

Black Hawk

inspection 5/21/80 Lee, Joe, MK

possible alternatives: catch basin on NW side of proposed straw dike would help with drainage problem - therefore not as much fill would be required.

extend portal #2 culvert 50-75' due to step wall - don't think retaining wall will hold it.

ACT/043/001
MINING Plan
Interim Program

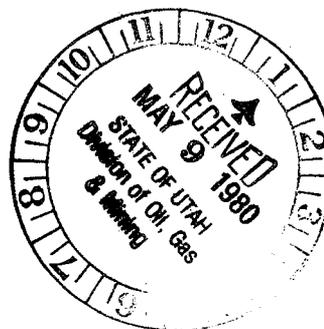
MINING AND RECLAMATION PLAN

for

THE BLACK HAWK COAL MINE

SUMMIT COUNTY, UTAH

Section 36, T. 3 N., R. 6 E., SLB&M



UTAH COAL AND ENERGY, INC.

Coalville, Utah

MAY 8, 1980

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STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING
1588 West North Temple
Salt Lake City, Utah 84116

MINING AND RECLAMATION PLAN

1. APPLICANT: Utah Coal & Energy, Inc.
General Delivery,
Coalville, Utah

Represented By: C. G. Cafarelli, President
5511 South 4385 West
Kearns, Utah 84118
Phone: 968-5901

(a) Application:

To begin an underground coal mining operation on private property known as the Boyer Tract, described as follows: (See Figure 1 and 2; Plate 1)

S ² NE ⁴	=	80 acres
N ² SE ⁴	=	80 acres
<hr/>		
Total		160 acres

Section 36, T. 3 N., R. 6 E., SLB&M, Summit County, Utah

2. TYPE OF OPERATION:

Underground coal mine using conventional room and pillar mining method. Three portals spaced 100 feet apart with 100-foot cross-cuts.

3. LAND USE:

(a) Prior Land Use:

Historically the land has been used for coal mining, cattle grazing, and deer hunting. Grazing has been limited to the portions of the tract at lower elevations and at the higher elevations. The lowest part of the tract, along Chalk Creek, has been cultivated. The area occupied by the portals is steep, devoid of vegetation and has only been used for the extraction of sand and gravel and coal.

(b) Current Land Use:

The lowest portions of the tract, along Chalk Creek, are alternately seeded and fallowed. To make sure that the mining operation does not damage this portion of the tract a dike will be constructed along a natural bluff on the south and east sides of the cultivated area (See Plate 1). The area occupied by the portals is an area of sand and gravel and material is being sold by the owners of the land. The higher portions of the tract, described above, are used for grazing and hunting.

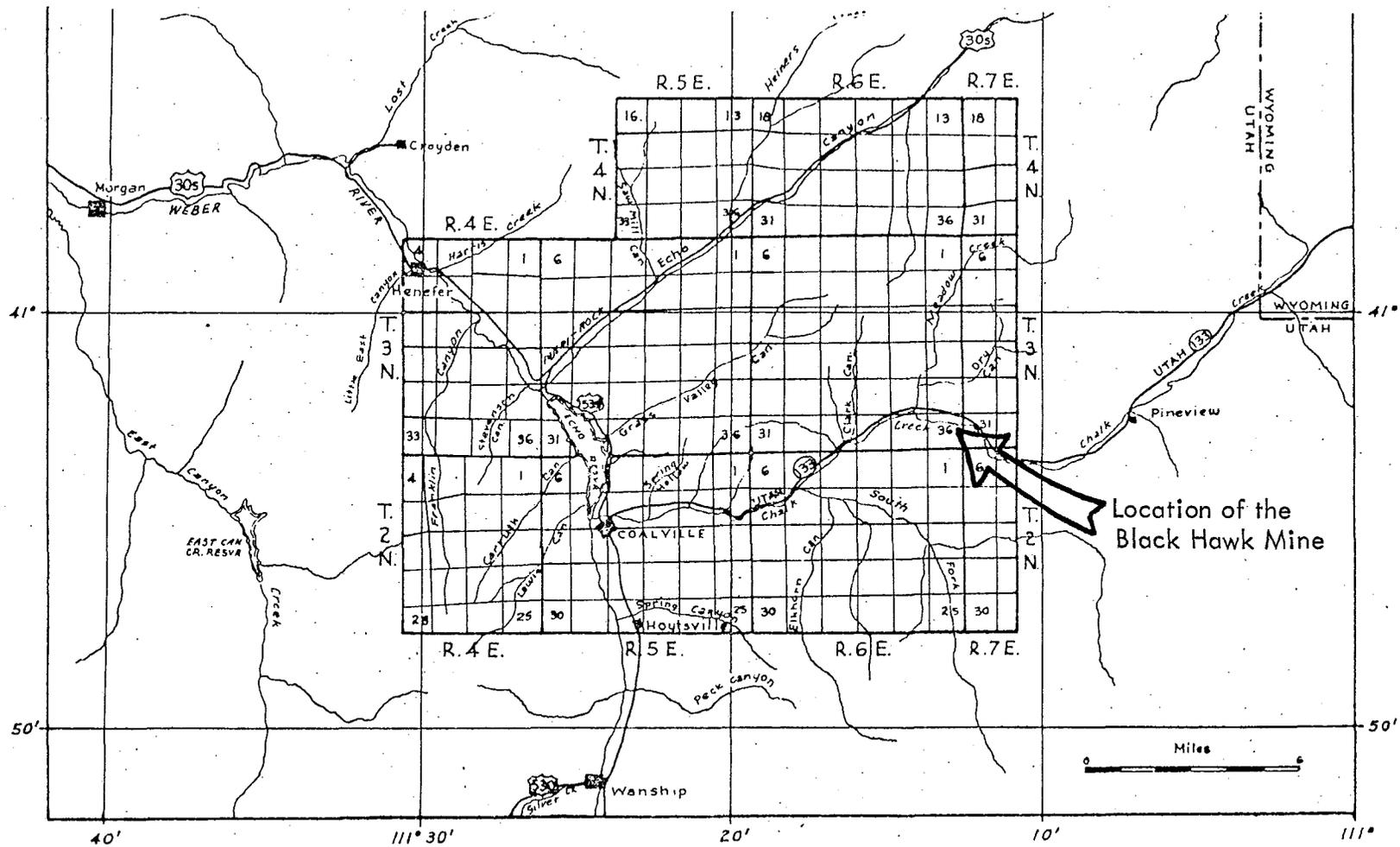


FIGURE 1.-- INDEX MAP OF COALVILLE AND THE SURROUNDING AREA SHOWING THE LOCATION OF THE BLACK HAWK MINE.

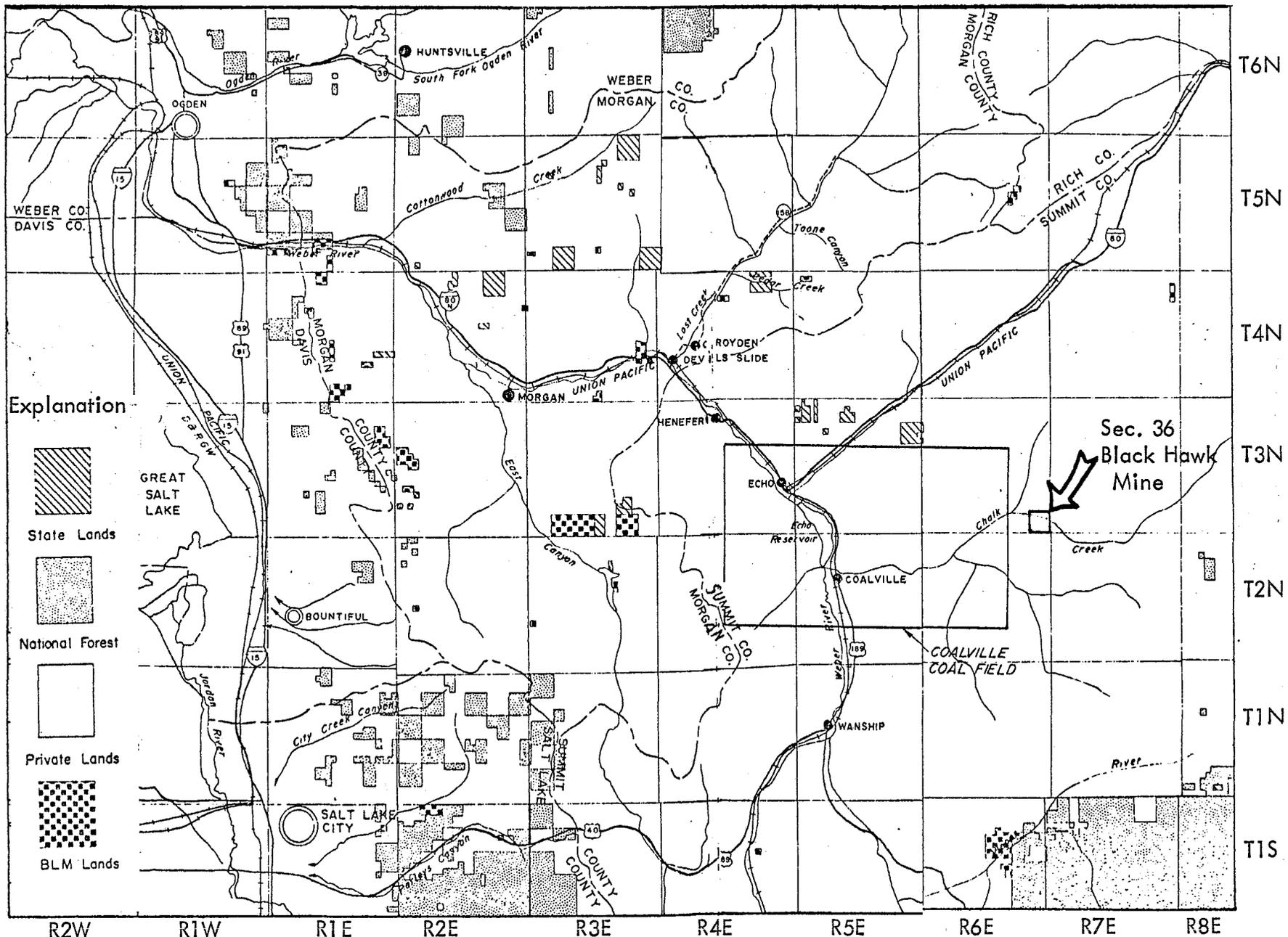


FIGURE 2.-- LAND OWNERSHIP MAP FOR COALVILLE AND THE SURROUNDING AREA

3. (Cont'd):

(c) Possible or Prospective Future Land Use:

Upon completion of Utah Coal and Energy's mining operation the land will continue to be used for grazing, hunting, and possible for the extraction of sand and gravel. The lower portions of the tract will likely still be cultivated. It is possible that an excessive population growth in the area might result in attempts to subdivide the land into "ranchettes", especially in the lower portions along Chalk Creek; portions of the tract that will not be affected by this mining operation. The nature of an underground mine of this size requires minimal surface disturbance. All disturbed areas shall be restored in a timely manner to conditions that are capable of supporting the uses which they were capable of supporting before any mining.

4. VEGETATION:

The area of the tract that is likely to be disturbed the most, around the portals, is essentially devoid of vegetation, the surface being composed of sand and gravel and very steep.

(a) Types and Estimated Percent Cover:

The significant vegetative types of the Chalk Creek area consist of big sagebrush, crested wheatgrass, bluebunch wheatgrass, Canada thistle, rabbitbrush, Utah serviceberry, Burdock, Flannel Mullein, pinon-juniper, and cottonwood. Tall trees occur only along the flood plain of Chalk Creek, an area not affected by this mining operation. Ninety percent of the working site is devoid of vegetation and consists of a portion of a large, poorly sorted gravel alluvial fan. On the perimeter of the working site, the land has a discontinuous cover of brush and sage. This brush will be removed only when absolutely necessary by dozer and will be disposed of in a prudent manner. The higher portions of the tract contain pinon-juniper as the largest vegetation. Those portions of the tract also will not be affected by this mining operation, except for the drilling of test holes. The drilling of test holes may require the removal of some vegetation in small, restricted areas. Unless absolutely necessary, the pinon-juniper will not be disturbed and the drill sites will be revegetated upon completion of drilling.

Because the elevations and terrain vary from relatively flat areas along Chalk Creek, to low rolling hills, to steep slopes, vegetation cover also varies. Percent cover is greater at the higher and lower elevations and on the gentler slopes. Along Chalk Creek the vegetation cover in some places is 100 percent. Above the flood plain of the creek, on the gentler slopes, and at the higher elevations the cover may be as high as 25 to 30 percent. For the most part, the cover in the proposed working areas is generally no more than 10 percent.

5. SOILS:

At this date there are no published soil surveys of the Chalk Creek area. A discussion with Mr. John L. Harvey, Party Leader, Soil Conservation Service, Coalville, Utah, on April 29, 1980 indicates that work in the Chalk Creek area is supposed to begin this summer (Personal Communication to R. S. Kopp). It is anticipated that at least preliminary data will be available about the first of August and at that time this

5. (Cont'd):

section can be updated with more detailed information if desired by the regulatory authority.

Soil along Chalk Creek is fine and dark, being the result of fine sediment carried and deposited by the creek. In fact, the name of the creek gives a clue to the clearness of the water in the creek on a year round basis. The portions along the creek will not be disturbed by this mining operation and there will not be any adverse affects on the soil because of the nature of the reclamation efforts to be undertaken on the higher ground.

In the mine area the soils of this topography can probably best be classified as Rockland and Lithic. The soils are derived mainly from the Tertiary Knight Formation (See Figure 3 showing the surface geologic formations) or from unconsolidated Quaternary deposits. The Knight Formation overlies all other beds in the area and is composed mainly of reddish-yellow conglomerate and variegated shales. The Formation can be roughly divided into four units of varying thicknesses:

- 1) Clay and sandstone, mainly red and yellow
 - 2) Cobble conglomerate, brown weathering
 - 3) Clay and sandstone, mainly gray in color but becoming red in places.
 - 4) Cobble conglomerate, brown weathering
- Angular unconformity with coal-bearing rocks

Quaternary deposits also occur and they include gravels of several modes of origin; in the Chalk Creek area, landslide debris above the stream valleys and alluvium in the valleys.

Rock land soil types usually have 50 to 70 percent of the surface covered by stones, boulders, and outcrops of bedrock. The land surface is commonly moderately eroded, but some areas may be severely eroded. Soil is very sparse to absent and the slopes are commonly between 50 and 80 percent. Such a land type has almost no value for farming and a very low value for grazing. Vegetation growing on such a "soil-type" usually is very sparse and consists of grass, sagebrush, and locally pinon-juniper. Small areas are accessible to livestock and wildlife, but for the most part the land type is too steep and rocky for grazing. The disturbed area on this mining property occurs in this type of "soil".

Above the disturbed area, the slopes are gentler and actual soil has a better chance of developing. The land consists of Tertiary rocks with less than four inches of soil material over it. The Tertiary rock areas vary from slight ground protrusions of small area to locally large tertiary rock exposures. Sparse amounts of grasses and sagebrush occur on the thin soil material. Locally, scrubby pinon-juniper and shrubs grow in small clumps or as individual plants in small soil pockets. This area has its main value as a watershed and for the grazing of cattle and wildlife. Except for the drilling of test holes this area will not be disturbed by the mining operation. Any disturbance due to the drilling program will be restored almost immediately after the hole has been completed. Only a stake will remain to mark the drill hole site. All holes will be filled or sealed so as not to cause injury to animal life.

This underground mining operation will not alter the pH of the existing soils.

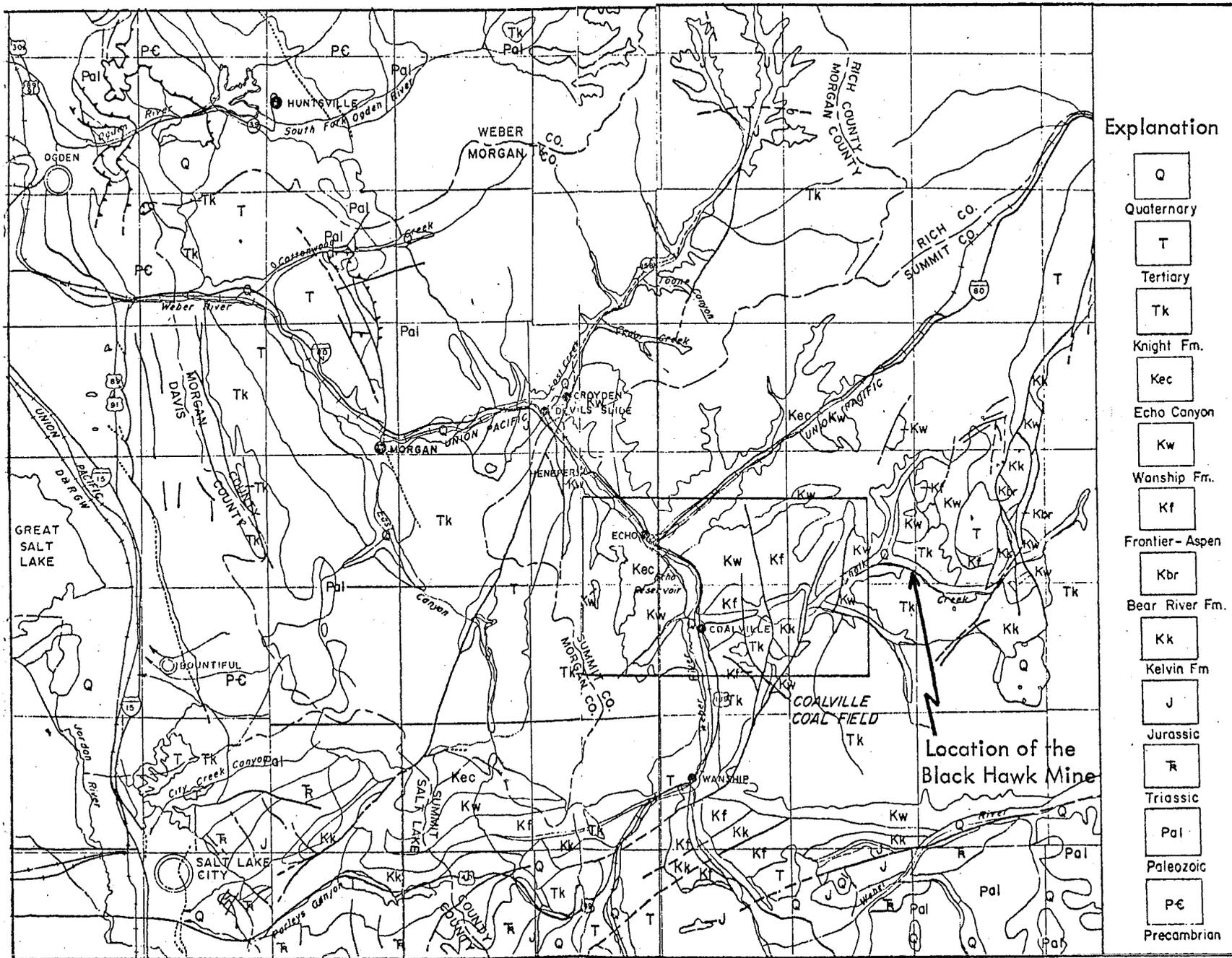


FIGURE 3.--GENERALIZED SURFACE GEOLOGY OF THE COALVILLE AND SURROUNDING AREA

6. ELEVATION:

The mine site and surface installation range from approximately 6240 to 6400 feet. The elevation on the property described in item one ranges from approximately 6200 to 6800 feet. Total relief on the property is about 600 feet, while the relief in the mine area is about 160 feet.

7. COAL BEDS PRESENT:

The coal bed found in the subcrop beneath the Tertiary Knight Formation is probably the Morby Bed (seam) which occurs at the base of the Dry Hollow Member of the Wanship Formation (Figure 4.). The coal bed dips approximately 18 degrees S. 75° W. and ranges from 7 to 9 feet in thickness. It was first discovered and mined by N. B. Morby who sunk a shaft in 1879 (Figure 5). The coal appears to be of high quality having very low sulphur content, 3 percent ash, and clean burning. Estimates indicate upwards of a billion tons of coal are present on a total of 34,000 acres controlled by Utah Coal and Energy, Inc.

Because of possible structural complexities (i.e. faulting) it is possible that the coal bed is the Wasatch Coal Bed at the bottom of the Coalville Member of the Frontier Formation. More important, if the bed is the Morby Coal Bed then the Wasatch Bed would be approximately 1200 below making possible two levels of operation and extending the life of the mine considerably.

8. PROJECT LIFE:

Because of the probable extensive coal resources the theoretical life of the mine is considerable, perhaps 50 to 100 years depending on the rate of extraction. Based on the known reserves, upon which the new underground workings are proposed (Plate 2.), the minimum life is projected to be about 20 years.

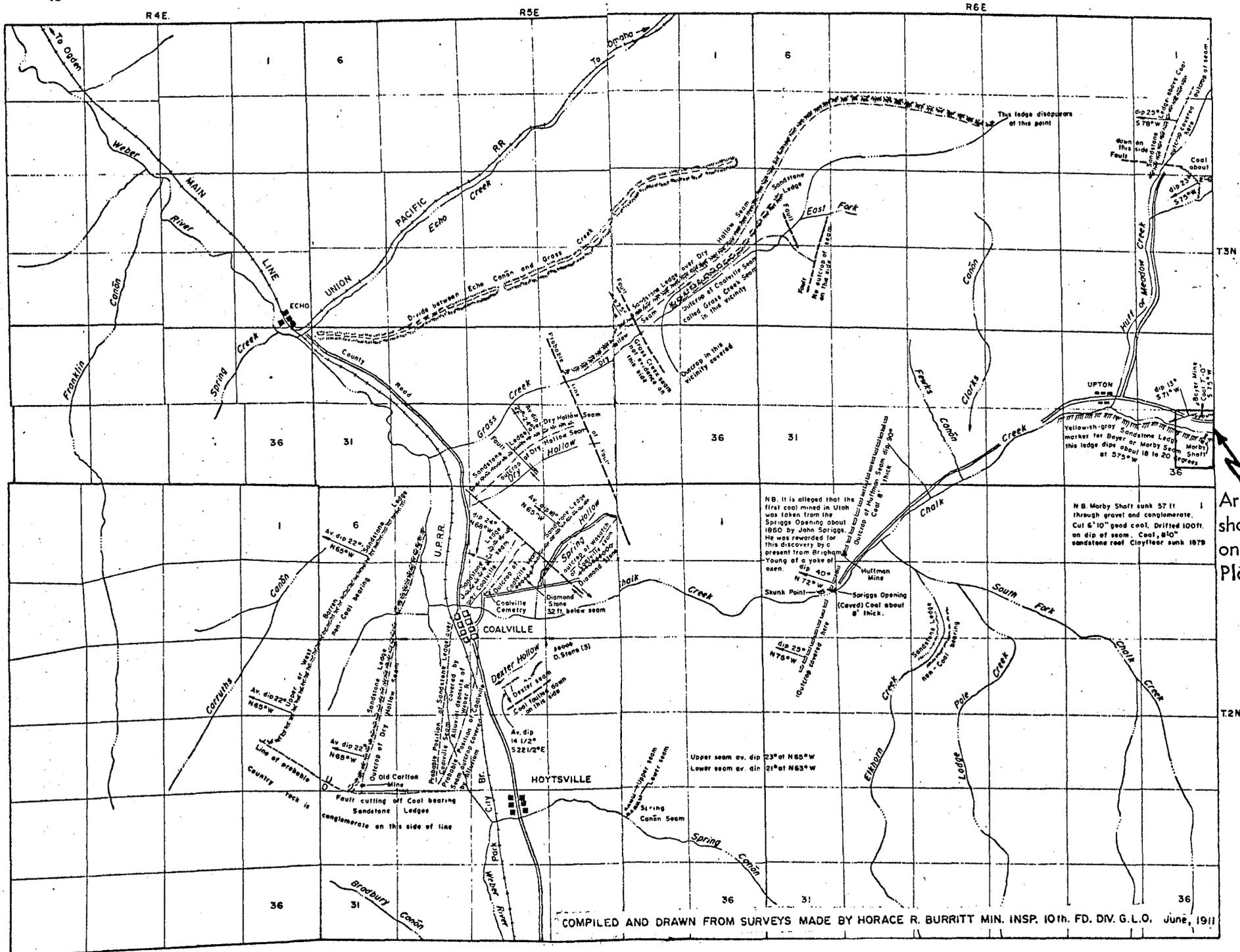
9. OVERBURDEN, WASTE, AND REJECTED MATERIALS:

Little waste or reject material is anticipated from this mining operation. Most mines produce reject material that is commonly acid and gray to black in color. Because the coal in the Black Hawk Mine has a low sulphur content and no pyrite, any waste or rejected materials produced will likely not be acid. Any waste or reject material will be stored in the western portion of the tract at the site labeled on Plate 1. Refuse piles will be constructed under the most recent regulations and specifications of MESA and in accordance with part 715.15 (paragraph a) of the OSM regulations, to include the following:

- 1) The disposal areas will be within the area shown on Plate 1. as the Boyer tract, and will be approved by the regulatory authority as suitable for construction of fills.
- 2) The disposal areas will be located on the most moderate sloping and naturally stable area available as approved by the regulatory authority.
- 3) The fill will be designed using recognized professional standards, certified by a registered professional engineer, and approved by the regulatory authority.

System	Series	Stratigraphic Unit	Thickness (feet)	Description		
TERTIARY	Eocene	Knight Formation	2,000+	Red to variegated clays, sands and conglomerates. Unconformity		
	Maestrichtian	Echo Canyon Conglomerate	3,000±	Gray, red weathering boulder and pebble conglomerate interbedded with gray and red shale and gray sandstone. Unconformity		
Campanian						
Santonian						
CRETACEOUS	Coniacian	Wanship Formation	Henefer Member	2,450-2,500	Light brown to light yellowish gray, fine- to medium-grained sandstone and red, brown, yellow and tan claystone.	
			Upton Sandstone	450	Light yellow to blue-gray, fine-grained, calcareous, well bedded sandstone.	
			Judd Shale	350- 760	Gray marine shale, thickens eastward.	
			Grass Creek Member	875-1,025	Tan thin-bedded sandstone, alternating with gray shale in upper third with lenticular coarse-grained sandstone and red clay shale in lower part, thickens westward.	
			Dry Hollow Member <i>COAL (Morby)</i>	1,000-1,220	Upper white sandstone hogback, Dry Hollow coal zone, and lower part divided into an upper shale and conglomerate, middle nonmarine shale and basal conglomerate. Unconformity	
	Turonian	Frontier Formation	Oyster Ridge Sandstone	200- 28	Light yellow, orange to gray, massive, ridge-forming very fine-grained calcareous sandstone.	
			Allan Hollow Shale	780	Gray marine calcareous shale.	
			Coalville Member <i>COAL (Wasatch)</i>	175- 223	Dark gray conglomeratic sandstone overlies Wasatch coal zone, yellow-gray ridge-forming fine-grained calcareous sandstone at base, thickens westward.	
	Cenomanian		Chalk Creek Member	3,150	Nonmarine redbeds; pink to red claystone, coarse sandstone and conglomerate sandstone.	
			Spring Canyon Member <i>COAL</i>	350+	Dark shales, carbonaceous shales, sandstone and thin coal beds.	
	Albian		Longwall Sandstone	70- 100	Light gray ridge-forming, massive, fine-grained sandstone, thickens eastward.	
		Aspen Shale	210	Dark gray shale and tan sandstone with interbedded light gray shale containing teleost fish scales.		
	?	Kelvin Formation		2,500+	Nonmarine redbeds, shale and sandstone with lenses of conglomerate. After Doelling & Graham, 1972	
						Aptian
						Neocomian

FIGURE 4.--STRATIGRAPHIC COLUMN OF ROCKS AROUND COALVILLE AND IN THE SURROUNDING AREA



Area shown on Plate 1

FIGURE 5.--PROMINENT LEDGES AND ASSOCIATED COAL BEDS IN COALVILLE AND THE SURROUNDING AREA

9. (Cont'd):

- 4) The disposal area will not contain springs, natural water courses, or wet weather seeps.
- 5) Any organic material will be removed from the disposal area and the topsoil will be removed and segregated.
- 6) The reject material will be transported and placed in a controlled manner, concurrently compacted as necessary to ensure stability and to prevent any mass movements, then covered and graded to allow surface and sub-surface drainage to be compatible with the natural surroundings, and to ensure long-term stability. The final configuration of the fill will be suitable for postmining land uses approved in accordance with part 715.13. Terraces will not be constructed unless approved by the regulatory authority.
- 7) No portion of the fill will interrupt, obstruct or encroach upon any natural drainage channel.
- 8) The fill will be inspected for stability by a registered engineer or other qualified professional specialist during critical construction periods to assure removal of all organic materials and topsoil, placement of under-drainage systems, and proper construction of terraces according to the approved plan. The registered engineer or other qualified professional specialist will provide a certified report after each inspection certifying that the fill has been constructed as specified in the design approved by the regulatory authority.

10. HYDROLOGIC SYSTEM:

- (a) Most underground mines give the appearance of being wet, this is because of minor dripping from the roof due to percolating water in the vadose zone. During the setting of one of the portals, a perched aquifer was encountered and it was quickly sealed off. No other underground aquifers are anticipated when mining commences.
- (b) There is no water being discharged from the portals of this mine at this time and none is anticipated.
- (c) The only permanent running water on the tract is Chalk Creek and the mine site is removed from it. No other permanent bodies of water occur on the property. The only other running water comes from spring runoff and from precipitation drainage.

Utah Coal and Energy will employ underground mining practices which will prevent any water pollution to either the ground water supply or to Chalk Creek. These practices will include the following techniques:

- 1) Prevention of water contact with acid or toxic forming materials.
 - 2) Minimizing water contact time with waste materials.
 - 3) Reestablishing disturbed areas through grading, diverting runoff, achieving rapid revegetation and lining drainage channels
- (d) Immediately north and down slope from the disturbed area a sediment basin will be constructed (Plate 1.). Construction will be in accordance with the requirements of part 717.17 (paragraph e) to include the following (Plate 3.; Figure 6.):



FIGURE 6.--LOCATION OF PROPOSED SEDIMENT BASIN AND
THE TYPE OF VEGETATION ALONG CHALK CREEK

10. (d) (Cont'd):

- 1) The sediment basin will be a self-dewatering type.
- 2) The spillway will be located to provide maximum detention time and to safely discharge maximum runoff from a 25 year six hour precipitation event.
- 3) The sediment collected will be removed before it exceeds 80 percent of the storage volume of the basin. This sediment will be stored in the refuse storage area.
- 4) The sediment basin will not include an embankment greater than 20 feet in height.
- 5) The sediment basin will be designed, inspected, and certified under a registered engineer.
- 6) The sediment basin will be examined for structural weakness, erosion, and other hazardous conditions in accordance with part 77.216-3.

(e) Surface water will be monitored during periods of runoff or sufficient precipitation to create flowing water in the drainage. Because all of the disturbed area is on an alluvial gravel fan, surface runoff is subordinate to adsorption into the gravels. There are no discrete channels carrying runoff from the disturbed area. Most waters from the disturbed area are dispersed throughout the vadose zone and eventually enter into Chalk Creek by subsurface seepage. It is proposed, therefore, to monitor the effects of runoff in Chalk Creek itself both above and below the lateral boundaries of the disturbed area. The proposed monitoring locations are shown on Plate 1. If, however, the regulatory authority requires it monitoring stations will be set up both above and below the disturbed area.

- 1) The samples taken will be tested for pH, total iron, total manganese, total suspended solids, and any other characteristics requested by the regulatory authority.
- 2) Reports of these samples will be filed with the regulatory authority within 60 days.
- 3) The equipment necessary to measure and sample the quality and quantity of surface water will be properly installed and maintained and will be removed when no longer needed.
- 4) No diversion structures, either temporary or permanent, will be installed.
- 5) No stream channels will be diverted.

(f) Underground operations will be conducted to minimize adverse effects on ground-water quality and quantity.

(g) No effluent will emanate from the mine workings as designed. However, application will still be made for a NPDES permit.

(h) In order to protect the cultivated field in the northern portion of the tract, a straw dike will be installed along the south and east side of the field (Plate 1). Along the line of the dike a trench one foot deep will be dug wide enough to handle the straw bales. The dike will be held in place by ground bolting. The dike will be maintained so as to provide an adequate filter system for any waters that might seep toward the field, and for as long as required by the regulatory authority or until a more permanent structure is constructed. (See Figure 7.).

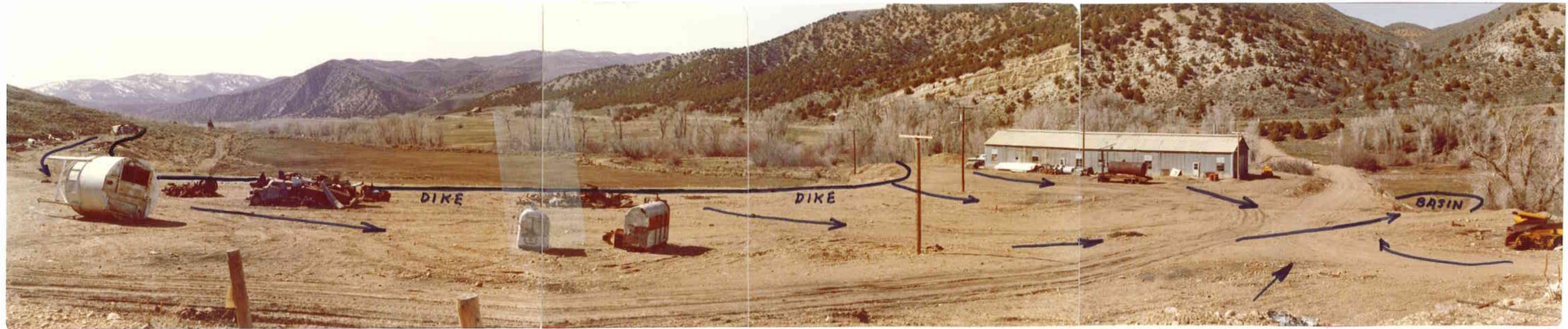


FIGURE 7.--PANARAMA VIEW SHOWING CULTIVATED FIELD, LOCATION OF PROPOSED STRAW DIKE, SEDIMENT BASIN, AND GENERALIZED DRAINAGE TO BE ESTABLISHED BY GRADING AND FILLING

10. (Cont'd):

- (i) In order to assure that drainage flowing onto the pads ends up in the sediment basin, the area will be graded and low areas filled so as to maintain drainage slopes towards the sediment basin (Plate 1.). Culverts will be installed as necessary to assure that all runoff ends up in the sediment basin.
- (j) The sediment basin, culverts, and drainage channels will be designed and constructed so that they can handle a 10 year, 24 hour precipitation event. The emergency spillway for the sediment basin will be designed to handle a 25 year, 6 hour precipitation event. Basic data for the determinations was obtained from Orville Richardson, State Climatologist, Logan, Utah. He reports that the nearest station to the Black Hawk Mine with sufficient data is Echo Dam. He estimates that at the mine precipitation might slightly higher than the values obtained at Echo Dam. The 10 year 24 hour event at Echo Dam is 1.90 inches; the 25 year 6 hour event is 1.58 inches (Table 1.).

TABLE 1.--ESTIMATED RETURN PERIODS FOR SHORT DURATION PRECIPITATION
(in inches)

Station: Echo Dam
Latitude: 40° 58'

Elevation: 5500
Longitude: 111° 26'

D U R A T I O N

R E T U R N P E R I O D (years)	D U R A T I O N									
	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	12 Hr	24 Hr
1	.17	.26	.32	.45	.57	.60	.62	.68	.73	.79
2	.18	.28	.35	.49	.62	.68	.73	.86	.98	1.10
5	.20	.31	.39	.54	.68	.78	.88	1.13	1.35	1.58
10	.21	.33	.42	.58	.74	.87	1.00	1.32	1.60	<u>1.90</u>
25	.23	.35	.44	.62	.78	.96	1.14	<u>1.58</u>	1.97	2.38
50	.26	.41	.51	.71	.90	1.10	1.30	1.79	2.23	2.68
100	.27	.42	.54	.74	.94	1.18	1.41	1.98	2.49	3.02

The average annual precipitation for the area of the Black Hawk Mine is approximately 19 inches per year (Figure 8). Most of the precipitation comes during the period October to April when approximately 13 inches of precipitation falls, mainly as snow. May through September is a period when intense storms of short duration are likely to occur. About 6 inches of precipitation falls on the average during that period.

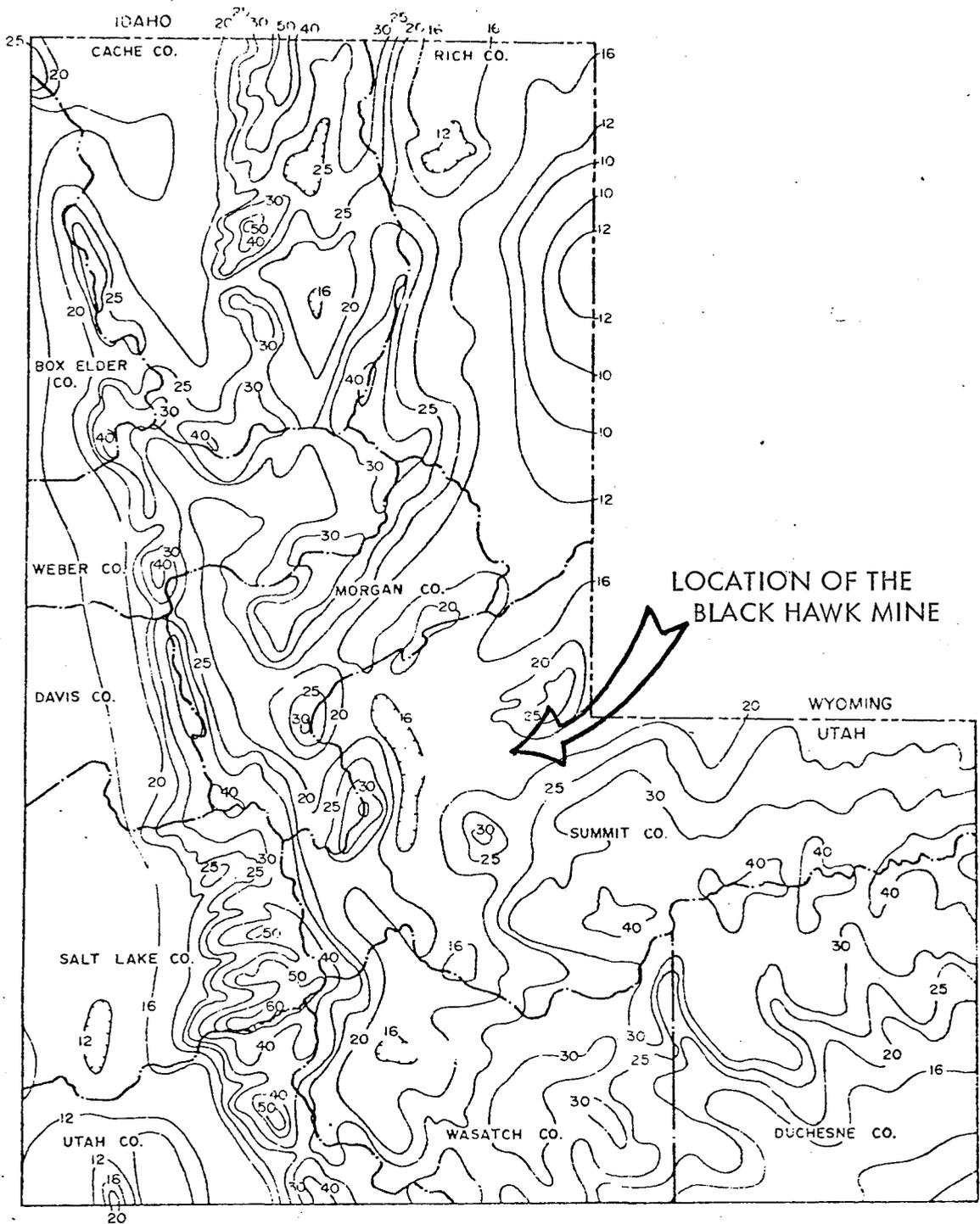


FIGURE 8.--NORMAL ANNUAL PRECIPITATION FOR COALVILLE AND THE SURROUNDING AREA

10. (Cont'd):

- (k) All hydrologic structures (sediment basin, culverts, channelways, etc.) will be designed, inspected, and certified by a registered engineer or other qualified professional specialist to assure that all structures meet the minimum requirements required by the regulatory authority.

11. SPECIFIC INSTALLATION AND OPERATION PROCEDURES:

(a) Mining Sequence:

The mining shall be accomplished by underground conventional room and pillar method using shuttle cars, a roof bolter, and a conveyor belt system for loading the trucks. The main entry development will be three portals on 100-foot centers. All entries and crosscuts will be 30 feet wide, leaving 70' X 70' support pillars. Two of the entries have been completed, and a third one is to be constructed. The third portal requires additional excavation of dugway through gravel to reach the coal subcrop.

In the entry systems, as well as in the panel area, coal will be mined by drill and shoot methods; coal loaded into shuttle cars for transportation from the face to the feeder-breaker just outside the portal. The feeder-breaker will discharge the coal onto a conveyor for transportation to trucks.

An exhaust ventilation system will be maintained by placing a fan in one portal and ventilating through a second portal. The third portal would be a utility one. The ventilation system will be according to MESA approved ventilation plan.

The mine roof will be supported according to a MESA approved roof support plan.

The initial surface preparation involves installation of the third portal, clearing of surface area, grading and revegetation, installation of a sediment basin, straw dike, sump with pump, and several retaining walls.

(b) Road Construction and Maintenance:

Access from Highway 133 to the mining area is provided by a pre-existing road. The road has a maximum grade of less than five percent. The road has a gravel surface and will be maintained with a patrol grader and will be sprinkled when dusty. Road fill banks will be seeded as necessary to stabilize the banks.

Along the east margin of the tract is one unimproved road used for access to the areas of excavation for portal dugways. The road is constructed along a ridge crest, so cut and fill methods are not needed at this time.

The entry road and the access road along the east margin of the tract, will be maintained and repaired in a timely manner. During dry periods, the entry road will be watered to control dust.

The access road along the eastern border of the area will be maintained until no longer needed. At that time it will be graded to final restoration slope of disturbed area seeded in the same manner as other areas described in the section on revegetation.

11. (Cont'd):

(c) Site Preparation:

1) Portals-

Two portals have been installed and a third needs to be constructed before mining can begin. Because the coal bed is covered by relatively unconsolidated sand and gravel of an alluvial fan, retaining walls need to be constructed, slopes cut back, backfilling, and revegetation accomplished. Figure 9. shows the situation as it now exists and indicates the general line to be followed by the retaining walls. Plate 2 shows in more detail the nature of the retaining wall system deemed necessary for safe working conditions around the portals during mining. The slope profiles on Plate 2 indicate the proposed slopes after grading and backfilling.

It is proposed, at least as a temporary measure, to construct retaining walls of thirty-foot telephone poles set at least 10 feet into the ground. These poles would be placed on four-foot centers and reinforced with planking and sheet metal. It is particularly important that something like this be undertaken for portal #2 (Figure 9.) which is in danger of being lost by burial in the gravel.

All permanent retaining walls will be designed, inspected, certified, and built under the supervision of a registered engineer.

2) Surface Grading-

Surface grading will be required at both the mine portal sites (Figure 10.) and on the pad around the surface facilities. Grading in the mine area will be strictly controlled to prevent unnecessary defoliation. There is little topsoil to be moved; however, all topsoil will be removed as a separate operation from areas to be disturbed by any surface installations, such as roads and areas upon which support facilities are to be sited. Topsoil will be segregated, stockpiled, and protected from wind and water erosion and contaminants. Disturbed areas no longer required for the mining operations will be regraded, topsoil distributed, and revegetated.

(d) Topsoil Removal and Replacement:

The areas from which topsoil will be removed is very small and includes poorly developed soils. Using dozers and front-end loaders, the topsoil will be scraped from the surface, loaded into trucks and dumped at the site indicated on Plate 1. The topsoil will be removed as a separate operation from areas to be disturbed by surface installations. The topsoil will be segregated, stockpiled, and protected from wind and water erosion, or contaminants. Disturbed areas no longer required for the conduct of mining operations shall be regraded, topsoil distributed, and revegetated.

(e) Placement and Containment of all Disturbed Materials:

At the mine site, slopes will be stabilized by immediate reseeding after the completion of grading. All cut material will be used in fill situations to provide flat surface areas for buildings and associated structures. Fill material



FIGURE 9.--PANARAMA SHOWING PORTALS #1 AND #2 AND THE GENERALIZED LINE FOR THE PROPOSED RETAINING WALLS.



FIGURE 10.--PANARAMA SHOWING THE NATURE OF THE AREAS THAT HAVE TO BE STABILIZED BY GRADING AND REVEGETATION

11. (e) (Cont'd):

will be compacted using heavy rubber tired equipment.

Embankments will be graded to acceptable, stable slope conditions. Water from the level areas will be controlled and channeled into the sediment basin. All effected areas will be tested chemically for plant nutrients. Those chemicals lacking will be added and recommended vegetation will be planted immediately to reduce effects of wind and water. Vegetation planted will conform to the recommendations given in the section on revegetation later in this report.

(f) Final Stabilization of Disturbed Material:

When the project is completed, all buildings and extraneous materials will be removed and using the most advanced technology at the time Utah Coal and Energy, Inc. will reestablish terrain to as nearly the original shape as is practical. The area will be reseeded and vegetation reestablished.

12. GRADING AND REGRADING:

(a) Typical Regrading:

All disturbed areas will be backfilled and graded to as near as possible the approximate original contour, and to the most moderate slope possible. Slopes shall not exceed the angle of repose or such lessor slopes as required by the regulatory authority to maintain stability. Fill material will be compacted to assure stability and to prevent leaching of toxic pollutants.

Areas to be regraded will include the portal site, surface facility site, roads, the waste disposal site. Because of the diversity of these areas all regrading will conform to the specific site.

Where possible all final grading and placement of topsoil will be done along the contour to minimize erosion. In all instances, grading will be conducted in a manner which minimizes erosion and provides a stable surface for the placement of topsoils.

(b) Topsoil:

Upon reclamation topsoil will be hauled to the area by end-dump trucks, piled and spread using a grader. Where possible the soil will be distributed along the contour. The thickness of the reestablished soil will be consistent with soils in the vicinity and will be sufficient to support vegetation equal to or superior to pre-mining history.

(c) Soil Treatment:

Soils will be tested according to the most advanced technology. Any chemicals or nutrients which are lacking will be added under the direction of the regulatory authority. In general, the types of additives will be commercial fertilizers, including organic mulch or chemical fertilizers.

Utah Coal and Energy, Inc. will establish on all lands that have been disturbed by mining operations a diverse, effective, and permanent vegetative cover capable of self-regeneration and adequate to control soil erosion.

12. (Cont'd):

(d) Drainage Control:

During regrading all culverts will be removed and all drainage will be reestablished. Regraded areas will be protected from main drainage using rip-rap. On regraded slopes if rill or gullies deeper than 9 inches form where vegetation has not yet been established Utah Coal and Energy will fill, grade and stabilize these rills and gullies and then revegetate. If excessive runoff occurs this will be temporarily diverted away from the newly revegetated areas. Once the vegetation has been adequately reestablished these temporary diversions will be removed and reclaimed.

(e) Grading Slopes:

Regrading will be done to return the area to its approximate original contour. At no time will regraded slopes exceed the angle of repose or an angle designated to be an unstable condition by the regulatory authority.

13. TESTING AND REVEGETATION:

- (a) Reclaimed fill areas will be tested for stability in two ways; 1) Slope staking and 2) frequent visual inspection for excessive erosion.

Newly formed fill areas will be staked along the contours at various elevations on the bank. A record will be kept of any slumping, creeping, or movement until a final vegetative cover has been established. Upon recommendation of the regulatory authority any excessive slumping will be refilled, recompacted and revegetated.

During the reclamation process filled areas will be visually inspected for excessive erosion. If rills or gullies form deeper than 9 inches they will be refilled, graded, compacted, and revegetated.

- (b) Soil samples will be taken to determine any deficiencies which would effect the growth in new revegetated areas. Any deficiencies will be corrected by adding to the soil chemical fertilizers, organic mulch, or any other substances recommended by the regulatory authority.
- (c) Areas to be reclaimed will be filled and then compacted using heavy, rubber-tired equipment. Top soil which has been set aside and stired, or which has been hauled in will be spread along the contour using graders. Where possible the areas will be disced using conventional farm equipment. The seed will be spread using a rangeland drill where possible or mechanically broadcasted on steeper slopes. Steeper slopes will be raked to provide a slight soil cover for the seed. If necessary, because of excessive slope conditions, hydroseeding will be the method used.

Vegetative cover will be promptly reestablished to stabilize erosion. Mulch will be used and reseeding will occur during the first normal favorable period for growth following regrading.

Revegetation will be accomplished by Utah Coal and Energy, Inc. or under its direct supervision and under the recommendations of the regulatory authority.

13. (Cont'd):

- (d) Areas will be revegetated according to the following mixture recommended by Mr. James W. Smith in a letter dated May 2, 1978:

<u>Species</u>	<u>Rate (lbs./acre)</u>
Fairway Crested Wheatgrass	2
Bluebench Wheatgrass	3
Intermediate Wheatgrass	3
Indian Ricegrass	1
Meadow Foxtail	1
Smooth Brome	2
Orchard Grass	2
Alfalfa	1
Yellow Sweetclover	1
Antelope Bitterbrush	1
Utah Serviceberry	1

For the problem areas above the portals seeding will likely have to be by hydroseeding methods and by applying a wood fiber mulch at the rate of 1500 pounds per acre. Fertilizer will be applied at the rate of 50 pounds per acre in the form of ammonium nitrate or urea.

- (e) Vegetation will be protected from both wildlife and livestock by drift fences until the reclaimed areas have been adequately reestablished. Upon approval of the regulatory authority the fences will be removed.
- (f) No mechanical irrigation will be used unless it can be demonstrated that vegetative growth will not take hold without such methods.
- (g) Reclaimed areas will be maintained by constant observation. Any excessive erosion will be promptly refilled and controlled. Deficiencies in vegetative cover will be noted and altered using additional fertilizer or newly recommended vegetative species. Utah Coal and Energy, Inc. will monitor all reclaimed areas until the surety release is granted.

14. SIGNS AND MARKERS:

Signs showing the company name, business address and telephone number will be placed at all access points to the mining property. These signs will be placed to be easily seen and they will be made of durable material. Topsoil storage areas will be clearly marked. Because this is to be an underground mine there will be no blasting conducted on the surface. Blasting performed underground will conform to both state and federal regulations governing explosives and blasting in underground coal mines.

15. SUMMARY OF PROPOSED SEQUENCE OF WORK:

The following is a proposed sequence of work to accomplish the reclamation plan. It is likely that several work items will be accomplished concurrently.

1. Set monitor stations
2. Begin construction of straw dike
3. Begin construction of sediment basin
4. Grade pad to accomplish drainage into sediment basin
5. Seed around sediment basin and cultivated field.
6. Begin construction of retaining walls
7. Reduce slopes above portals
8. Grade slopes above portals
9. Seed slopes above portals
10. Instal pump and sump
11. Maintain and monitor reclaimed areas
12. Begin mining

STATE OF Utah

COUNTY OF Salt Lake

I, C. G. Cafarelli, having been duly sworn

depose and attest that all of the representations contained in the foregoing application are true to the best of my knowledge; that I am authorized to complete and file this application on behalf of the Applicant and this application has been executed as required by law.

Signed: *C. G. Cafarelli*

Taken, subscribed and sworn to before me the undersigned authority in my said county, this _____ day of _____, 19 _____

Notary Public: _____

My Commission Expires: _____

PLEASE NOTE:

Section 40-8-13(2) of the Mined Land Reclamation Act provides as follows:

"Information relating to the location, size, or nature of the deposit and marked confidential by the operator, shall be protected as confidential information by the Board and the Division and not be a matter of public record in the absence of a written release from the operator, or until the mining operation has been terminated as provided in subsection (2) of section 40-8-21."

Is confidential information contained herein?

YES _____ (Initial)

NO _____ (Initial)

Sections desired to be maintained as confidential information -

COMPLIANCE SCHEDULE
Black Hawk Mine

Summit County, Utah
Utah Coal & Energy, Inc.

*Meeting on this
w/ Mr. Pueler & Mr
Shannon 1030 AM
Fri 1/5/78*

Ref:

Compliance Order and Schedule
Case No. ACT/043/001
November 29, 1978



Item I.

MC 700 Rules.

Submittal of data herewith.

MC-717.12 Signs and Markers.

- A. Signs will be of galvanized sheet metal and placed at entrance to mine property at junction of access road with State highway 133.
- B. Sign(s) will depict name of operator, business address, telephone number, and identification numbers of federal and state permits when received.

MC-717.14 Backfilling and Grading.

Upon cessation of mining activities, operator will:

1. Seal all mine entries as per MSHA regulations CFR-30-75.1721 (as per 75.330-1) or as probably amended prior to abandonment.
2. Backfill and slope-dress dugways, benches, roadcuts, and other disturbances of the terrain to conform with standards of this section, including seeding as prescribed in letter from James W. Smith of your Division dated May 2, 1978.

MC-717.15 Disposal of Excess Rock or Earth Material.

No excess rock or earth material as defined in this section is produced. Should any develop, it will be placed in a disposal area to be selected as approved by subsequent request.

MC-717.17 Protection of the Hydrologic System.

1. All of the subject area is comprised of an alluvial gravel fan wherein surface runoff is subordinate to adsorption. There are no discrete channels carrying runoff; waters are dispersed

per recommendation of James W. Smith in letter dated May 2, 1978.

MC-717.18 Dam Constructed of or Impounding Waste Material.

It is not anticipated that waste material as defined in this section will derive from the mine. In the event that such material will be generated, it will be impounded in Area B indicated on the map, Exhibit A. Such impoundment will be contained by a dam or dams designed, constructed, and maintained in accordance with the standards set forth in this section.

MC-717.20 Topsoil Handling and Revegetation.

Operator will comply with items A,B,C,D, as set forth in this section. Topsoil storage will be maintained at Area A shown on map, Exhibit A.

M Rules.

Rule M-3 Maps and Plans.

- A. Division form MR-1 submitted herewith.
- B. Map, Exhibit A submitted herewith.

Rule M-5 Surety.

Surety to be to be posted upon determination by Board.

Respectfully submitted:

Utah Coal & Energy, Inc.



C. Cafarelli, President

26 December 1978

CF/cws

Encl:

Map, Exhibit A
Form MR-1

ADDENDUM TO MR-2
Utah Coal & Energy, Inc.
Black Hawk Mine
Summit County, Utah

Sec. 11

a. Mining Sequence.

Underground conventional room and pillar method with entries and cross-entries on 70 foot centers. Three-entry system with portals spaced 100 feet apart. Two entries/portals completed. Third entry access to be constructed. Requires additional excavation of dugway through gravel to reach coal subcrop.

- b. Access road to mining site pre-existing. Maximum grade less than five percent. This road gravel surfaced and maintained with patrol grader. Sprinkled when dusty. Road fill banks will be seeded as necessary to stabilize.

One existing road (unimproved) along east margin of working area is used for access to area of excavation for portal dugways. This road constructed along ridge crest; no cut or fill. Drainage will be controlled by diversion ditching. When no longer needed, will be graded to final restoration slope of disturbed area. Road is maintained with patrol grader to minimize rutting and reduce runoff erosion.

- c. Ninety per cent of working site is devoid of vegetation and consists of a portion of a large, poorly sorted gravel alluvial fan. Ten per cent of the area on the perimeter has a discontinuous cover of brush and sage. This brush will be removed by dozer where necessary and piled on adjacent gravel surface for subsequent prudent disposition.

- d. Topsoil will be scalped off with dozer or FEL and transported to storage area designated on Map, Exhibit A.

Gravel will be spread and compacted as feasible along existing benches of previously excavated gravel.

- e. Upon cessation of mining, portals will be sealed as per MSHA regulations; CFR 30-75.1721 (as per 75.330.1). Disturbed area will then be backfilled with previously stored gravel and contoured to stable slope.

Acid, alkali, and/or toxic substances are not recognized in the disturbed gravels. Any such material which may be produced in future mining activities will be buried and/or treated as required. Such materials when identified and segregated will be protected from water contact.

- f. Final stabilization of disturbed material will be achieved by backfilling and grading to stable slope, utilizing benches where necessary to maintain permissible overall gradient. Seeding will be carried out as per letter recommendation of James W. Smith to Utah Coal & Energy, Inc. dated may 2, 1978.

Grading and Re-grading.

- a. As described in 11-f above, disturbed area will be re-graded to stable slope which will be approximately the 32 degrees of original contours. Typical cross-sections ; north-south and east-west, are appended herewith.
- b. Topsoil to be stored as described in 11-d above will be re-distributed on areas from which removed. Approximate thickness of restored topsoil will be three inches.
- c. Soil treatment will be determined upon consultation with Division of Natural Resources.
- d. Drainage will be controlled as is feasible by retardation of runoff velocity through slope and bench design augmented with seeding of re-graded areas. Re-grading will be designed to re-establish original drainage salients to the extent reasonably possible. All outslopes will be graded to not less than $1\frac{1}{2}:1$. *correct*
- e. Maximum gradient of slopes in conjunction with benches will be approximately 33 degrees.

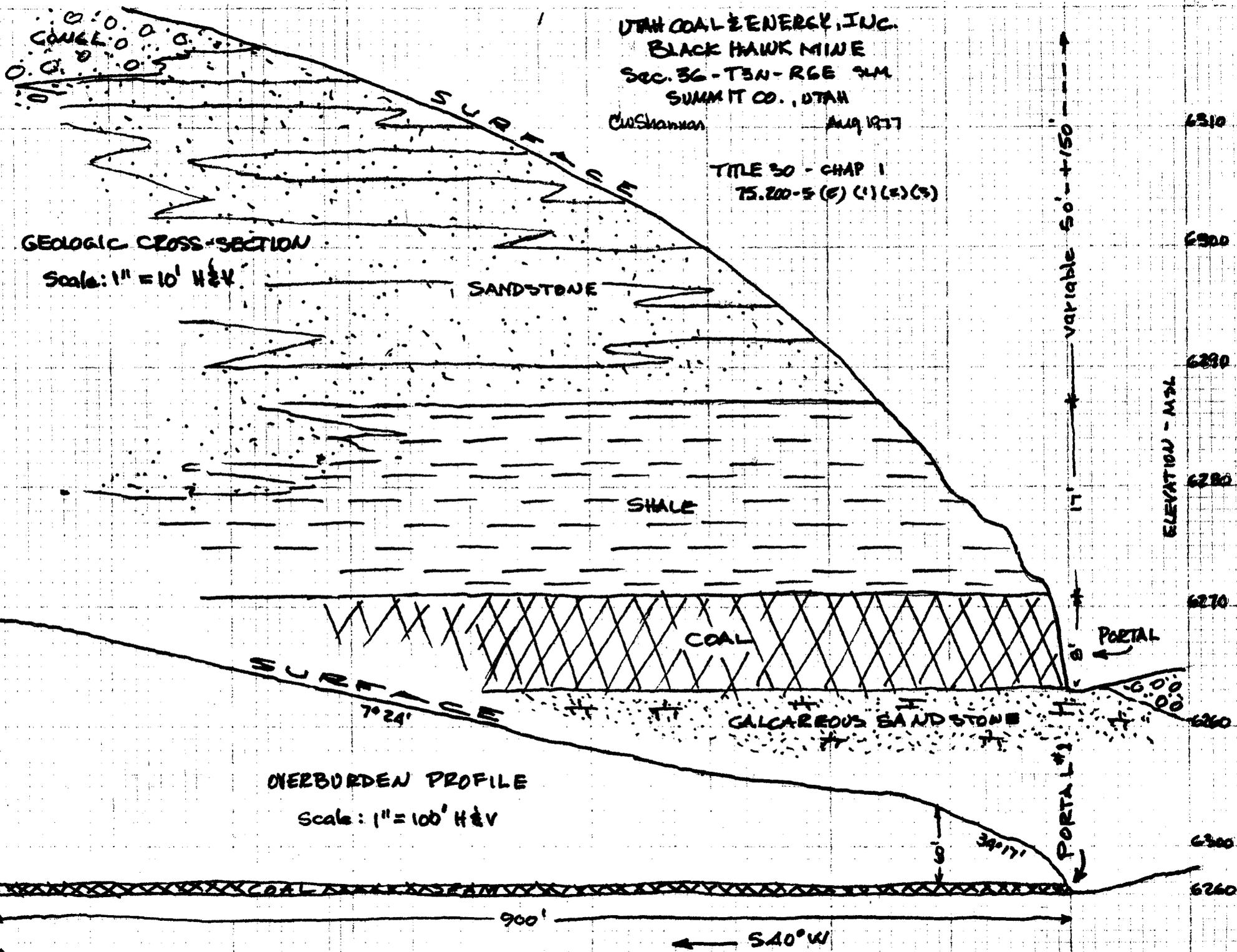
Testing.

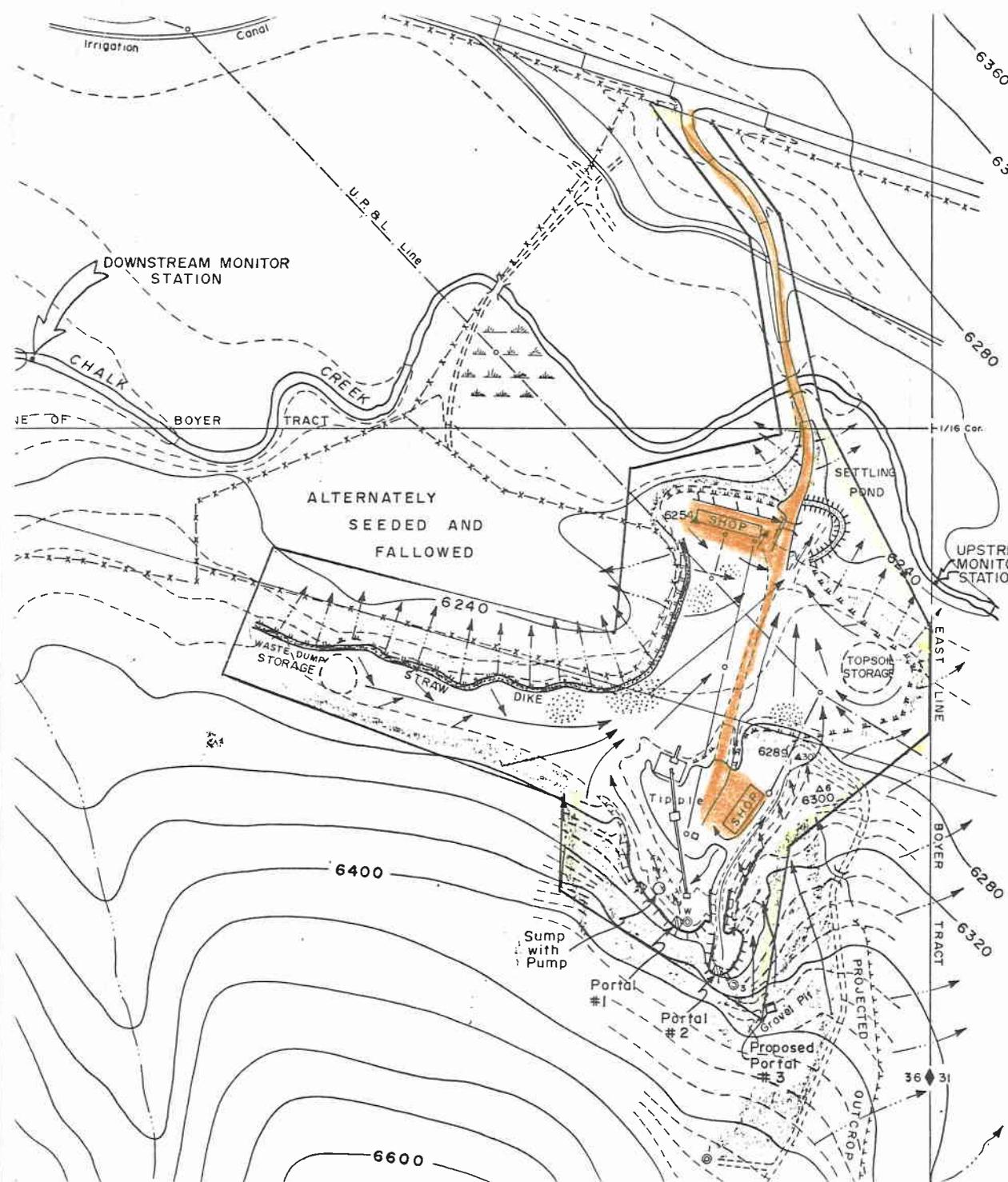
1. The stability of fill material which consists entirely of the gravels of the extant alluvial fan can be observed in the cuts and fills produced during the current operations. It can be demonstrated that gravel fill reconsolidates through the cementing action of contained clays to form as stable a mass as can be expected of gravel deposits.
2. What soils are contained within the subject area are conceded to be capable of supporting the type of vegetation which occurs. Any soil testing required will be contracted to reputable soils testing laboratory.

cws/ 1/4/79

UTAH COAL & ENERGY, INC.
 BLACK HAWK MINE
 SEC. 36-T3N-R6E 9M
 SUMMIT CO., UTAH
 C. W. Shanahan AUG 1937

TITLE 50 - CHAP 1
 75.200-5 (F) (1) (2) (3)





- ▲ Elevation Point
- ⌋ Culvert
- Graded Roads
- x-x-x- Fence
- ⊙ Location of Drill Hole
- o-o- Powerline Showing Location of Poles
- ≡≡≡ Natural Edge of Bluff
- Natural Drainage Pattern (Generalized)
- Runoff Drainage Pattern in Area of Influence After Filling of Low Areas and Grading.
- Areas to be Filled to Obtain Proper Drainage
- ~ Straw Dike
- U Retaining Wall
- ⌋ Settling Pond (See Plate 3 for Details of Construction)
- Large Areas to be Seeded
- ~ 40 Foot Contour
- - - 10 Foot Contour

ESTIMATED DISTURBED AREA - 19 ACRES
J.R.H. 3-20-85

FACILITIES TO REMAIN FOR
POST MINING LAND USE
AREA - 3 ACRES



throughout the vadose zone and eventually enter by seepage into Chalk Creek, the basal drainage salient of the region. It is deemed logical, therefore, to monitor the effects of runoff in Chalk Creek itself above and below the lateral boundaries of the "disturbed" area. These proposed monitoring locations are shown on the map, Exhibit A. Keeping in mind that the "disturbed" area embraces no more than 5 acres, monitoring will provide the data enumerated in MC-715.17 (b) (i) through (v).

2. No effluent will emanate from the mine working as designed. Application for NPDES permit will be made in deference to compliance.
3. Exemption of this item is requested as per sentence three of paragraph one of MC-715.17(a) on the basis that:
 - (a) The total "disturbed area is small.
 - (b) Effluent limitations can be met (monitoring test).
 - (c) Water quality in downstream receiving waters will not be denegated (monitoring test).
4. The access road from State highway 133, although a pre-existing access used for entry to the Boyer tract and for haulage by purchasers of gravel from Boyer, will be maintained by the company during their operational tenure. Whereas the amount of sediment entering Chalk Creek from the road fill is deemed minimal, an effort will be made to retard erosion of the filled portions by seeding with wheatgrass at the rate of approximately 3 pounds per acre. Drainage ditches will be constructed on the north side of the bridge.

The road traversing the east side of the working area which begins at the shop-changehouse and courses to the top of the "disturbed" area above the eastermost portal will be ditched so as to disperse road runoff over the vegetation-covered east flank of the extant ridge spur. When and if this road is no longer needed for the mining operation, it will be dressed and contoured to the configuration of the portal area terrain, and seeded as

MINING AND RECLAMATION PLAN

FOR

THE BLACK HAWK COAL MINE

SUMMIT COUNTY, UTAH

Section 36, T. 3 N., R. 6 E., SLB&M

UTAH COAL AND ENERGY, INC.

Coalville, Utah

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STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING
1588 West North Temple
Salt Lake City, Utah 84116

MINING AND RECLAMATION PLAN

1. APPLICANT: Utah Coal&Energy, Inc.
General Delivery,
Coalville, Utah

Represented By: C.G. Cafarelli, President
5511 South 4385 West
Kearns, Utah 84118

Phone: 968-5901

(a) Application:

To begin an underground coal mining operation on private property known as the Boyer Tract, described as follows:
(See Figure 1 and 2; Plate 1)

S²NE⁴ = 80 acres
N²SE⁴ = 80 acres

Total 160 acres
Total disturbed permit area = 11.07 acres
Section 36, T. 3N., R. 6E., SLB&M, Summit County, Utah

2. TYPE OF OPERATION:

Underground coal mine utilizing conventional room and pillar mining methods. Four portals spaced one hundred (100) feet apart.

3. LAND USE:

(a) Prior Land Use:

Historically the Boyer Tract has been used for coal mining, cattle grazing, deer hunting and the extraction of sand and gravel. The portion of the Boyer Tract that will be disturbed and comprise the permit area has in the past only been used for the extraction of coal and sand and gravel.

(b) Current Land Use:

The lowest portions of the tract, along Chalk Creek, are seeded and fallowed. To insure that mining operations do not adversely affect this area, all water discharges from the permit area will be passed through silt control

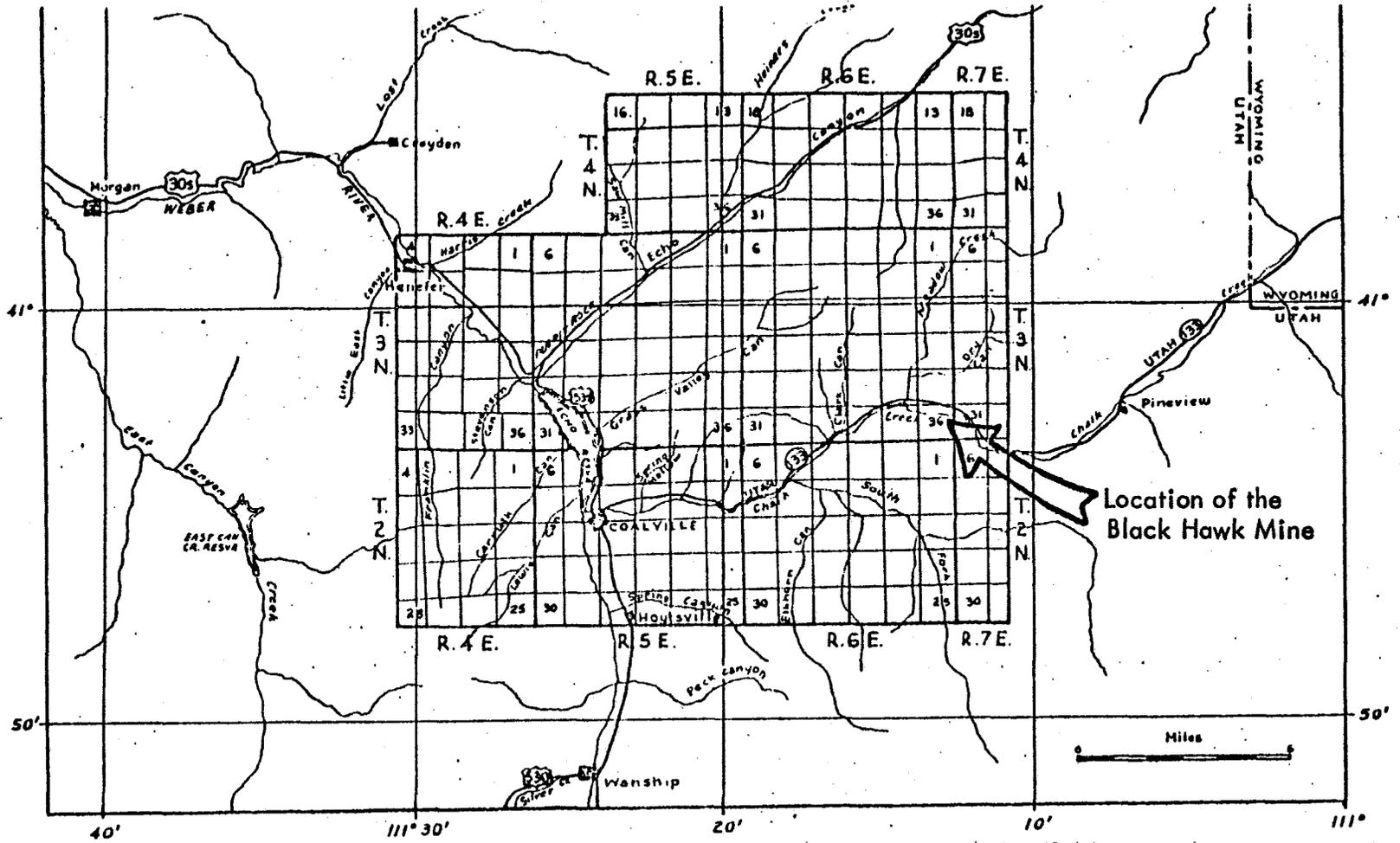


FIGURE 1.-- INDEX MAP OF COALVILLE AND THE SURROUNDING AREA SHOWING THE LOCATION OF THE BLACK HAWK MINE.

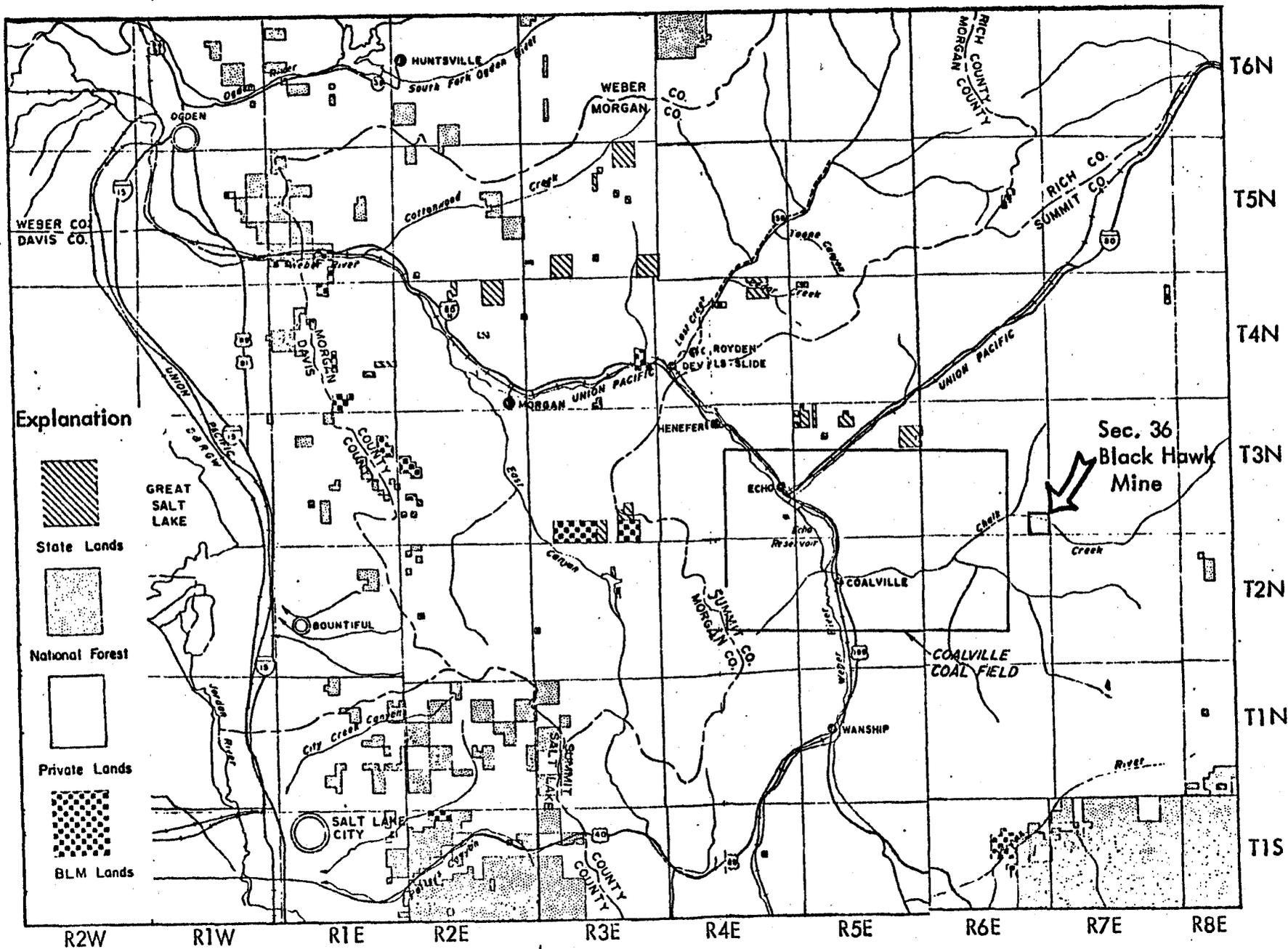


FIGURE 2.-- LAND OWNERSHIP MAP FOR COALVILLE AND THE SURROUNDING AREA

3. (Cont'd):

structures by the use of berms and diversion ditches (See Plate 1). The area occupied by the portals is an area of sand and gravel and material is being sold by the owners of the land. The higher portions of the tract, described above, are used for grazing and hunting.

(c) Possible or Prospective Future Land Use:

Upon completion of Utah Coal and Energy's mining operation the Boyer Tract will continue to be used for grazing, hunting, and possibly for the extraction of sand and gravel. The lower portions of the tract will likely still be cultivated. It is possible that an excessive population growth in the area might result in attempts to subdivide the land into "ranchettes", especially in the lower portions along Chalk Creek; portions of the tract that will not be affected by this mining operation. The nature of an underground mine of this size requires minimal surface disturbance. All disturbed areas shall be restored in a timely manner to conditions that are capable of supporting the uses which they were capable of supporting before any mining.

4. VEGETATION:

The area of the tract that will be disturbed and comprise the permit area is essentially devoid of vegetation, the surface being composed of sand and gravel.

(a) Types and Estimated Percent Cover:

The significant vegetative types of the Chalk Creek area consist of big sagebrush, crested wheatgrass, blue-bunch wheatgrass, Canada thistle, rabbitbrush, Utah serviceberry, Burdock, Flannel Mullein, pinon-juniper, and cottonwood. Tall trees occur only along the flood plain of Chalk Creek, an area not affected by this mining operation. Ninety percent of the working site is devoid of vegetation and consists of a portion of a large, poorly sorted gravel alluvial fan. On the perimeter of the working site, the land has a discontinuous cover of brush and sage. This brush will be removed only when absolutely necessary by dozer and will be disposed of in a prudent manner. The higher portions of the tract contain pinon-juniper as the largest vegetation. Those portions of the tract also will not be affected by this mining operation, except for the drilling of test holes. The drilling of test holes may require the removal of some vegetation in small, restricted areas. Unless absolutely necessary, the pinon-juniper will not be disturbed and the drill sites will be revegetated upon completion of drilling.

Because the elevations and terrain vary from relatively flat areas along Chalk Creek, to low rolling hills, to steep slopes, vegetation cover also varies. Percent cover

4. (Cont'd):

is greater at the higher and lower elevations and on the gentler slopes. Along Chalk Creek the vegetation cover in some places is 100 percent. Above the flood plain of the creek, on the gentler slopes, and at the higher elevations the cover may be as high as 25 to 30 percent. For the most part, the cover in the proposed working areas is generally no more than 10 percent.

5. SOILS:

At this date there are no published soil surveys of the Chalk Creek area. A discussion with Mr. John L. Harvey, Party Leader, Soil Conservation Service, Coalville, Utah, on April 29, 1980 indicates that work in the Chalk Creek area is supposed to begin this summer (Personal Communication to R.S.Kopp). It is anticipated that at least preliminary data will be available about the first of August and at that time this section can be updated with detailed information if desired by the regulatory authority.

Soil along Chalk Creek is fine and dark, being the result of fine sediment carried and deposited by the creek. In fact, the name of the creek gives a clue to the clearness of the water in the creek on a year round basis. The portions along the creek will not be disturbed by this mining operation and there will not be any adverse effects on the soil because of the nature of the reclamation efforts to be undertaken on the higher ground.

In the mine area the soils of this topography can probably best be classified as Rockland and Lithic. The soils are derived mainly from the Tertiary Knight Formation (See Figure 3 showing the surface geologic formations) or from unconsolidated Quaternary deposits. The Knight Formation overlies all other beds in the area and is composed mainly of reddish-yellow conglomerate and variegated shales. The Formation can be roughly divided into four units of varying thickness.

- 1) Clay and sandstone, mainly red and yellow
- 2) Cobble conglomerate, brown weathering
- 3) Clay and sandstone, mainly gray in color but becoming red in places.
- 4) Cobble conglomerate, brown weathering
Angular unconformity with coal-bearing rocks

Quaternary deposits also occur and they include gravels of several modes of origin; in the Chalk Creek area, landslides debris above the stream valleys and alluvium in the valleys.

Rock land soil types usually have 50 to 70 percent of the surface covered by stones, boulders, and outcrops of bedrock. The land surface is commonly moderately eroded, but some areas may be severely eroded. Soil is very sparse to absent and the slopes are commonly

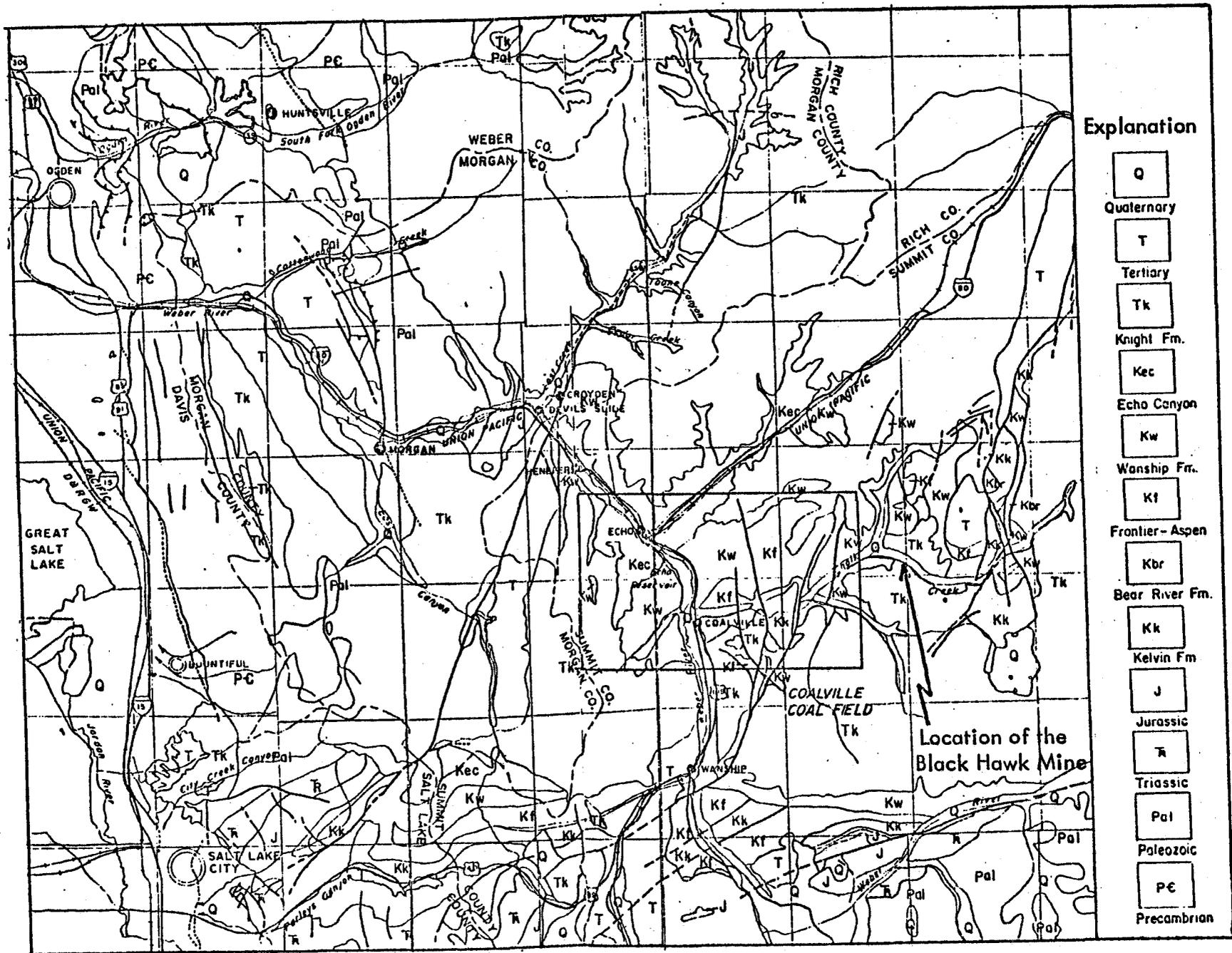


FIGURE 3.--GENERALIZED SURFACE GEOLOGY OF THE COALVILLE AND SURROUNDING AREA

5. (Cont'd):

between 50 and 80 percent. Such a land type has almost no value for farming and a very low value for grazing. Vegetation growing on such a "soil-type" usually is very sparse and consists of grass, sagebrush, and locally pinon-juniper. Small areas are accessible to livestock and wildlife, but for the most part the land type is too steep and rocky for grazing. The disturbed area on this mining property occurs on this type of "soil".

Above the disturbed area, the slopes are gentler and actual soil has a better chance of developing. The land consists of Tertiary rocks with less than four inches of soil material over it. The Tertiary rock areas vary from slight ground protrusions of small area to locally large Tertiary rock exposures. Sparse amounts of grasses and sagebrush occur on the thin soil material. Locally, scrubby pinon-juniper and shrubs grow in small clumps or as individual plants in small soil pockets. This area has its main value as a waterbed and for the grazing of cattle and wildlife. Except for the drilling of test holes this area will not be disturbed by the mining operation. Any disturbance due to the drilling program will be restored almost immediately after the hole has been completed. Only a stake will remain to mark the drill hole site. All holes will be filled or sealed so as not to cause injury to animal life.

This underground mining operation will not alter the pH of the existing soils.

6. ELEVATION:

The mine site and surface installation range from approximately 6240 to 6400 feet. The elevation on the property described in item one range from approximately 6200 to 6800 feet. Total relief on the property is about 600 feet, while the relief in the mine area is about 160 feet.

7. COAL BEDS PRESENT:

The coal bed found in the subcrop beneath the Tertiary Knight Formation is probably the Morby Bed (seam) which occurs at the base of the Dry Hollow Member of the Wanship Formation (Figure 4). The coal bed dips approximately 18 degrees S. 75° W. and ranges from 7 to 9 feet in thickness. It was first discovered and mined by N.B. Morby who sunk a shaft in 1879 (Figure 5). The coal appears to be of high quality having very low sulfur content, 3 percent ash, and clean burning. Estimates indicate upward of a billion tons of coal are present on a total of 34,000 acres controlled by Utah Coal and Energy, Inc.

Because of possible structural complexities (i.e. faulting) it is possible that the coal bed is the Wasatch Coal Bed at the bottom of the Coaleville Member of the Frontier

System	Series	Stratigraphic Unit	Thickness (feet)	Description	
TERTIARY	Eocene	Knight Formation	2,000+	Red to variegated clays, sands and conglomerates. ----- Unconformity -----	
	Maestrichtian	Echo Canyon Conglomerate	3,000±	Gray, red weathering boulder and pebble conglomerate interbedded with gray and red shale and gray sandstone. ----- Unconformity -----	
Campanian					
Santonian					
CRETACEOUS	Coniacian	Wanship Formation	Henefer Member	2,450-2,500	Light brown to light yellowish gray, fine- to medium-grained sandstone and red, brown, yellow and tan claystone.
			Upton Sandstone	450	Light yellow to blue-gray, fine-grained, calcareous, well bedded sandstone.
			Judd Shale	350- 760	Gray marine shale, thickens eastward.
			Grass Creek Member	875-1,025	Tan thin-bedded sandstone, alternating with gray shale in upper third with lenticular coarse-grained sandstone and red clay shale in lower part, thickens westward.
			Dry Hollow Member <i>COAL (Morby)</i>	1,000-1,220	Upper white sandstone hogback, Dry Hollow coal zone, and lower part divided into an upper shale and conglomerate, middle nonmarine shale and basal conglomerate. ----- Unconformity -----
	Turonian	Frontier Formation	Oyster Ridge Sandstone	200- 28	Light yellow, orange to gray, massive, ridge-forming very fine-grained calcareous sandstone.
			Allan Hollow Shale	780	Gray marine calcareous shale.
			Coalville Member <i>COAL (Wasatch)</i>	175- 223	Dark gray conglomeratic sandstone overlies Wasatch coal zone, yellow-gray ridge-forming fine-grained calcareous sandstone at base, thickens westward.
			Chalk Creek Member	3,150	Nonmarine redbeds; pink to red claystone, coarse sandstone and conglomerate sandstone.
			Spring Canyon Member <i>COAL</i>	350+	Dark shales, carbonaceous shales, sandstone and thin coal beds.
			Longwall Sandstone	70- 100	Light gray ridge-forming, massive, fine-grained sandstone, thickens eastward.
	Cenomanian	Aspen Shale	210	Dark gray shale and tan sandstone with interbedded light gray shale containing teleost fish scales.	
			Kelvin Formation	2,500+	Nonmarine redbeds, shale and sandstone with lenses of conglomerate.
	Albian	?			
	Aptian	?			
	Neocomian				After Doelling & Graham, 1972

FIGURE 4.--STRATIGRAPHIC COLUMN OF ROCKS AROUND COALVILLE AND IN THE SURROUNDING AREA

7. (Cont'd):

Formation. More important, if the bed is the Morby Coal Bed then the Wasatch Bed would be approximately 1200 feet below making possibly two levels of operation and extending the life of the mine considerably.

8. PROJECT LIFE:

Because of the probable extensive coal resources the theoretical life of the mine is considerable, perhaps 50 to 100 years depending on the rate of extraction. Based on the known reserves, upon which the new underground workings are proposed, the minimum life is projected to be about 20 years.

9. OVERBURDEN, WASTE, AND REJECTED MATERIALS:

Little waste or reject material is anticipated from this mining operation. Most mines produce reject material that is commonly acid and gray to black in color. Because the coal in the Black Hawk Mine has a low sulfur content and no pyrite, any waste or rejected materials produced will likely not be acid. Any waste or reject material will be stored in the western portion of the tract at the site labeled on Plate 1. Refuse piles will be constructed under the most recent regulations and specifications of MSHA and in accordance with part 715.15 (paragraph a) of the OSM regulations, to include the following:

- 1) The disposal areas will be within the area shown on Plate 1 as the Boyer Tract, and will be approved by the regulatory authority as suitable for construction of fills.
- 2) The disposal areas will be located on the most moderate sloping and naturally stable area available as approved by the regulatory authority.
- 3) The fill will be designed using recognized professional standards, certified by a registered professional engineer, and approved by the regulatory authority.
- 4) The disposal area will not contain springs, natural water courses, or wet weather seeps.
- 5) Any organic material will be removed from the disposal area and the topsoil will be removed and segregated.
- 6) The reject material will be transported and placed in a controlled manner, concurrently compacted as necessary to ensure stability and to prevent any mass movements, then covered and graded to allow surface and sub-surface drainage to be compatible with the natural surroundings, and to ensure long-term stability. The final configuration of the fill will be suitable for postmining land uses approved in accordance with part 715.13. Terraces will not be constructed unless

9. (Cont'd):

- approved by the regulatory authority.
- 7) No portion of the fill will interrupt, obstruct or encroach upon any natural drainage channel.
 - 8) The fill will be inspected for stability by a registered engineer or other qualified professional specialist during critical construction periods to assure removal of all organic materials and topsoil, placement of under-drainage systems, and proper construction of terraces according to the approved plan. The registered engineer or other qualified professional specialist will provide a certified report after each inspection as specified in the design approved by the regulatory authority.

10. HYDROLOGIC SYSTEM:

- (a) Most underground mines give the appearance of being wet, this is because of minor dripping from the roof due to percolating water in the vadose zone. During the setting of one of the portals, a perched aquifer was encountered and it was quickly sealed off. No other underground aquifers are anticipated when mining commences.
- (b) There is no water being discharged from the portals of this mine at this time and none is anticipated.
- (c) The only permanent running water on the tract is Chalk Creek and the mine site is removed from it. No other permanent bodies of water occur on the property. The only other running water comes from spring runoff and from precipitation drainage.

Utah Coal and Energy will employ underground mining practices which will prevent any water pollution to either the ground water supply or to Chalk Creek. These practices will include the following techniques:

- 1) Prevention of water contact with acid or toxic forming materials.
 - 2) Minimizing water contact time with waste materials.
 - 3) Reestablishing disturbed area through grading, diverting runoff, achieving rapid revegetation and lining drainage channels.
- (d) In order to prevent runoff from the higher elevations entering the permit area, diversion ditches will be constructed immediately south and up slope from the portals (Plate 1). Runoff will be diverted to both the east and west away from the disturbed area.
 - (e) Two sediment basins will be constructed for surface runoff from the disturbed area (Plate 1). Construction

10. (Cont'd):

will be in accordance with the requirements of part 717.17 (paragraph e) to include the following (Refer to Supplement A):

- 1) The sediment basins will be the self dewatering type.
 - 2) The spillway will be located to provide maximum detention time and to safely discharge maximum runoff from a 25 year six hour precipitation event.
 - 3) The sediment collected will be removed before it exceeds 80 percent of the storage volume of the basin. This sediment will be stored in the refuse storage area.
 - 4) The sediment basins will not include an embankment greater than 20 feet in height.
 - 5) The sediment basins will be designed, inspected, and certified under a registered engineer.
 - 6) The sediment basins will be examined for structural weakness, erosion, and other hazardous conditions in accordance with part 77.216-3.
- (f) Surface water will be monitored during periods of runoff or sufficient precipitation to create flowing water in the drainage. Because all of the disturbed area is on an alluvial gravel fan, surface runoff is subordinate to adsorption into the gravels. There are no discrete channels carrying runoff from the disturbed area. Most waters from the disturbed area are dispersed throughout the vadose zone and eventually enter into Chalk Creek by subsurface seepage. It is proposed, therefore, to monitor the effects of runoff in Chalk Creek itself both above and below the lateral boundaries of the disturbed area. The proposed monitoring locations are shown on Plate 1. If however, the regulatory authority requires it monitoring stations will be set up both above and below the disturbed area.
- 1) The samples taken will be tested for pH, total iron, total manganese, total suspended solids, and any other characteristics requested by the regulatory authority.
 - 2) Reports of these samples will be filed with the regulatory authority within 60 days.
 - 3) The equipment necessary to measure and sample the quality and quantity of surface water will be properly installed and maintained and will be removed when no longer needed.
 - 4) No stream channels will be diverted.
- (g) Underground operations will be conducted to minimize adverse effects on groundwater quality and quantity.
- (h) No effluent will emanate from the mine workings as designed. However, application will still be made for a NPDES permit

10. (Cont'd)

- (i) In order to protect the cultivated field in the northern portion of the tract, a berm will be constructed along the south and east side of the field (Plate 1).
- (j) In order to assure drainage from the disturbed area ends up in the sediment basins, the area will be graded so as to maintain drainage slopes toward the sediment basins.
- (k) The sediment basins, culverts, and drainage channels will be designed to handle a 10 year, 24 hour precipitation event. The emergency spillway for the sediment basins will be designed to handle a 25 year, 6 hour precipitation event. Basic data for the determination was obtained from Orville Richardson, State Climatologist, Logan, Utah. He reports that the nearest station to the Black Hawk Mine with sufficient data is Echo Dam. He estimates that at the mine, precipitation might be slightly higher than the values obtained at Echo Dam. The 10 year 24 hour event at Echo Dam is 1.90 inches; the 25 year 6 hour event is 1.58 inches (Table 1). The average annual precipitation for the area of the Black Hawk Mine is approximately 19 inches per year (Figure 6). Most of the precipitation comes during the period October to April when approximately 13 inches of precipitation falls, mainly as snow. May through September is a period when intense storms of short duration are likely to occur. About 6 inches of precipitation falls on the average during that period.

11. SPECIFIC INSTALLATION AND OPERATION PROCEDURES:

(a) Road Construction and Maintenance:

Access from Highway 133 to the mining area is provided by a pre-existing road. The road has a maximum grade of less than five percent. The road has a gravel surface and will be maintained with a patrol grader and will be sprinkled when dusty. Road fill banks will be seeded as necessary to stabilize the banks.

Along the east margin of the tract is one unimproved road used for access to the areas of excavation for portal dugways. The road is constructed along a ridge crest so cut and fill methods are not needed at this time.

The entry road and the access road along the east margin of the tract, will be maintained and repaired in a timely manner. During dry periods, the entry road will be watered to control dust.

The access road along the eastern border of the area will be maintained until no longer needed. At that time it will be graded to final restoration slope of disturbed area and seeded in the same manner as other areas described in the section on revegetation.

TABLE 1.

ESTIMATED RETURN PERIODS FOR SHORT DURATION PRECIPITATION

Station: Echo Dam

Elevation: 5500

Latitude: 40° 58'

Longitude: 111° 26'

D U R A T I O N (inches)

R E T U R N P E R I O D
(years)

	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	12 Hr	24 Hr
1	.17	.26	.32	.45	.57	.60	.62	.68	.73	.79
2	.18	.28	.35	.49	.62	.68	.73	.86	.98	1.10
5	.20	.31	.39	.54	.68	.78	.88	1.13	1.35	1.58
10	.21	.33	.42	.58	.74	.87	1.00	1.32	1.60	<u>1.90</u>
25	.23	.35	.44	.62	.78	.96	1.14	<u>1.58</u>	1.97	2.38
50	.26	.41	.51	.71	.90	1.10	1.30	1.79	2.23	2.68
100	.27	.42	.54	.74	.94	1.18	1.41	1.98	2.49	3.02

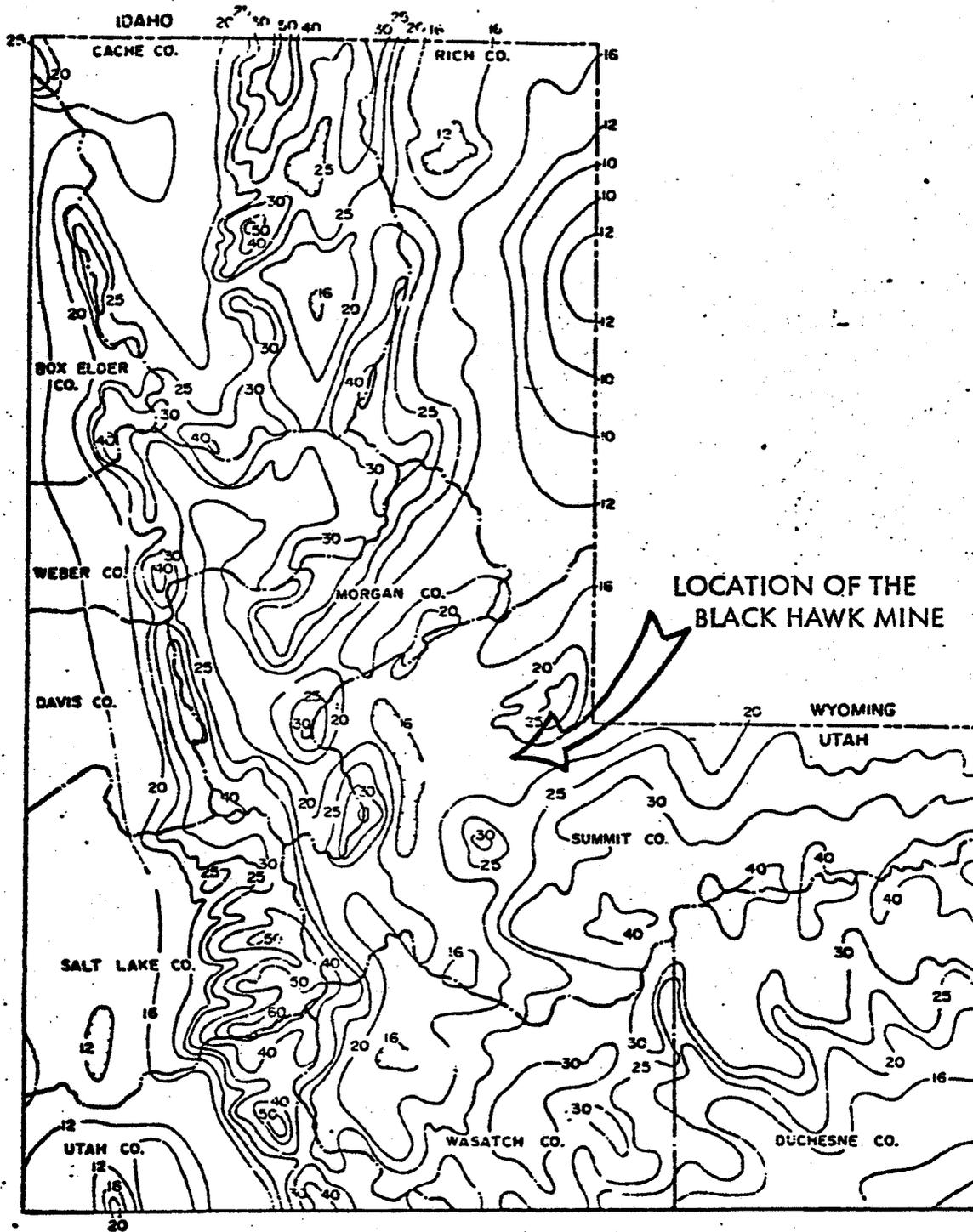


FIGURE 6.--NORMAL ANNUAL PRECIPITATION FOR COALVILLE AND THE SURROUNDING AREA

11. (Cont'd)

(b) Site Preparation:

1) Portals-

Two portals have been constructed and two more will be constructed at the commencement of mining activities. Presently a slope stability problem exists at portal #2 and the proposed location for portal #3 (Plate 1). Refer to Supplement B for details of the slope stabilization plan for these areas.

2) Surface Grading-

Surface grading will be required on the permit area for surface facilities and to insure proper drainage. Grading will be controlled to prevent any unnecessary defoliation. Any topsoil present in areas to be graded will be handled according to 11. (c).

(c) Topsoil Removal and Replacement:

The areas from which topsoil will be removed is very small and includes poorly developed soils. Using dozers and front end loaders, the topsoil will be scraped from the surface, loaded into trucks and dumped at the site indicated on Plate 1. The topsoil will be removed as a separate operation from areas to be disturbed by surface installations. The topsoil will be segregated, stockpiled, and protected from wind and water erosion, or contaminants. Disturbed areas no longer required for the conduct of mining operations shall be regraded, topsoil distributed, and revegetated.

(d) Placement and Containment of all Disturbed Materials:

At the mine site, slopes will be stabilized by immediate reseeding after the completion of grading. All cut material will be used in fill situations to provide flat surface areas for buildings and associated structures. Fill material will be compacted using heavy rubber tired equipment.

Embankments will be graded to acceptable, stable slope conditions. Water from the level areas will be controlled and channeled into the sediment basins. All effected areas will be tested chemically for plant nutrients. Those chemicals lacking will be added and recommended vegetation will be planted immediately to reduce effects of wind and water. Vegetation planted will conform to the recommendations given in the section on revegetation later in this report.

(e) Final Stabilization of Disturbed Material:

When the project is completed, all buildings and extran-

11. (Cont'd)

eous materials will be removed and using the most advanced technology at the time Utah Coal and Energy, Inc. will reestablish terrain to as nearly the original shape as practical. The area will be reseeded and vegetation reestablished.

12. GRADING AND REGRADING:

(a) Typical Regrading:

All disturbed areas will be backfilled and graded to as near as possible the approximate original contours, and to the most moderate slope possible. Slopes shall not exceed the angle of repose or such lesser slopes as required by the regulatory authority to maintain stability. Fill material will be compacted to assure stability and to prevent leaching of toxic pollutants.

Areas to be regraded will include the portal site, surface facility site, roads, and the waste disposal site. Because of the diversity of these areas, all regrading will conform to the specific site.

Where possible all final grading and placement of topsoil will be done along the contour to minimize erosion. In all instances, grading will be conducted in a manner which minimizes erosion and provides a stable surface for the placement of topsoils.

(b) Topsoil:

Upon reclamation topsoil will be hauled to the area by end-dump trucks, piled and spread using a grader. Where possible the soil will be distributed along the contour. The thickness of the reestablished soil will be consistent with soils in the vicinity and will be sufficient to support vegetation equal to or superior to pre-mining history.

(c) Soil Treatment:

Soils will be tested according to the most advanced technology. Any chemicals or nutrients which are lacking will be added under the direction of the regulatory authority. In general, the types of additives will be commercial fertilizers, including organic mulch or chemical fertilizers.

Utah Coal and Energy, Inc. will establish on all lands that have been disturbed by mining operations a diverse, effective, and permanent vegetative cover capable of self-regeneration and adequate to control soil erosion.

12. (Cont'd)

(d) Drainage Control:

During regrading all culverts will be removed and all drainage will be reestablished. Regraded areas will be protected from main drainage using rip-rap. On regraded slopes if rills or gullies deeper than 9 inches form where vegetation has not yet been established, Utah Coal and Energy, Inc. will fill, grade and stabilize these rills and gullies and then revegetate. If excessive runoff occurs this will be temporarily diverted away from the newly revegetated areas. Once the vegetation has been adequately reestablished these temporary diversions will be removed and reclaimed.

(e) Grading Slopes:

Regrading will be done to return the area to its approximate original contour. At no time will regraded slopes exceed the angle of repose or an angle designated to be an unstable condition by the regulatory authority.

13. TESTING AND REVEGETATION:

- (a) Reclaimed fill areas will be tested for stability in two ways; 1) Slope staking and 2) frequent visual inspection for excessive erosion.

Newly formed fill areas will be staked along the contours at various elevations on the bank. A record will be kept of any slumping, creeping, or movement until a final vegetative cover has been established. Upon recommendation of the regulatory authority any excessive slumping will be refilled, recompactd and revegetated.

During the reclamation process filled areas will be visually inspected for excessive erosion. If rills or gullies form deeper than 9 inches they will be refilled, graded, compacted and revegetated.

- (b) Soil samples will be taken to determine any deficiencies which would effect the growth in new revegetated areas. Any deficiencies will be corrected by adding to the soil chemical fertilizers, organic mulch, or any other substances recommended by the regulatory authority.
- (c) Areas to be reclaimed will be filled and then compacted using heavy, rubber-tired equipment. Topsoil which has been set aside and stired, or which has been hauled in will be spread along the contour using graders. Where possible the areas will be disced using conventional farm equipment. The seed will be spread using a range-land drill where possible or mechanically broadcasted on steeper slopes. Steeper slopes will be raked to pro-

13. (Cont'd)

vide a slight soil cover for the seed. If necessary because of excessive slope conditions, hydroseeding will be the method used.

Vegetative cover will be promptly reestablished to stabilize erosion. Mulch will be used and reseeded will occur during the first normal favorable period for growth following regrading.

Revegetation will be accomplished by Utah Coal and Energy, Inc. or under its direct supervision and under the recommendations of the regulatory authority.

- (d) Areas will be revegetated according to the following mixture recommended by Mr. James W. Smith in a letter dated May 2, 1978:

<u>Species</u>	<u>Rate (lbs./acre)</u>
Fairway Crested Wheatgrass	2
Bluebench Wheatgrass	3
Intermediate Wheatgrass	3
Indian Ricegrass	1
Meadow Foxtail	1
Smooth Brome	2
Orchard Grass	2
Alfalfa	1
Yellow Sweetclover	1
Antelope Bitterbrush	1
Utah Serviceberry	1

For the problem areas above the portals seeding will likely have to be by hydroseeding methods and by applying a wood fiber mulch at the rate of 1500 pounds per acre. Fertilizer will be applied at the rate of 50 pounds per acre in the form of ammonium nitrate or urea.

- (e) Vegetation will be protected from both wildlife and livestock by drift fences until the reclaimed areas have been adequately reestablished. Upon approval of the regulatory authority the fences will be removed.
- (f) No mechanical irrigation will be used unless it can be demonstrated that vegetative growth will not take hold without such methods.
- (g) Reclaimed areas will be maintained by constant observation. Any excessive erosion will be promptly refilled and controlled. Deficiencies in vegetative cover will be noted and altered using additional fertilizer or newly recommended vegetative species. Utah Coal and Energy, Inc. will monitor all reclaimed areas until the surety release is granted.

14. SIGNS AND MARKERS:

Signs showing the company name, business address and telephone number will be placed at all access points to the mining property. These signs will be placed to be easily seen and they will be made of durable material. Topsoil storage areas will be clearly marked. Because this is to be an underground mine there will be no blasting on the surface. Blasting performed underground will conform to both state and federal regulations governing explosives and blasting in underground mines.