife the slide series with tapes produced by UDWR at

Price will be purchased to instruct all the employees of the value of all wildlife and problems inherent to Utah wildlife. This instructional series will be shown at scheduled employee training sessions so all employees new or old will have viewed this series. This series explains the effect of harassing wildlife during their different life stages and the needs of species resident to Utah.

Signs will be placed on the Des-Bee-Dove haul road in the permit area to notify drivers of the presence of deer in the area. A flyer containing the following information on avoiding deer vehicle collisions will be distributed during training to all employees.

1. Drivers are to be aware of deer in the area.
2. Be aware that deer are most active at night and during dawn and dusk.
3. At night flash lights at deer on road to break their trance and allow them to react to the oncoming vehicle.
4. Each deer is worth $1,100 to the economy of Utah.

This instruction will also include the precaution of shooting at raptors perched on the transmission line adjacent to the haul road and access road.

The UDWR presently conducts a deer road-kill monitoring program which includes the Des-Bee-Dove Mine access road. The program functions to monitor road-kills and identify significantly hazardous areas for the purpose of initiating mitigating measures to reduce the incidence rate.

Road-kills observed by mine personnel will be reported to the UDWR to aid them in their monitoring program.

Information regarding mule deer seasonal distribution and numbers within the permit is not available due to the dynamic characteristics of the deer herds involved. UDWR personnel indicate such information would not be truly representative of the demographics of the deer population; therefore, it is not available from them.

If hazardous areas are identified on the Des-Bee-Dove Mine access road, within the permit area, appropriate mitigating measures will be instituted based on consultation with UDWR personnel.

Personnel involved will be apprised of the critical value of snake dens. They will be advised to be particularly observant for concentrations of snakes during the months of April, May, September and October. Such concentrations indicate the presence of snake dens. If a den is located, it will be reported to the UDWR for assistance in the necessary mitigating measures.

Surface water disturbance due to subsidence on East Mountain from mining activities in the Des-Bee-Dove Mine will be replaced or repaired by the following methods:

1. Streams will be bridged across bedrock fractures by culverts until sediments fill the crack.

2. Springs and seeps proven to be lost to subsidence action will be replaced by guzzlers which will be located and designed with prior regulatory authority approval.

These methods require little maintenance and will provide a semi-permanent fix to surface water problems that can be attributed to subsidence and liability determined by courts.

The interim reclamation plans provide for the stabilization of all the fill slopes with a vegetative cover. Because the fill slopes are intertwined with the mine facilities, the planting mixture is designed more for soil stabilization than for an attraction to wildlife. The large mammals especially would be a nuisance in and around the operation and the operations a hazard to them. The final reclamation plan will restore the stream channels and revegetate the disturbed sites. The planting mix of forbs, grasses, shrubs and trees is similar to the adjacent native plant communities and would provide food and cover for wildlife through grouping of shrub plantings. See details in Final Revegetation section (817.111-.117).

The UDWR general mitigation plan for the East Mountain area follows. Applicant has stated compliance to these recommendations insofar as they are applicable.

SMC 780.16 or UMC 784.21; FISH AND WILDLIFE PLAN
UTAH POWER AND LIGHT COMPANY, WILBERG MINE, DES-BEE-DOVE MINE
AND COTTONWOOD FAN PROJECTS

Mitigation and Impact Avoidance Procedures General to all Wildlife

Utah Division of Wildlife Resources provides the following recommendations in order to minimize disturbances and impacts on wildlife and their habitats that could be impacted during developmental, operational and reclamation operations at the Company's mining project. The recommendations address how enhancement of the wildlife resource and their habitats as discussed in UMC 783.20 can be achieved. They are also consistent with the performance standards of UMC 817.97. In instances where it would be necessary to restore or could be beneficial to enhance or develop high value habitats for fish and wildlife, recommended plant materials and rates of application are provided as "Appendix B" (UMC 817.97 and UMC 817.111 through 817.117). This list should prove useful in meeting the additional requirements to be imposed upon the operator if the primary or secondary land use will be for wildlife habitats (UMC 817.97 d 9). Additionally, "Appendix C" represents a list of commercial sources for plant materials.

The project and adjacent areas are represented by nine basic wildlife habitats which are inhabited on occasion and during different seasons of the year by about 245 species of vertebrate wildlife. The wildlife habitats and use areas for the "high interest" species from this group of wildlife have been ranked into four levels of importance. The most valuable to an individual species or ecological assemblage are the critical sites followed in respective importance by high-priority, substantial value and limited value sites. Each type of use area requires various and specific levels of protection from man's activities. Additionally, due to the variability of vegetation communities in each use area, various and specific tech-

nologies in site development will need to be evaluated for possible mitigations, enhancements of wildland habitats or the required level of reclamation. It is recommended that all land clearing impacts be designed so that irregular shaped openings are created in contrast to openings that would have straight edges.

It is recommended that the Company make significant efforts to educate all employees associated with their coal handling operation of the intricate values of the wildlife resource associated with the project and adjacent areas and the local area. Each employee should be advised not to unnecessarily or without proper permits harrass or take any wildlife. (Apprehension of wildlife violators has increased by nearly 250 percent during recent years in the region). It is especially important that wildlife not be harrassed during winter periods, breeding seasons and early in the rearing process. Exploration should be limited as much as possible during these crucial periods.

During winter wildlife are always in a depleted condition. Unnecessary disturbance by man causes them to use up critical and limited energy reserves which, often times, results in mortality. In less severe cases, the fetus being carried by mammals may be aborted or absorbed by the animal, thus reducing reproductive success of a population.

During breeding seasons, disturbance by man can negatively affect the number of breeding territories for some species of wildlife. Disturbance can also interrupt courtship displays and preclude timely interactions between breeding animals. This could result in reduced reproductive success and ultimate reductions in population levels.

Early in the rearing process, young animals need the peace and tranquility normally afforded by remote wildlands. It is also during this crucial period that young animals gain the strength and ability to elude man and other predators. This allows the young animal to develop in relatively unstressed situations and to

utilize habitats that are secure from predators. Disturbance by man can compromise this situation and result in abandonment of the young by the female, increased accidents that result in mortality to young animals or increased natural predation. It is recommended that employees be cautioned against disturbing young animals or females with young if accidentally located.

Employees associated with coal handling operations should be instructed that when wildlife are encountered during routine work that they not stop vehicles for viewing purposes. Moving traffic is less disturbing to wildlife than traffic that stops or results in out-of-the-vehicle activities. If viewing is desireable, the vehicle should only be slowed, but not stopped.

Hunting and other state and federal wildlife regulations must be adhered to by sportsmen utilizing the project area.

Mitigation and Impact Avoidance Procedures for Aquatic Wildlife

There are no recommendations for a wildlife plan that would enhance any fishery.

If ultimate operations are planned or occur that could physically or chemically impact any perennial stream beyond the impact of mere crossings, detailed reclamation plans will be required. Permanent culvert crossings exceeding a width of eight feet must have a natural bottom and devices for reducing stream velocity so that fish migration is not blocked. A reclamation plan for a stream or lake would have to provide for measurement of the physical characters of the water prior to disturbance. Such measurements should consider surface water information required in SMC 779.16, data on stream velocity, gradient, width, depth, pool-riffle ratio and substrata types.

Reclamation that would achieve development of a lake bed or stream channel similar in character to that which existed prior to disturbance should result in natural re-establishment of macroinvertebrates, macrophytes and a fish population. If merited, the Division could then introduce desired fishes into those waters.

This would adequately mitigate for disturbance and temorary loss of aquatic resources. There would be no mitigation for displacement and possible loss of other wildlife species dependent upon the aquatic wildlife as a prey source. It is believed that impacts on such species would not be significant.

It is also recommended that adequate precautions be taken to keep all forms of coal or other sediments from being inadvertently deposited along or within perennial stream channels. Similar precautions should be taken to preclude deposition of coal partilces or sediments in or along other drainages from which the material could be transported during a precipitation event into a perennial stream. This would include blow-coal from haulage trucks, railroads or other transportation systems and storage piles. Control of larger coal particles from the above sources is equally important to control of fugitive dust. If needed, haulage vessels or storage sites should be covered, or the surface of the coal appropriately sprayed in order to solidify it against wind movement. Travel speeds of haulage vessels could be reduced so that coal is not allowed to leave the transportation system. The impacts of coal or other sediments on aquatic ecosystems are many and varied; therefore, sediments must be kept out of those systems.

Utah Division of Wildlife Resources reaffirms all of the recommendations in UMC 817.41 through 817.57 and UMC 817.126 for protecting the State's waters and their associated riparian and wetland zones along with the aquatic wildlife resource.

Mitigation and Impact Avoidance Procedures for Terrestrial Habitats

It is recommended that all wetland and riparian habitats be maintained. Roads and other facility developments should not destroy or degrade these limited, highly productive and unique habitats. Roads crossing through those areas should do so in a manner that is least damaging to the habitat. Wetlands and riparian habitats are ranked as being of critical value and are the most productive sites in terms of herbage and biota produced as compared to other local habitat types. It is probable

that a majority of the vertebrate wildlife that inhabit the project area make some use of riparian or wetland areas.

It is important to note that roads and other surface facilities to be constructed should as far as practicable be placed at sites where they will not compromise wildlife or their use areas. Also, surface facilities, including roads, should be screened if possible from wildlife use areas by vegetation or terrain.

In situations where wildland habitats have been or will be disturbed, reclamation is required. Also, there are sites where development or enhancement of wildland habitats through vegetation treatments and/or seedings and transplants of seedlings could benefit wildlife. "Appendix B" depicts the Division's recommendation for plant materials to be utilized for various wildlife habitats on wildland treatments that are intended to benefit wildlife. If circumstances arise where seed or seedling transplants for a recommended plant species are not available, suitable alternates are also recommended.

Seedling transplants from nursery stock as well as nearby rangelands would also be acceptable for some wildland treatments.

Appendix C represents an exaustive list of commercial sources for plant materials for use in wildland treatments.

Temporary control of rodents may be required to ensure a successful rangeland treatment. It is recommended that the county agent be consulted in this area of concern. Poisoned oats are the most common and acceptable method for rodent control; however, only licensed perons may apply the treatment.

Currently, there are some new concepts in metholdology for revegetation that are being successfully implemented in other parts of the nation and world. One promising method is a procedure where a large scoop removes, from a natural and stabilized site, a small area of earth intact with vegetation and subsurface soils for placement on a site to be restored. This same procedure can be utilized when disturbing pristine sites, except that the native vegetation is stored for use in

latent reclamation. Another meritorius method for stimulating natural revegetation, in combination with other reclamation techniques, is to plan facility developments so that islands of natural, native vegetation remain. This will allow for natural vegetation to spread from the islands. These techniques can also be useful for enhancement of poor quality sites that currently exist on the mine plan area.

Encapsulation of seed and fertilizer for several releases over a period of years after a single application is a new and possibly advantageous procedure. This technique along with soil stabilizing structures has been successfully used in South Africa. Dr. J. Van Wyk in the Department of Botany at Potchetstroom University in South Africa could provide additional information on this new technique.

There are also new specialized techniques coming to the forefront for stabilization of problem sites such as roadbanks and steep slopes. It is important that these sites be promptly and permanently revegetated in order to reduce siltation into local riverine systems. This will mitigate for damage to aquatic wildlife populations and habitats from siltation. Enhancement of existing problem sites or reclamation of disturbed sites can mitigate for salt loading of local river systems. It is believed that natural, nonpoint sources represent 50 percent of the salinity in the upper basin of the Colorado River system into which this mine plan area drains.

It is recommended the Company make numerous contacts with appropriate agencies, institutions and persons to ensure that enhancement or reclamation projects achieve the required degree of permanency, plant diversity, extent of cover and capability of regeneration to ensure plant succession. Generally speaking, seeding should be accomplished as late in the fall as possible. Seedling transplants need to be coordinated with local soil moisture conditions which are usually at optimum in the early spring just as the snow melts.

It is paramount that suitable vegetation be maintained and/or re-established if thelife requirements of wildlife are to be satisfied in the postmining period. Success in this area of concern along with cessation of man's disturbances will likely result in a natural reinvasion and the resultant inhabitation by most wildlife species of an impacted site.

It is important to note that enhancement or reclamation projects that are to benefit wildlife must be properly designed so that all the life requirements of the target species are considered in conjunction with forage. Water must be provided or be present and thermal cover along with escape and hiding cover has to be in abundance. Loafing areas and travelways between the many types of use areas must also be provided. In order to meet these goals, a considerable degree of consultation will be required between the Company and Utah Division of Wildlife Resources.

As a service and also to ensure that the needs of wildlife are met, the various expertism within the Division of Wildlife Resources are available to the Company for consultation. For the most part, Larry Dalton, Resource Analyst, for the Southeastern Regional office at 455 West Railroad Avenue in Price, Utah 84501 (phone 637-3310) will coordinate any needed contacts. Richard Stevens, Wildlife Biologist, at the Great Basin Research Center, Box 704, in Ephraim, Utah 84627 (phone 283-4441) is available for consultation and site specific analysis concerning species for vegetation plantings, timing and techniques to achieve the best results.

In instances where revegetation projects are to be planned over coal waste areas, heavy metal uptake by the plants must be evaluated. It is recommended that the Company initiate an appropriate long-term monitoring program to determine the magnitude and resolutions, if needed, for this problem.

It is recommended that persistent pesticides not be utilized on the project area. Other alternate pesticides or forms of control should be utilized.

All hazards associated with the project operation should be fenced or covered to preclude use by wildlife; of special concern would be sites having potential to entrap animals or toxic materials.

Mitigation and Impact Avoidance Procedures for Amphibians and Reptiles

Enhancement or development of habitats that provides a diversity of vegetation will benefit amphibians and reptiles. It is important to note that all of these species are protected by Utah law. Due to the myriad and myths that surround these animals, it is urged that individual specimens not be destroyed. This is especially true for snakes since they are a valuable component of the ecosystem.

Snake dens are ranked as being of critical value to the population and are protected by law. If a den is located, it should be reported to the Utah Division of Wildlife Resources. Snake dens can be moved by the Division, but only with intensive efforts that may take a year or more (snakes are caught and removed in the spring and fall). Thus, construction of facility developments may take place in denning locations if there is sufficient lead time to relocate the occupants.

Mitigation and Impact Avoidance Procedures for Avifauna

It is recognizable that development and operation of a mining project will in some cases negatively impact many avian species through physical destruction of habitats and continual disturbance that makes other habitats unavailable or less desireable to an individual bird. It is also true that impacts that are negative to one species may be beneficial to another species. It is recommended that the Company plant native and/or ornamental berry producing shrubs around surface facilities. When mourning doves are a target species, sunflowers or blazing star should be planted. This will provide food and cover for many of the smaller species of birds, resulting in enhancement of their substantial value and high-priority habitats. This action would also mitigate for disturbances and destruction of avifauna habitats at other sites associated with project operations.

It is important to note that the nests of all avifauna (except the house sparrow, starling and rock dove) when active and their eggs are protected by federal (Federal Migratory Bird Treaty Act) or state laws (Utah Code 23-17-1 and 23-17-2). All avifauna utilize a nest during their reproductive process. Dependent upon the species, some nests are well developed while others may be represented by only a scrape on the ground. These sites when being utilized are critical to maintenance of individual bird populations; each species has a specific crucial time period in which the nest is occupied. It is during this crucial period that the nest must be protected from disturbance.

Several species of raptors frequent the project area. Their nests when active should not be disturbed and abandoned stick nests are never to be damaged. Every effort should be made to eliminate man's disturbance within visual sight or one-half kilometer radius of an active raptor nest. This distance would have to be increased to a one-kilometer radius if the cause for disturbance were to originate within view and from above the nest. This effort is demanded in the instance of golden eagles and cliff nesting falcons since they are sensitive to disturbance and could abandon the nest. Termination of man's use of a site would not be required if eagles or falcons constructed their nest after mining had been initiated, since it would demonstrate the individual bird's willingness to tolerate mining activities and the associated disturbance by man.

Roost trees for eagles, if located, must not be disturbed or destroyed. Similarly, activities planned for high-priority concentration areas of eagles must be designed and implemented so that they are not of significant disturbance to the birds.

As a general comment, whenever active raptor nests are observed or roost trees for eagles located, they need to be reported to the Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service.

Design and construction of all electrical power lines and other transmission facilities shall be designed in accordance with guidelines set forth in "Environmental Criteria for Electric Transmission System" published by the USDA and USDI in 1970 and/or the REA Bulletin 61-10 "Powerline Contacts by Eagles and Other Large Birds." It is also recommended that placement of utility poles over flat or rolling terrain be planned so that they are out of view of roads or at least 300 meters away from any roads. This will lessen opportunity for illegal killing of these valuable birds, since the poles can serve as suitable hunting perches for raptors. In some instances poles can result in an extension of raptor hunting territories, which would represent a beneficial impact.

During the crucial period of December through February spruce-fir forests and aspen forests need to be protected from man's disturbance so that blue grouse and ruffed grouse will not be impacted. Destruction of these wildlife habitats at any time of the year need be minimized due to their value to wildlife.

During the spring period (mid-March through mid-June) care needs to be taken that male blue grouse are not disturbed or precluded from establishing breeding territories. Similar precautions need be taken for male ruffed grouse (March through May) in the area of drumming logs.

Mature trees with natural cavities and dead snags need to be protected for use by cavity nesting birds. Trees with such a character are ranked as being of critical value to cavity nesting birds. The project should be planned so that three such trees are left standing per acre within 500 feet of forest openings or water and two such trees per acre in dense forested areas.

Mitigation and Impact Avoidance Procedures for Mammals

The lodges, nests and dens of all mammals or roosts in the instance of bat like mammals represent a critical use area for maintenance of their individual populations. The crucial period for any species is when the lodge, den, nest or roost is occupied. Therefore, such sites for any mammal must be protected from

disturbance during that period when it is being utilized.

Many species of mammals develop food caches in order to carry individual animals or family groups through periods when they cannot forage. Such sites are of critical value to maintenance of their populations and if located should not be destroyed or subjected to regular disturbance by man.

It is important to realize that within natural ecosystems there exists a predator-prey relationship. One specie of animal may represent a prey source for other species. Therefore, it is important that project operations be designed and implemented so as to not unnecessarily disturb or destroy any wildlife or their habitats.

Big game ungulates--mule deer, moose and elk--each have seasonal use areas ranked as being of critical value to an individual herd. Such sites need to be protected from any of man's activities or developments that could result in destruction, loss or permanent occupancy of the site by man or has facility developments. If these types of impacts cannot be avoided the site must ultimately be reclaimed and revegetated. Also, critical valued areas need protection from disturbance during their appropriate crucial period.

High-priority valued use areas for all wildlife and particularly big game ungulates need to be protected from man's activities or facility developments. Actions that would result in loss or permanent occupancy of significant acreages (25 or more acres) of habitat are of special concern. In any event impacts to high-priority valued areas should be limited and ultimate reclamation planned. Many impacts can be avoided simply by precluding exploration, developmental or other activities during the period of time when a high interest specie is present.

Haulage of coal between the various mine projects and distribution points should be planned so that impacts to wildlife are lessened; of special concern is haulage of coal through wintering areas for big game. It is recommended that the

Company develop coal haulage contracts that require personnel involved with coal haulage to use extreme caution so that accidental collisions between motor vehicles and big game are reduced. Without doubt, a reduction in speed across winter ranges would aleviate this problem during the period between November 1 and May 15 each year.

At present the most successful and cost effective technique for reducing deer-highway mortality is a system of warning reflectors. This system (manufactured by Streiter Corporation, 2100 Eighteenth Avenue, Rock Island Illinois 61201 and known as "Swareflex") is only of value at night time, but it is during darkness that most deer-highway mortaility occurs. Strieter Corporation describes the effect of the reflector system as follows: "The headlights of approaching vehicles strike the wildlife reflectors which are installed on both sides of the road. Unnoticeable to the driver, these reflect red lights into the adjoining terrain and an optical warning fence is produced. Any approaching wildlife is [are] alerted and stops or returns to the safety of the countryside. Immediately after the vehicle has passed, the reflectors become inactive, thereby permitting the animals to cross safely".

Installation of a wildlife warning reflector system, a reduction in speed of coal-haulage trucks and other mine related traffic and increased awareness of wildlife values by mine associated employees should result in a reduction of deer-highway mortality problems. Such a reduction would represent satisfactory mitigation.

In instances where conveyors, slurry lines or any other structure having potential to be a barrier to big game movement is to be developed, passage structures must be provided. Generally speaking overpass and underpass type structures are recommended in order to allow passage of big game to habitats either side of any barrier. These crossings should be placed at the points to be identified from in-

tensive study of big game movements in relation to the mine plan area. Such study would not be required if the structure was adequately elevated to allow uninhabited passage of big game along its entire length.

Underpasses should have aminimum clearance of three meters maintained across a span of at least five meters. Overpasses should be designed as a circular earthern ramp with the barrier bisecting the ramp into two equal halves as follows:

> On either side of the conveyor a half-round ramp with a slope no greater than 3:1 on a five meters wide path placed at an angle 90 degrees to the conveyor and tapering around to a slope of 5:1 at paths adjacent and parallel to the conveyor. The platform over the conveyor should be concrete or some other material that would not echo when being crossed by big game and should be of character similar to rock or natural earth.

Soils associated with either crossing style should be of the A or B horizons to allow for development of vegetation. Vegetative cover must be established in association with all crossing sites. This will lessen anxiety of individual animals using the site through development of a natural appearing environment.

Mature pinion or juniper trees and an abundance of browse plants need to be placed proximal to crossing points in order to provide a safe travelway. The browse plants will also serve as a permanent attraction for big game to crossing points. Additionally, a mixture of grass and forb seeds should be broadcast over each crossing point to stabilize the soil and enhance the forage situation.

Appropriately sized boulders may need to be placed at crossing sites in order to control off-road vehicles utilized in outdoor recreation.

Industrial developments are encouraged on habitat use areas that are ranked as being of limited value to wildlife. It should be noted, however, that reclamation is ultimately expected on any wildlife use area, regardless of its value to wildlife.

UNITED STATES FISH & WILDLIFE SERVICE
EAST MOUNTAIN RAPTOR NEST LOCATIONS

Raptor Nest No.	1981 Survey	1982 Survey
5	2 GE; 1 Active (2 Young), 1 Inactive	1 Active/2 Young 1 Inactive
6	1 GE Inactive	Inactive/Old
7	1 GE Inactive, Very Old	Not Located
8	1 GE Inactive, Very Old	Inactive
9	1 Occupied Site (Probably Owls - no nest)	Not Located
12	2 Large Inactive Stick Nests, Very Old	Both Inactive
13	1 Inactive Buteo	-
14	1 Inactive Stick Nest, 1 Small Inactive Stick Nest	-
15	1 Inactive Buteo	-
16	2 Inactive Buteo	Both Inactive, Probably Eagle
17	1 Inactive GE, Very Old	2 Inactive
18	3 GE, All Tended, Very Well Established, Large	1 Active/2 Young 1 Inactive
19	2 Large Inactive Stick Nests Probably Eagle	3 Inactive
20	1 Adult GE Observation	-
21	Potential Scrape	Not Found
45	3 Turkey Vulture Observations	-
46	1 Raven Nest - Inactive	-
47	2 Turkey Vulture Observations	-
48	4 Buteo, 1 Active Redtail (2 Young) 3 Inactive	4 Inactive
49	Adult GE Observation	-
50	2 GE, 1 Active (1 Young - No Count) 1 Inactive	1 Inactive 1 Inactive/Tended

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Raptor Nest No.	1981 Survey	1982 Survey
51	Raven Observation (2 Birds)	-
52	Adult Eagle Observation	-
53	1 Active GE - Fledged	Not Located
54	2 Inactive GE	2 Inactive
55	1 Inactive GE - Fledged	Inactive/Tended
56	1 Inactive GE	Inactive
57	1 Inactive GE	Inactive
58	1 Raven Nest	Inactive
59	1 Inactive GE	Not Checked-Windy
60	Possible Falcon Scrape	Inactive
61	1 Inactive GE - Very Old	Inactive
62	1 Inactive GE	Active - 2 Young
63	2 Tended GE	Not Located-Windy
64	2 Raven Nest	Not Found-Possible Scrape
65	1 Praire Falcon Eyrie (1 Young) Fledged)	Not Found
66	1 Raven Nest	-
94	GE Observation (Adult)	-
96	2 GE Observation (Adults)	-
97	2 GE, Tended	2 Inactive-Tended
98	4 GE Inactive	5 GE Inactive-Tended
99	Inactive GE, & Inactive Stick Nest	2 Inactive-Tended & Inactive Stick Nest

Raptor Nest No.	1981 Survey	1982 Survey
100	GE Active (1 Fledged-No Count)	Inactive-Tended
101	2 Inactive Stick Nests	2 Inactive-Stick Nests
102	Buteo Inactive	-
103	GE Tended	Inactive-Tended
105	Potential Falcon Scrape	Inactive
106	2 Inactive Stick Nests 1 Buteo Inactive	3 Inactive Stick Nest 1 Buteo Inactive