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4.1 RECLAMATION PLAN - INTRODUCTION

Reclamation activities at the mine site, conveyor route and load-out facilities are, and will continue to be, directed towards minimizing the overall impacts of coal mining activities on the environment. It is recognized, however, that land management policies and disturbed land reclamation technology can, and probably will, change over the life of the Skyline Mines Project. In view of this, eventual reclamation of the mine site will satisfy the standards current at the time of reclamation and will be conducted using the most applicable current technology.

As now proposed, the mine site will be returned to a wildlife/grazing habitat at the conclusion of the mining operation. The conveyor route and load-out will be returned to a postmining grazing landuse. The premining and proposed postmining uses are identical for all areas.

It is not intended that all of the disturbed areas be returned to their original contours or configurations. These areas, as addressed in Section 4.6 - TOPSOIL AND SUBSOIL HANDLING PLAN and Section 4.7 - REVEGETATION PLAN, are currently being stabilized and revegetated and consist primarily of those steep slopes where return to original configuration is impractical. The stream diversions, other than those in the portal area, will also be left in their present channels. (See Section 4.19 - STREAM DIVERSIONS)

The initial step in the final reclamation plan is to seal all large diameter openings. This will be accomplished by backfilling these openings with noncombustible material. The seals will be designed such that mine drainage, if any, will not enter surface water bodies. For a more detailed description of the sealing of openings see Section 4.9 - OPENING AND SEALING PLANS.

The next step in reclamation will be the removal of all surface structures and equipment. Once this has been accomplished, all solid waste generated in the abandonment operation will be collected and removed from the areas being reclaimed. Additional information concerning this aspect of the reclamation plan is presented in subsection 3.2.8 - Components of Operation Construction, Modification, Use, Maintenance and Removal.

Backfilling of the subterranean portion of the silos, holes and depressions will be the next reclamation activity. Once the backfilling is completed, the stream in the portal area will be returned to a surface channel and the disturbed areas will be graded and recontoured. A detailed description of this reclamation phase is found in Section 4.4 - BACKFILL, SOIL STABILIZATION, COMPACTION, CONTOURING AND GRADING and in subsection 4.19.5 - Reclamation of Diversions and Channels - Portal Area. As approved in the original application, these new stream channels will be on fill material with erosion protection as described.

As soon as the grading and recontouring operation is completed, the ground at the sites will be scarified to a minimum depth of 6 inches so as to reduce compaction and allow better soil retention and vegetation establishment. Following completion of scarifying procedures, topsoil will be uniformly spread over the disturbed areas in such a manner as to avoid excessive compaction of the topsoil. The topsoil will be tested to determine if fertilization and/or neutralization is required. (Section 4.6 - TOPSOIL AND SUBSOIL HANDLING PLAN)

The disturbed areas will then be revegetated. Upon completion of the soil testing and any necessary fertilization or neutralization, a seed mixture suitable for achieving the objectives of the postmining landuse plan will be spread over the disturbed areas. The methods used for revegetation are discussed in Section 4.7 - REVEGETATION PLAN.

The proposed timetable for the reclamation plan activities is presented in Section 4.2 - RECLAMATION TIMETABLE.

Once the revegetation procedures are completed, a monitoring program will be established to ensure that an acceptable vegetational cover is established. If during the monitoring program erosion develops in revegetated areas, regrading and reseeding will be conducted in the affected areas. When the disturbed areas are stabilized by revegetation and surface runoff is demonstrated to meet water quality standards without detention time, the drainage ditches and loadout sedimentation pond will be backfilled and revegetated.

That portion of the project area used for the new state highway (SR-264), and for which the Utah Department of Transportation (UDOT) now has jurisdiction, will not be reclaimed. UDOT jurisdiction also includes slopes attendant to the highway.

No impoundments, sedimentation ponds or treatment facilities will remain upon abandonment. Diversions and culverts which may remain will be renovated to the approved design specification prior to abandonment of the area.

4.1.1 Reclamation Plan - Rock Disposal Site

Reclamation activities will be conducted on portions of the affected areas as those portions are filled to design capacity. The final contours of the rock disposal site are presented in Map 4.16.1-B. The rock waste collection pit and diversion ditches will be removed during final reclamation. The disturbed area affected by the disposal operation will, at the request of the property owner's representative, be leveled off and reclaimed to native rangeland for subsequent use as a corral. The access road to the site will not be reclaimed except for the removal of the guard rail (Exhibit 1).

EXHIBIT 1

August 27, 1982

Mr. Vernal J. Mortensen
Vice President
Coastal States Energy Co.
411 West 7200 South
Midvale, Utah 84047

Dear Mr. Mortensen:

I understand your firm needs clarification on the future use of the "strip pit" area you have under lease from the Telonis estate, to use as a mine rock waste dump site.

The land surrounding the "strip pit" area will continue to be used for grazing in the future and, as such, I would prefer the reclaimed dump site to be leveled off so it could be used for corrals and a livestock containment area if we so desire.

The improved road leading to the waste dump site should not be reclaimed, since we would need the road to allow for easier access to the dump site when working with livestock in the area.

Thank you for your consideration in this matter.

Sincerely yours,

Angelo Georgedes

Angelo Georgedes, Administrator
for the Telonis Estate

4.2 RECLAMATION TIMETABLE

A suitably permanent and diverse vegetative cover, as required by the U. S. Forest Service, will be established on all affected areas of land, except areas of railroad rights-of-way and travelled roadways.

Land reclamation will take place as soon as possible after surface disturbance. Steep cut slopes will be revegetated as recommended in Section 4.7 - REVEGETATION PLAN. The "first appropriate growing season" is defined as the earliest possible available growing season. The Permittee interprets available growing seasons to be the favorable spring and fall intervals during which revegetation attempts have the optimum chance for success. Areas occupied by support facilities such as roads, office buildings, shops, coal handling structures and conveyors will not be reclaimed until conclusion of the mining operations. The reclamation sequence is shown on Table 4.2-1.

TABLE 4.2-1

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
1979		Establishment of Baseline Reference Plots	N/A
1980		Construction of Site Drainage System	0.0
1981-1982	Contemp-oraneous	Mine Site Temporary Stabilization Topsoil Stockpile	0.6
		Loadout Site Temporary Stabilization Topsoil Stockpile	0.3
1983-1984	Contemp-oraneous	Mine Site Initial Reclamation - Completed. Excludes 100 ft. from any portal for MSHA safety reasons	8.3
1988-1995	Contemp-oraneous	Mine Access and Eccles Canyon Conveyor Banks Final Reclamation - Conveyor bench slopes	6.0
1988-1994	Contemp-oraneous	Loadout Site Final Reclamation - South Side Cut Slope	.84

REPLACES	TEXT
Table 4.2.1 Page 4-6	Table 4.2-1 Page 5-6 Date 5/9/89

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
1985-1990		Maintenance of Reclaimed Banks	N/A
2010		Reassessment of Operational Reclamation Success;	N/A
		Modifications to Abandonment Reclamation Plan	N/A
2016		Mining cessation recover underground equipment	N/A
	I A.	Structure Removal	
		Mine Site - Lower Bench	N/A
		-Crusher	
		-Rock and Coal Bypass	
		-Sampling Stations	
		-Conveyors	
		-Truck Loadout	
		-Substations	
		-Misc. Storage Bldgs.	
		Mine Site - Upper Bench	N/A
		-Substation	
		-Conveyors	
		-Transfer Building & Drive House	
		-Stack Tube	
		-Reclaim Tunnel	

REPLACES		TEXT		
Table 4.2.1	Page 4-7	Table 4.2-1	Page 4-7	Date 3/1/90

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2016 (continued)		Mine Site - Middle Bench	N/A
		-Conveyors	
		-Rock and Coal Bypass	
		-Mine 2 & 3 Conveyor Slope Portal	
		Loadout Site	N/A
		-Parking Area	
		-Substation	
		-Conveyors	
		-Train Loadout	
		-Pump Building	
		Overland Conveyor Site	N/A
		-Conveyor	
2017	I	A. Structure Removal	
		Mine Site	N/A
		-Water Tank Area	
		-Well Houses	
		Upper Bench	N/A
		-Mine #1 Portal Area	
		-Water Treatment Bldg.	
		Middle Bench	N/A
		-Shop-Warehouse-Changehouse-Office	
		-Substation	
		-Silo	

REPLACES		TEXT		
Table 4.2.1	Page 4-8	Table 4.2-1	Page 4-8	Date 3/1/90

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2017 (continued)	I	Structure Removal	
		Lower Bench	N/A
		-Mine No. 3 Portal Area	
		Loadout Site	N/A
		-Silos	
	I	B. Earth Work	
		Mine Site	
		-Water Tank and Well House Areas	.26
		Top Soil Placement	
		Seeding and Mulching	
		Upper Bench	13.40
		-Drainage Considerations	
		Culvert Removal or Filling	
		Ditch Filling	
		Drainage Reconstruction	
		Top Soil Placement	
		Seeding and Mulching	
		Middle Bench	11.60
		-Drainage Considerations	
		Culvert Removal or Filling	
		Ditch Filling	
		Drainage Reconstruction	
		Top Soil Placement	
		Seeding and Mulching	

REPLACES	TEXT
Table 4.2.1 Page 4-9	Table 4.2-1 Page 4-9 Date 03/01/90

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2017	I	Earth Work	
		Lower Bench	11.4
(continued)		-Drainage Considerations	
		Culvert Removal or Filling	
		Ditch Filling	
		Drainage Reconstruction	
		Top Soil Placement	
		-Seeding and Mulching	
		Train Loadout	13.82
		-Top Soil Placement	
		-Seeding and Mulching	
		-Drainage Considerations	
		Culvert Removal or Filling	
		Ditch Filling	
		Drainage Reconstruction	
		Scofield Disposal Site	1.67
		-Top Soil Placement	
		-Seeding and Mulching	
		South Fork Breakout	.96
		-Top Soil Placement	
		-Seeding and Mulching	

REPLACES	TEXT
Table 4.2.1 Page 4-9A	Table 4.2-1 Page 4-9A Date 03/01/90

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2017-2019		Maintenance of Reclaimed Area (if necessary)	N/A
		Regrading and Reseeding (if necessary)	N/A
2020-2021		Success Monitoring and Extended Responsibility Period	N/A
		Determination of Successful Reclamation Expected	N/A
2022-2027		Removal/Reclamation of Loadout Site Drainage Ditches and Pond	N/A
		Removal/Reclamation of Mine Site Drainage Ditches	N/A
		Maintenance of Reclaimed Area (if necessary)	N/A
		Regrading and Reseeding (if necessary)	N/A
		Compliance Documentation	

4.3 COST ESTIMATE FOR PERFORMANCE BOND

The Surface Mining Control and Reclamation Act of 1977 requires the operator of a coal mine to file with the Office of Surface Mining, a bond payable to the regulatory authority in the amount equal to the estimated cost of completing the work described in the operator's reclamation plan. The purpose of the bond provision is to ensure the State of Utah that in the event of the operator being financially unable to reclaim the disturbed areas, such areas can and will be restored by the proper regulatory authority at no cost to state residents.

The Permittee believes that a bond is not required for the surface area over the underground mine workings. This conclusion is based on the fact that, due to the strata characteristics above the coal seams, the slow and uniform rate of subsidence will not affect the surface terrain to such an extent that reclamation work will be necessary.

The Permittee's reclamation cost calculations for the facilities area disturbance is shown in Table 4.3-1. The estimated reclamation costs are shown on Table 4.3-2. The engineering estimates supporting the reclamation cost may be found in the Engineering Calculations section of Volume 5.

TABLE 4.3-1

ESTIMATED RECLAMATION COST CALCULATIONS

Description	Units	Unit Cost	Subtotal
BUILDING AND EQUIPMENT REMOVAL			
Equipment Removal	Tons	$140/ton	
1,525 tons x 75% (25% assumed saleable)	1,144		$160,160
Steel Frame Building Removal	ft^3	$0.17/$ft^3$ of Volume	
Shop-Warehouse	1,856,000		$315,520
	113,000		19,210
Administration Building	78,000		13,260
Mine #1 Transfer Tower and Drive House	186,040		31,630
Mine #2 & 3 Drive House	180,000		30,600
Crusher--Raw Coal	88,000		14,900
Truck Loadout	30,000		5,100
Railcar Loadout	118,000		20,060
Conveyors (7)	309,840		52,670
Water Tanks (2)	46,800		7,960
Pump House	4,640		1,020
Overland Conveyor System (5)	480,000		81,600
Well Houses (3)	860		150
Water Treatment Bldg.	24,000		4,080
Misc. Storage Bldg.	90,000		15,300
			629,380
CONCRETE AND BLACKTOP REMOVAL	yd^2, yd^3, or ft^3		
Upper Terrace			
Conveyor Foundation	972 ft^3	$.22/$ft^3$	$ 210
Stack Tube	6,410 ft^3		1,410
Reclaim Tunnel	52,910 ft^3		11,640
Middle Fork Slope Protection Apron	20,340 ft^3		4,470

REPLACES	TEXT
Table 4.3-1 Page 4-11	Table 4.3-1 Page 4-11 Date 03/01/90

Table 4.3-1 (continued)

Description	Units	Unit Cost	Subtotal
Middle Terrace			
Shop Warehouse Foundation	5,130 ft^3	$.22/$ft^3$	1,130
Transfer Tower Foundation Mine #1	1,782 ft^3	$.22/$ft^3$	390
Conveyor Foundation	1,458 ft^3	$.22/$ft^3$	$ 320
Silo	18,360 ft^3	$.22/$ft^3$	$ 4,040
Parking Area	140 yd^2	$1.40/$yd^2$	$ 200
Disposal	1,026 yd^3	$5.10/$yd^3$	$ 5,230
Lower Terrace			
Crusher Foundation	2,916 ft^3	$.22/$ft^3$	640
Mine 2 & 3 Drive House	3,660 ft^3	$.22/$ft^3$	800
Conveyor Foundation	2,430 ft^3	$.22/$ft^3$	$ 530
Truck Loadout Foundation	270 ft^3	$.22/$ft^3$	$ 60
Road and Storage	14,670 yd^2	$1.48/$yd^2$	$ 21,700
Disposal	340 yd^3	$5.10/$yd^3$	$ 1,730
Misc. Storage Bldgs.	3,066 ft^3	$ .22/ft^3	$ 680
Road			
Conveyor - Transfer Tower Foundations	32,400 ft^3	$.22/$ft^3$	7,130
Disposal	1,200 yd^3	$5.10/$yd^3$	6,120
Concrete Removal - Loadout			
Silo Sides	162,000 ft^3	$.22/$ft^3$	35,640
Railcar Loadout (Including Stoker System)	6,706 ft^3	$.22/$ft^3$	1,470
Paving	4,660 yd^2	$1.48/$yd^2$	$ 6,900
Disposal	6,784 yd^3	$5.10/$yd^3$	$ 34,600
Pump House	1,240 ft^3	$ .22/ft^3	$ 270
Backfilling			
Mine #1	6,940		$ 6,940
Mine # 2 & 3	6,940		$ 6,940

REPLACES	TEXT
Table 4.3-1 Page 4-12	Table 4.3-1 Page 4-12 Date 03/01/90

TABLE 4.3-2

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	MINE SITE											
	Water Tank Area & Well Pads	0.26	—	4,240	1,070	100	7,600	50	120	240	300	$13,720
	Upper Terrace	13.40	—	55,240	55,240	17,340	88,520	880	3,520	7,040	8,800	236,580
ABANDONMENT	Mine #1 & 2 Portals		—	6,940	—	—	—	—	—	—	—	6,940
	Conveyor Foundations		420	—	—	—	—	—	—	—	—	420
	Stack Tube		1,410	—	—	—	—	—	—	—	—	1,410
	Drainage Reconstructions		—	—	82,900	—	—	—	—	—	—	82,900
	Reclaim Tunnel		11,640	—	—	—	—	—	—	—	—	11,640
	Mine #1 Transfer Tower		520	—	—	—	—	—	—	—	—	520
	Slope Protection Apron		4,470	—	—	—	—	—	—	—	—	4,470
	Middle Terrace	11.6	—	3,020	3,020	8,020	35,430	930	3,720	7,440	4,300	65,880
	Shop-Warehouse		2,100	—	—	—	—	—	—	—	—	2,100
	Mine #1 Sampling Tower		960	—	—	—	—	—	—	—	—	960
	Conveyor Foundations		1,470	—	—	—	—	—	—	—	—	1,470
	Silo & Feed Tunnel		350	—	—	—	—	—	—	—	—	350
	Drainage Reconstruction	—	—	—	84,690	—	—	—	—	—	—	84,690

REPLACES TEXT
Table 4.3-2 Page 4-13 !! Table 4.3-2 Page 4-13 Date 03/01/90!

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	Lower Terrace	11.4	—	42,570	42,570	7,290	31,330	730	2,920	5,840	7,300	140,560
ABANDONMENT	Crusher		1,190	—	—	—	—	—	—	—	—	1,190
	Conveyors		560	—	—	—	—	—	—	—	—	560
	Truck Loadout		110	—	—	—	—	—	—	—	—	110
	Mine #3 Portals		—	6,940	—	—	—	—	—	—	—	6,940
	Silo		7,510	—	—	—	—	—	—	—	—	7,510
	Misc. Storage Bldg.		680	—	—	—	—	—	—	—	—	680
	Road and Storage		21,700	—	—	—	—	—	—	—	—	21,700
	Drainage Reconstruction		—	—	37,750	—	—	—	—	—	—	37,750
	Subtotal (Mine site-Abandonment Phase)		55,090	118,950	307,250	32,750	162,880	2,590	10,280	20,560	20,700	$731,050
	ECCLES CANYON CORRIDOR											
	Transfer Towers Conveyor	1.0	13,250	—	—	—	—	100	400	800	1,000	15,550
	Subtotal (Road Abandonment Phase)		13,250	—	—	—	—	100	400	800	1,000	15,550

REPLACES TEXT
Table 4.3-2 Page 4-14 !! Table 4.3-2 Page 4-14 Date 03/01/90!

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	LOADOUT SITE	13.82	—	47,360	47,360	11,500	26,590	8,700	3,480	6,960	8,700	160,650
	Silos (4)		64,700	—	—	—	—	—	—	—	—	64,700
ABANDONMENT	Railcar Loadout		2,630	—	—	—	—	—	—	—	—	2,630
	Sedimentation Pond Backfill		33,580	—	—	—	—	—	—	—	—	33,580
	Drainage Reconstruction		—	—	32,800	—	—	—	—	—	—	32,800
	Pump House		270	—	—	—	—	—	—	—	—	270
	Paving		12,440	—	—	—	—	—	—	—	—	12,440
	Subtotal (Loadout - Abandonment Phase)		113,620	47,360	80,160	11,500	26,590	8,700	3,480	6,960	8,700	$307,070
	WASTE ROCK DISPOSAL SITE	1.67	—	—	—	1,060	74,460	230	920	1,840	2,300	80,810
	Subtotal (Waste rock Abandonment Phase)		—	—	—	1,060	74,460	230	920	1,840	2,300	80,810
	SOUTH FORK BREAKOUT AREA	.96		26,660	10,310	2,740	16,880	300	360	750	1,600	59,600
	Subtotal (South Fork Abandonment Phase)		—	26,660	10,310	2,740	16,880	300	360	750	1,600	59,600
	Sub-Total Abandonment Phase		181,960	192,970	397,720	48,050	280,810	11,920	15,440	30,910	34,300	$1,194,080

REPLACES TEXT

Table 4.3-2 Page 4-15 !! Table 4.3-2 Page 4-15 Date 03/01/90!

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	BUILDING AND EQUIPMENT REMOVAL		789,540 (Building removal)									789,540
ABANDONMENT	Subtotal (Removal - Abandonment Phase)		789,540									789,540
	TOTAL ABANDONMENT PHASE		971,500	192,970	397,720	48,050	280,810	11,920	15,440	30,910	34,300	1,983,620
	Contingency (10%) (Including Engineering and Final Design)											198,360
	Sub Total											$2,181,980
	Inflation Factor (1.97% per year)											$214,930
	PROJECT TOTAL											$2,396,910

REPLACES TEXT

Table 4.3-2 Page 4-16 !! Table 4.3-2 Page 4-16 Date 3/1/90

4.4 BACKFILL, SOIL STABILIZATION, COMPACTION, CONTOURING AND GRADING

The objective of the proposed backfilling, soil stabilizing, compacting, contouring and grading process is to achieve a reclaimed surface which will provide a variety of topographic features effecting enhanced postmining land use.

Reclamation earthwork activities will be conducted as outlined in Sections 4.12--POSTMINING LANDUSE AND 4.2--RECLAMATION TIMETABLE. The steps to be taken in the backfill, soil stabilization, compaction, contouring and grading program are described in the following subsections.

4.4.1 Backfill and Compaction

Backfilling operations, utilizing equipment such as rubber-tired scrapers, front-end loaders, bulldozers, and dump trucks, will be conducted in the portal, sedimentation pond, and subsurface silo areas. Holes or depressions will be filled when the mining operation is concluded. Compaction operations, utilizing equipment such as sheeps-foot tampers, will be conducted to stabilize all filled holes and depressions. The portal fill material will be put in place using special equipment such as a LHD (load, haul, dump) unit to ensure proper backfilling.

When mining is completed, all buildings and steel structures will be removed from the mine site. Concrete foundations, walls, stack tube, reclaim tunnel, and silos will be broken up and will be used as backfill in the mine portals, or buried and covered with sufficient subsoil and a minimum of two feet of topsoil to provide an adequate growth material for the proposed perennial vegetation. Foundations that will be in deepfills will not need to be broken up.

Structural removal will include concealment or removal of structures containing obtrusive form, line, color or texture. Area cleanup will also include alteration, concealment or removal (as directed by the U. S. Forest Service) of mine debris. The embankment for the RRLO sedimentation pond will be pushed back during phase II to fill in the pond.

4.4.2 Grading and Final Contour

The area around the mine No. 1 portals is overlain by moderately thick (8 to 12) feet sandstone and shale units. Final cut slopes in this area will be contoured to a one horizontal to two vertical

slope (1h:2v) with 8-foot-wide benches provided at 30-foot height intervals. The area around Mine No. 3 portals is overlain by thin (1 to 2 feet thickness) sandstones, shales and siltstones. Final cut slopes in this area will be contoured to a one horizontal to one vertical slope (1h:1v) with 8-foot-wide benches provided at 30-foot height intervals. The described specifications have been determined to be stable and safe by analysis of the geotechnical core drilling. Stability and designated postmining landuse will be achieved without extensive backfilling and therefore the mine site will not be returned to the original contours. The sedimentation pond at the portal area will be backfilled, covered with topsoil and revegetated. All drainage diversion ditches will not be reclaimed as they will already be fully revegetated and in stable condition.

The reclamation plan is shown on in maps 4.4.2-1A, 4.4.2-1B and 4.4.2-1B1. Costs and mass balance data associated with reclamation may be found in the Engineering Calculations, Volume 5.

The cut slopes will be constructed in a manner which will achieve the necessary physical stability. The Permittee will develop cutslopes with 1h:2v slopes in competent rock only and will develop cutslopes with 1h:1v (maximum) slopes in less competent materials such as soil and colluvium. This design will prevent slides and reduce other related erosional damage from occurring. The operational bench slopes will be reduced to the approximate original contour (2h:1v) upon abandonment, utilizing a bulldozer working along the slopes. A geotechnical analysis will be made of this slope at the time of reclamation and design adjustment made as necessary to insure slope stability.

Grading operations will be possible at the railroad load-out site which will be returned to the approximate original contour and

shown on Maps 4.4.2-1C and 4.4.2-1D. Water tank final reclamation contours are shown on Maps 4.4.2-1E and 4.4.2-1F. The waste rock disposal site final reclamation contours are shown on Map 4.16.1-1B.

4.4.3 Soil Stabilization

In addition to the vegetative stabilization discussed in Section 4.7 - REVEGETATION PLAN, physical stabilization of the soil is also planned. The specific methods to be implemented will be defined on the basis of additional soil analyses at the time of reclamation. An example of the soil stabilization methodology that might be used includes the placement of crushed and heavier material at the toe of road fill slopes and along stream banks.

4.4.4 Stabilization of Rills and Gullies

All rills and gullies which erode to a depth of nine inches or more will be filled, regraded and reseeded unless there is less than two feet of cover; then when the rills reach six inches in depth, the areas will be regraded and reseeded. The areas may be regraded and reseeded for other situations if deemed necessary by the Permittee and the regulatory agencies.

4.4.5 Acid and Toxic-Forming Materials

Extensive testing of soil material near the coal seams failed to identify the presence of any materials capable of causing acidity or toxicity problems. (Refer to Hydrology Section of Volume A-1 for test results. These test, however, were conducted using different procedures than those currently requested by the Division. More recent tests on waste material removed from the mine have given mixed signals, particularly on acid forming potential. (Recent test data from representative samples are appended to this section.)

Material placed at the waste disposal site will be compositely sampled on a quarterly basis during periods of deposition at the site within a minimum of 1 sample per 2000 tons hauled, unless it has already been sampled at the temporary minesite gob pile. Composite samples will also be taken during recontouring prior to final reclamation at the waste rock disposal site and on the waste material to be left at the loadout facility site. Analyses of potential toxic or acid forming materials will follow the parameter list and will use the methods outlined on Table 6 of the Division's approved Soil and Overburden Handling Guidelines. Operational test data will be submitted to the Division annually. However, should acidity or toxicity problems be defined either during operation or reclamation, the Division will be notified immediately and mutually acceptable remedial action will be taken.

Waste material temporarily stored in the mine site gob pile will be tested for each accumulation of approximately 2,000 tons if it is going to remain at the temporary site longer than three months. The location in the stockpile from which the sample is taken will be identified. Sample will be a composite sample from throughout the pile. Materials found to be toxic will be removed to the permanent disposal site within 30 days or as soon thereafter as weather conditions permit. Drainage from the temporary storage site reports to the sedimentation pond where the discharge is tested in accordance with NPDES Discharge Permit conditions.

Material placed at the waste disposal site will be compositely sampled on a quarterly basis during periods of deposition at the site **(insert) within a minimum of 1 sample per 2000 tons hauled, unless it has already been sampled at the temporary minesite gob pile.** Composite samples will also be taken during recontouring prior to final reclamation at the waste rock disposal site and on the waste material to be left at the loadout facility site. Analyses of potential toxic or acid forming materials will follow the parameter list and will use the methods outlined on Table 6 of the Division's approved Soil and Overburden Handling Guidelines. Operational test data will be submitted to the Division annually. However, should acidity or toxicity problems be defined either during operation or reclamation, the Division will be notified immediately and mutually acceptable remedial action will be taken.

Waste material temporarily stored in the mine site gob pile will be tested for each accumulation of approximately 2,000 tons **(insert) if it is going to remain at the temporary site longer than three months.** The ~~location in the stockpile from which the sample is taken will be identified.~~ **(insert) sample will be a composite sample from throughout the pile.** Materials found to be toxic will be removed to the permanent disposal site within 30 days or as soon thereafter as weather conditions permit. Drainage from the temporary storage site reports to the sedimentation pond where the discharge is tested in accordance with NPDES Discharge Permit conditions.

REPLACES	TEXT
Section 4.4.5 Page 4-19A	Section 4.4.5 Page 4-19A Date 03/01/91

Branch Code 17

Lab. No 72293

Rec'd 07.20.87

Sampled 07.17.87

Sampled By YOURSELVES

STANDARD LABORATORIES, INC

SAMPLE ID:

ROCK SAMPLE

UTAH FUEL COMPANY
COASTAL STATES ENERGY
175 EAST 400 SOUTH
SALT LAKE CITY, UTAH 84111
(801) 529-7428

ACID - BASE ACCOUNTABILITY
CACO3 EQUIV. (TONS/1000 TONS OF MATERIAL)

COLOR	FIZZ	%SUL.	MAX. FROM %SUL.	AMOUNT PRESENT	MAX. NEEDED PH 7	EXCESS	PASTE pH
5Y 6-1	1	0.069	2.16	39.42		37.27	7.94

ELECTRICAL CONDUCTIVITY - 530 umhos/cm

PARTICAL SIZE ANALYSIS (BY HYDROMETER)

% SAND 45.6

% SILT 38.6

% CLAY 15.8

SODIUM ABSORPTION RATIO - 0.193 meq/L

SATURATED WATER PERCENTAGE - 39.80%

TOTAL SELENIUM - 1.08 ppm

TOTAL BORON - 5.68 ppm

Respectfully Submitted, Cliff Smart

CLIFF SMART 08.21.87

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Branch Code 43

Lab No 71932

Rec'd 05/05/87

Sampled 04/30/87

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STANDARD LABORATORIES, INC.

SAMPLE ID: WASTE ROCK SAMPLE

UTAH FUEL COMPANY
COASTAL STATES ENERGY
~~411 WEST 7200 SOUTH~~
~~MIDVALE, UTAH 84047~~

ACID - BASE ACCOUNTABILITY

CACO3 EQUIV. (TONS/1000 TONS OF MATERIAL)

COLOR	FIZZ	%SUL.	MAX. FROM %SUL.	AMOUNT PRESENT	MAX. NEEDED pH 7	EXCESS	PASTE pH
10YR 5/1	0	0.704	22.00	7.73	14.27	0	7.89

ELECTRICAL CONDUCTIVITY - 700 µmhos/cm

PARTICAL SIZE ANALYSIS (BY HYDROMETER)

% SAND 71.60
% SILT 20.20
% CLAY 8.20

SODIUM ABSORPTION RATIO - 1.16
SATURATED WATER PERCENTAGE - 39.16%
TOTAL SELENIUM - 0.45 ppm
TOTAL BORON - 46.8 µg/g

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Respectfully Submitted, Kayd Simpson

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TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81024

Date Rec'd. May 5, 1988

Date Sampled April 21, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Siltstone, 1 bag

Boron, Water Soluble .088ppm

Selenium, Water Soluble <.001ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

4-19D

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TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81016

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Peridefite, 1 bag

Boron, Water Soluble .114ppm

Selenium, Water Soluble .004ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

4-19E

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81026

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Sity Sandstone, 1 bag

Boron, Water Soluble .070ppm

Selenium, Water Soluble .004ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

4-19F

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81028

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.
Rock sample
Scofield Waste Rock Site
Highwall Sandstone

Boron, water soluble	.104 ppm
Selenium, water soluble	.001 ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

4-19G

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OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS,
TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465

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TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81025

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Sity Shale, 1 bag

Boron, Water Soluble .068ppm

Selenium, Water Soluble .007ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

4-19H

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F-465

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS,
TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

4.5 SOIL PREPARATION AND FERTILIZATION PLAN

Prior to redistribution, the topsoil stockpile will be loosened by ripping, disking or other reclaiming means to break up the topsoil.

Following redistribution, the topsoil will be fertilized. Fertilizer application and rate to be applied to the redistributed topsoil will be based on and established by analysis of stockpiled topsoil and/or by analyses conducted on topsoil that has been disturbed prior to revegetation. The topsoil will be analyzed for N, P, K, Fe, Mg, Mn, Zn, Ca, and pH to determine the fertilizer formulation and application. The fertilizer will be applied when there is suitable moisture in the soil; and initial application will be done at the time of seeding by the same method as the seeding, i.e., drilling, broadcasting or with the hydromulch but will not be mixed with the seed. If follow up applications are needed, they will be applied by broadcasting.

Chemical analyses for micro-nutrients on the permit areas was conducted by testing soil extracts with DTPA solution and measured by use of an atomic absorption analyzer. Ammonium acetate was used to extract potassium, calcium and magnesium for atomic absorption analysis. Phosphorous determination was made by using sodium bicarbonate extraction and colorimetric analysis. The Kjeldahl method was used for determination of total nitrogen. Soil texture was determined by using a Bouyoucus hydrometer method (sodium herametaphosphate dispersing agent). Soil pH was determined on a 1:1 soil/water mixture tested with an electrode pH meter. Salinity was analyzed by using a Wheatstone conductivity cell on an extract of each soil sample. These analyses correlated with the consultant's recommendation that 100 pounds per acre of available nitrogen be applied during initial seeding on all areas for seedling establishment and to assist in

the breakdown of straw that may be used for mulch. Actual mulching will be done as outlined in Section 4.7.2. Additional fertilization will be determined on a case-by-case basis. After seedlings are established, additional fertilizer will not be used to increase production.

4.6 TOPSOIL AND SUBSOIL HANDLING PLAN

To prevent suitable topsoil from being wasted or contaminated by spoil or other waste materials, the Permittee removed topsoil from the designated areas as a separate operation. The topsoil was stockpiled and protected from wind and water erosion and contamination which might lessen its capability to support vegetation. The following subsections deal specifically with the various phases of the topsoil and subsoil handling plan.

4.6.1 Topsoil Removal

At the start of the construction phase, topsoil was collected from the three major operational areas, i.e., the mine site, the load-out site, and the conveyor cut areas. Existing vegetation was removed and topsoil collected prior to excavation or other surface disturbance operations within the affected areas.

Soils are of a sandy loam mixture, with a minimum of small to large stones and with soluble salts of less than 10 ppm. Soils were harvested from 0 to 15 inches in the aspen, spruce and fir communities and 0 to 8 inches in the sagebrush communities.

The equipment used for topsoil removal consisted of rubber-tired scrapers (where suitable), bulldozers, front-end loaders, and dump trucks. The use of scrapers allowed the transport of removed topsoil directly to the topsoil stockpile. Bulldozers were also used to push the topsoil to a collection point for loading into dump trucks or other means of transportation to the designated stockpile.

Topsoil in the portal yard stockpile was originally removed from National Forest lands and will be returned to National Forest lands. Topsoil in the RRLO stockpile was originally removed from private lands and will be returned to private lands.

4.6.2 Topsoil Stockpile

Topsoil is stored within areas of the permit boundary which will not be routinely disturbed (See Maps 3.2.1-1 and 3.2.1-3). Two topsoil stockpiles are utilized: the first at the portal area, and the second at the loadout facility.

Long-Term Topsoil Storage Areas

During construction at the mine site, a stockpile area of approximately 0.6 surface acre was established in the draw on the north side of the site. The long-term stockpile is composed of topsoil collected at the mine site and portions of the conveyor bench. It will later be used for post-mining reclamation of the benches and conveyor routes.

A second long-term topsoil stockpile, covering approximately 0.3 surface acre, was established at the load-out site for later reclamation use in that area.

4.6.3 Topsoil Protection

Long-term topsoil stockpile protection is achieved by the performance of the following operational steps:

- A stable surface is provided in an area outside the influence of active operation.
- As a stockpile was completed, it was left in a rough condition to minimize erosion.
- A diversion ditch was dug around these piles to divert runoff from entering the stockpiled area.
- Storage piles were vegetated with quick-growing, soil-stabilizing plants. Revegetation involved the immediate seeding of stockpiled topsoil with the seed mixtures listed on Table 4.6-1.
- Signs are posted to protect the stockpiles from accidental use as fill or from other inadvertant material contamination.
- The establishment of noxious plant species is prevented.
- The slope of stockpiles does not exceed 2h:1v.

Table 4.6-1

TOPSOIL STOCKPILE SEED MIXTURE

Smooth Brome (Lincoln)	3-4 lbs/acre
Timothy or Meadow Foxtail	1-2 lbs/acre
Yellow Sweet Clover	1-2 lbs/acre
Alfalfa (Ladac or Nomad)	1-2 lbs/acre
Lewis Flax (native)	1-2 lbs/acre
Orchard Grass	1-2 lbs/acre

NOTE: This is a seed mixture recommended in a report on vegetation and plant community analysis in compliance with U.S. Forest Service requirements.

The stockpiled topsoil will not be removed or otherwise disturbed until required for redistribution operations on a prepared, regraded disturbed area.

4.6.4 Topsoil Redistribution

Topsoil redistribution on slopes steeper than 3h:1v will be done immediately prior to revegetation. Other surfaces will have topsoil redistributed prior to seeding and will be left in a roughened condition to help assure stabilization. This period is designed to permit even settling of topsoil prior to revegetation. Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor. The ground surface will be ripped to a suitable depth in order to reduce surface compaction, provide a roughened surface assuring topsoil adherence and to promote vegetional root penetration.

Within a suitable time period prior to seeding, topsoil will be distributed on all areas to be reclaimed. During this time period, the topsoil will be allowed to settle and attain equilibrium with its natural environment. This procedure will be followed for all areas in which facilities such as road beds, mine pads, and building sites are to be abandoned. The Permittee does not anticipate the use of any substitute or supplemental topsoil. Should such use become necessary, the Permittee will notify the regulatory authority of such proposed use and will provide information on the suitability of the supplemental or substitute topsoil.

Topsoil redistribution procedures will ensure an approximate uniform thickness consistent with the proposed reclamation plan. Topsoil for the proposed aspen areas and Elderberry transplants on south slopes will be spread in relatively deeper layers than for the remainder of the south slope areas.

To minimize compaction of the topsoil following redistribution, travel on reclamation areas will be limited. After topsoil has been applied, surface compaction will be reduced by ripping to a minimum depth of six (6) inches. This operation will also help prepare a proper seed bed and protect the redistributed topsoil from wind and water erosion.

The Permittee will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes by such measures as filling, regrading, contouring or otherwise stabilizing any rills or gullies deeper than nine (9) inches which form in areas which have been regraded and topsoiled, and other measures that may become apparent at the time of reclamation. The disturbed areas adjacent to any rills or gullies which have been filled, regraded or otherwise stabilized, will be reseeded or stabilized accordingly.

4.6.4.1 Rock Disposal Site

Coastal proposes to perform the revegetation of the waste disposal area in successive stages with a stage representing the portions of the site that have been filled to design capacity. When a stage is completely full, that area will be graded and topsoil will be placed over the waste rock. At least one foot of topsoil derived from aspen or sagebrush vegetative type areas will be placed on the fill area. The soil will be brought into the disposal site from other areas, e.g. unit train loadout or mine site stockpiles (both of which contain soil from non-National Forest areas), since previous mining activity has rendered none available at the site.

Topsoil will be applied to the final layer of moderately-compacted rock waste material. Typically, the rock waste which will be

disposed of in the pit consists of 36.00 percent less than 1/4 x 0 inch material and 28.6 percent between 1 x 1/2 and 1/2 x 1/2 inch (Exhibit 3). Therefore, the loss of topsoil into the pore space of the fill should not be a problem. The moderately-compacted final layer of fill should not, on the other hand, be an impermeable barrier which will redirect drainage.

The topsoil will be spread 12 inches thick in a manner to provide a roughened surface so that seed and mulch can remain during germination and initial growth of the seedlings. Topsoil depth was determined from soil pits in the reference area. Ripping the surface prior to planting seeds may be needed to provide the necessary roughened surface.

The potential for upward migration of salts is unknown. The Permittee commits to analyze for electrical conductivity sodium content and sodium absorption ratio prior to revegetation efforts.

Fertilizer rates may change after the soil's analyses of the topsoil are completed. The Permittee plans to apply 100 pounds per acre of available nitrogen. Mulching will be done as outlined in Section 4.7.2. The Permittee's consultant has stated that phosphorous and potassium concentration based upon Skyline's data should be adequate in the aspen soils, and, therefore, since the topsoil will be an aspen type, no potassium or phosphorous is recommended. The Permittee plans to test the topsoil before it is seeded to determine the type and amount of fertilizer or neutralizer required. The soil's analyses will determine the following components: (a) micro-nutrients, (b) potassium, (c) calcium, (d) magnesium, (e) phosphorus, (f) nitrogen, (g) soil pH and salinity, and (h) soil texture.

The drainage diversion ditch will not be reclaimed as it will be fully revegetated and in stable condition.

4.6.5 South Fork Breakout

Before any top soil was removed, all woody vegetation was removed from the project area. Soils are basically a sandy loam mixture and have been classified by the S.C.S. as Uinta Family loam/tozc Family fine Sandy loam. Core sampling in the area shows that the soils vary in depth from 24 - 36+" in depth.

After the vegetation had been removed, the A & B horizons of soil were removed using a track hoe. The track hoe stacked the soil where a front-end loader picked it up and transported it to the storage area on the abandoned temporary Forest Service road and on the small opening at the mouth of the canyon where the knob was removed. The front-end loader spread the soil in approximately two foot lifts. By handling the soil in this manner, it will not be compacted in the storage area and the roots of the revegetation plants will penetrate the entire depth of the soil. This will allow the soil to maintain itself as viable top soil to be used during final reclamation. It is estimated that approximately 2,990 cubic yards of topsoil was removed and stored.

As subsoils were encountered, they were used to bring the new access road up to grade. Subsoil not used as road was also stored on the small opening at the mouth of the canyon where the knob was removed. It is estimated that approximately 2,840 cubic yards of subsoil was removed. Approximately 1,820 cubic yards of the subsoil were used in the road fill and the remaining 1,020 cubic yards were stored for final reclamation.

As the coal in the coal seam was encountered, it was hauled out so as to eliminate the possibility of spontaneous combustion occurring.

Once the construction was complete, all of the disturbed areas were seeded and all the roads that are on National Forest Lands and the disturbed areas were water barred and seeded with the mixture shown on Table 4.6-1. A combination of silt fences and strawbales were used to treat surface run-off from the disturbed area of the new road, the breakout pad and the topsoil-subsoil storage areas until adequate vegetation is established. The silt fences and strawbales were located as needed between the disturbed and undisturbed areas to treat run-off from the disturbed area.

At the end of the life of mine, the road into the breakout site will be reopened. The portals will be sealed as outlined in Section 4.9. The highwall at the breakout area will be eliminated by front-end and back hoe type equipment. If additional fill material is needed to return the area to approximate original contour, the remainder of the small knob at the mouth of the canyon may be used. The subsoil from the storage area will be uniformly placed in the breakout area and then the topsoil will be uniformly spread over the area. The access road up the side canyon to the breakout area and the temporary road used for soil storage will then be returned to approximate original contour of surrounding terrain. The area where the knob was will also be contoured to blend in with the surrounding terrain.

The soil will be spread in a manner to provide a roughened surface so that seed, fertilizer and mulch can remain during germination and initial growth of the seedlings. ~~Raking~~ Ripping the surface prior to planting may also be needed to provide the necessary roughened surface.

see page 4-26

4.7 REVEGETATION PLAN

Planting and revegetation of all disturbed areas will take place following grading and/or topsoil redistribution procedures and will include, as necessary, the addition of remedial soil treatments. Fall seeding is preferred. A suitable, permanent, diverse vegetative cover will be established on all reclaimed areas. At the Scofield disposal site, reclamation activities will be conducted on areas that are filled to design capacity. The proposed reclamation schedule is presented in Section 4.2 -/ RECLAMATION TIMETABLE. The following subsections describe the major aspects of the proposed revegetation plan.

4.7.1 Species and Amount per Acre, Portal, Train Loadout and Conveyor Bench Areas

A suitable permanent, effective, and diverse vegetation cover of species native to the area, or suitable substitutes, will be established on all affected areas.

After the initial construction disturbance, the species selected for use and the numbers or amounts per acre depended on the steepness and exposure of the slopes to be revegetated. South-facing slopes 1h:3v (or lower) and flat areas were treated with seeding efforts at the rate as shown in Table 4.7-1. South facing slopes at angles of 2h:1v to 1h:2v were treated with hand-set plantings of sagebrush (Artemisia tridentata), rabbitbrush (Chrysothamnus nauseosus), and snowberry or red elderberry at not less than 1 meter (3.25 feet) intervals, with inter-spacings being seeded by the species shown in Table 4.7-1. The woody species stocking density for south facing slopes were established at approximately 1 meter intervals with minor adjustments for terrain.

Table 4.7-1

SEED MIXTURE

South-facing slopes of 1h:3v or lower and flat areas.

Grasses	lbs/acre
Kentucky blue grass (native	.5
Mountain brome (native)	2
Blue wildrye (native)	2
Bluebunch wheat grass (native)	2
Forbs	
Thickleaf peavine (native)	4
Sticky geranium (native)	1
Mountain lupine (native)	2
Shrubs and trees (handset at 1 m intervals)	
Aspen (native) - tublings	
Mountain snowberry (native) - tublings	
Big sagebrush (native) - tublings	
	13.5

Table 4.7-2

NORTH-FACING SLOPES

Grasses	lbs/acre
Mountain brome (native)	2
Kentucky bluegrass (native)	.5
Forbs	
Heart-leaf arnica (native)	.5
Sweetroot, spreading	.5
Sticky geranium (native)	1
Mountain lupine (native)	2
Thickleaf sweetpea (native)	4

Shrubs and Trees (Handset at 1 - 2.5 m intervals)

Mountain snowberry (native)(1 m intervals) - tublings

Englemann spruce (native)(2.5 m intervals) - tublings

Subalpine fir (native)(2.5 m intervals) - tublings

North facing slopes, which are shaded, were planted with hand-set seedlings of Englemann spruce and/or subalpine fir at intervals of 2.5 meters in all directions. Table 4.7-2 lists the seed mixtures spread on the inter-spacing on the north-facing slopes.

Riparian zones were revegetated with handset seedlings of yellow willow, blue spruce, Woods rose and American red raspberry at intervals at 1/2-1 meter. Table 4.7-3 lists the seed mixture spread on the inter-spaces. Steep slopes which have been rip-rapped were not revegetated.

4.7.2 Final Reclamation Seeding Tillage and Mulching, Portal and Train Loadout Areas and Other Small Areas

Seed mixture for final reclamation are shown on Tables 4.7-4, 4.7-5, 4.7-6 and 4.7-6A.

Seeding of the south-facing slopes (1h:3v) or lower flat areas will be conducted using a cyclone spreader. For slopes less than 2h:1v, seeding will be accomplished using a hydro-seeder. Plantings of shrubs and trees will be hand-set to ensure a plant cover of a permanent nature. Slopes of 2h:1v or steeper will be revegetated by hand-set planting techniques.

Tillage practices on level ground and on slopes flatter than 10h:1v will include leveling, tilling and mulching. Slopes of 10h:1v up to 3h:1v will be mulched using 1,000 to 2,000 pounds per acre of straw or other inert mulch material which will be anchored by crimping or chemical tacifer. Slopes steeper than 3h:1v will be treated with hydro mulch. All hydro mulch will be applied at the rate of 2,000 pounds per acre plus 140 pounds of tacifer per acre. All mulching and tacifer types and rates will be determined by using the best available technology available at the time of reclamation. However, 2,000 pounds per acre of wood fiber has been used for bonding calculations. ½-1 Ton/ac

Planting on slopes less than 10h:1v will be accomplished by drilling seed with a mechanical drill. Slopes between 10h:1v and 1.5h:1v will be seeded by hand broadcast and manually buried by raking. Mulch will be applied over the hand broadcast seed. The Permittee electes to revegetate areas with slopes greater than 1.5h:1v without topsoil; such areas will be treated to handset plantings in basins filled with topsoil and with hydromulch seeding in between. Where the substrate consists of outcroppings of stone, no attempt will be made to revegetate.

ADDITION TO	TEXT
Section 4.7.2 Page 4-30	Section 4.7.2 Page 4-30A Date 2/20/89

Table 4.7-3

RIPARIAN HABITAT SEED MIXTURE

Grasses	lbs/acre
Slender wheatgrass (native) (on terrace areas)	3
Mountain brome (native) (on terrace areas)	3
Tufted hairgrass (native) (along bank areas)	2
Kentucky bluegrass (native) (on terrace areas and bank margins)	2
	10

Shrubs and Trees (handset at 1/2-1 m intervals)

Yellow (Watson) willow (native) - rooted cuttings, 1/2 m interval (on banks and rip-rap areas).

Blue spruce (native) - (1 m intervals) tublings (on terrace areas)

Woods rose (native) - (1/2 m intervals) - tubling (on bank areas)

American red raspberry (native) - (1/2 m intervals) - tubling (on rip rap areas)

Table 4.7-4

SEED MIXTURE

South to West Facing Slopes

Grasses	lbs/acre*
Agropyron riparium Streambank wheatgrass	4.0
Agropyron dasystachyum Thickspike wheatgrass	4.0
Bromus marginatus Mountain brome	5.0
Phleum pratensis Timothy	0.5
Poa pratensis Kentucky bluegrass	0.1

Forbs	lbs/acre*
Achellia millifolium Yarrow	0.1
Artemisia ludoviciana 'Summit' louisiana sagewort	0.1
Linum lewisii Lewis flax	1.0
Melilotus officinalis Yellow sweetclover	2.0
Penstemon strictus 'Bandera' rocky mountain penstemon	0.5

Shrubs and Trees	lbs/acre*
Amelanchier alnifolia Sacatoon serviceberry	1.0
Artemisia tridentata vaseyana Mountain big sagebrush	0.2
Rhus trilobata Squawbush	3.0
Rosa woodsii Wood's rose	1.0
Symphoricarpos oreophylus Mountain snowberry	2.0

Transplants	#/acre
Chrysothamnus nauseosus albicaulis Whitestem rubber rabbitbrush	250
Populus tremuloides Quaking aspen	400
Sambucus cerulea Blue elderberry	400

* Pure live seed for broadcast seeding methods

REPLACES		TEXT		
Table 4.7-4	Page 4-32	Table 4.7-4	Page 4-32	Date 07/07/89

Table 4.7-5

SEED MIXTURE

North to East-facing slopes

Grasses	lbs/acre*
Agropyron trachycaulum	
Slender wheatgrass	3.0
Bromus marginatus	
Mountain brome	6.0
Festuca ovina	
Hard sheep fescue	1.0
Poa pratensis	
Kentucky bluegrass	0.2

Forbs	lbs/acre*
Achellia millifolium	
Yarrow	0.1
Aster chilensis	
Pacific aster	0.1
Lupinus sericeus	
Silky lupine	2.0
Melilotus officinalis	
Yellow sweetclover	1.5
Osmorhiza occidentalis	
Sweet anise	2.0
Penstemon strictus	
'Bandera' rocky mountain penstemon	0.5

Shrubs and Trees	lbs/acre*
Sambucus racemosa	
Red elderberry	1.0
Symphoricarpos oreophylus	
Mountain snowberry	2.0

Transplants	#/acre
Abies concolor	
White fir	200
Picea englemanii	
Englemann spruce	400
Potentilla fruiticosa	
Woody cinquefoil	100
Rubus idaeus	
American raspberry	100

* Pure live seed for broadcast seeding methods

REPLACES		TEXT		
Table 4.7-5	Page 4-33	Table 4.7-5	Page 4-33	Date 07/07/89

Table 4.7-6

Shrub Supplement for Riparian Zone
To Be Used in Addition To The South and North Slope Mixtures

	#/acre
Cornus stolonifera	
Red-oiser dogwood	200
Mahonia repens	
Creeping oregon grape	400
Salux sp.	
Willow cuttings	2,000
TOTAL	2,800

REPLACES		TEXT		
Table 4.7-6	Page 4-34	Table 4.7-6	Page 4-34	Date 07/07/89

Table 4.7-6A

SEED MIXTURE

Waste Rock Disposal Area

Grasses	lbs/acre*
Agropyron smithii	
Western wheatgrass	4.0
Agropyron dasystachyum	
Thickspike wheatgrass	4.0
Bromus marginatus	
Mountain brome	6.0
Poa pratensis	
Kentucky bluegrass	0.1

Forbs	lbs/acre*
Artemisia ludoviciana	
'Summit' louisiana sagewort	0.1
Linum lewisii	
Lewis flax	1.0
Medicago sativa	
'ladak' alfalfa	1.0
Melilotus officinalis	
Yellow sweetclover	1.0
Penstemon strictus	
'Bandera' rocky mountain penstemon	0.5

Shrubs and Trees	lbs/acre*
Artemisia tridentata vaseyana	
Mountain big sagebrush	0.25
Rosa woodsii	
Wood's rose	1.0

Transplants	#/acre
Chrysothamnus nauseosus albicaulis	
Whitestem rubber rabbitbrush	200

* Pure live seed for broadcast seeding methods

Revegetation on slopes steeper than 3h:1v will be undertaken as soon as possible following topsoil placement, mainly during spring and early fall, with fall seeding preferred. Where too steep for topsoil placement, planting will be followed immediately after the area becomes available during construction activities. Revegetation on slopes less steep than 3h:1v will follow topsoil placement.

The Permittee will create a natural appearance during post mining reclamation by extending tree and shrub planting past the toes of slopes. However, linkages will be left short or extended slightly as necessary to provide an irregular appearance. Grasses and forbs will be reestablished from seed. Trees will be planted as seedlings. The Permittee will additionally place rocks, originally designated as wind barriers, at the bottom of large rock cuts in an informal way so as to provide a more natural appearance. All south-facing slopes will be seeded with the south-slope mixture, and all north-facing slopes will be seeded with the north-slope mixture.

All riparian areas will be revegetated with handset seedlings as shown on Table 4.7-6. Tables 4.7-4 and 4.7-5 list the seed mixtures to be used on the inter-spaces. Rip-rapped banks will be included in the revegetation process where physically possible.

Noxious plants invading the disturbed areas will be controlled by hand grubbing. Surveillance will be maintained annually during the period of liability. Acreage by type for each disturbed area is shown in Table 4.7-7.

4.7.3 Revegetation, Stabilization and Reclamation of the Conveyor Bench

Revegetation, stabilization and reclamation of the conveyor belt slopes have been evaluated during the middle of each growing

season, when cover and composition studies are most feasible. Erosion pins were placed on slopes at the time of reseeding operations; a table of random numbers was used to determine location. Statistically acceptable techniques have been used in determining percent cover and composition of disturbed area. Revegetation analyses have been conducted annually and reported to the regulatory authority. The steep slopes (60%+) have continued to slough, which has precluded total revegetation on these slopes. The Permittee has developed a special revegetation plan for the conveyor bench slopes that have not been successfully revegetated. This revegetation plan is included in Volume A-2 and is directed at final reclamation. Although the mine does still plan to use the conveyor in the future, the final reclamation is to leave the conveyor bench intact. The current condition of the conveyor bench is an area that is well drained with drainage being treated with silt fences and/or strawbales. The bench itself is becoming well vegetated and is functioning as a safety bench to prevent rolling material from rolling onto SR 264. The revegetation plan is planned to establish the necessary vegetation for final reclamation. During final reclamation, the conveyor will be removed along with the supporting structures. The only areas requiring treatment will be the disturbed areas where the supporting structures were located. These small areas will be revegetated as outlined in Section 4.7.1 and 4.7.2.

Table 4.7-7

The acreage and seed mixture of each disturbance area is as follows:

	Seed Mixture	Acreage	%
Loadout	South Fork (including transplant area)	10.52	76
	North Slope	3.3	24
		13.82	100
Portal Yard	South Slope (including transplant area)	10.92	30
	North Slope	16.37	45
	South Slope (already disturbed)	9.11	25
		36.40	100
Water Tank and Well Pads	South Slope	.26	100
Conveyor Route	South Slope	6.0	100
Waste Rock Disposal	Waste Rock Seed Mix	1.67	100
South Fork Breakout	South Slope	.3	31
	North Slope	.66	69
		.96	100

		59.11	

REPLACES	TEXT
Table 4.7-7 Page 4-37	Table 4.7-7 Page 4-37 Date 03/01/90

4.7.4 Irrigation, Portal & Train Loadout Areas

Since the species used for reclamation were known for their survival characteristics, it was felt that application of additional water will not be needed. If irrigation is needed, an irrigation plan will be developed at that time and submitted to the Division of Oil, Gas and Mining for approval. The special revegetation plan (see Section 4.7.3) for the conveyor route does include some drip irrigation for establishment.

4.7.5 Monitoring Procedures, Portal, Train Loadout, Waste Rock Disposal Site, South Fork Breakout Areas and Other Small Areas

The Permittee will collect and submit data using a monitoring method designed to give empirical values sufficient to detect a 10 percent change in vegetative cover at a 90 percent statistical confidence interval. These data will be from those communities disturbed and for established reference areas which will be used for comparison (aspen & sagebrush, reference area for south slopes; spruce-fir, reference area for north slopes; riparian, reference areas for the riparian zone and the Reference Area for the waste rock disposal site). Vegetative parameters to be measured are: cover, density, productivity and species composition. Sampling of the approved reference area and revegetated area will occur for the last two years of the liability period and will meet sample adequacy tests for 90 percent confidence level with a 10 percent change in the mean.

A minimum of the following data will be provided: 1) canopy cover by species and total canopy cover excluding trees, 2) productivity by life form, and 3) density of woody species by life form (trees and shrubs). The Permittee will provide results of statistical analyses showing similarity between disturbance areas and reference areas.

The Permittee has inspected all seeded areas at the end of each growing season to determine the success of the seeding program for a period of at least five years (reclamation years 1-5).

Where success is apparent, as represented by achievement of 90 percent original cover during the five-year period, the interval of future monitoring efforts will be set at once every five years. Any area not achieving 90 percent original cover in the first five years will be immediately investigated to determine the possible failure cause(s) so steps can be taken to establish the desired permanent vegetation. A written report will prescribe the corrective actions to be taken prior to the next growing season.

The Permittee has monitored the vegetative reference area annually for five years to determine if the reference areas have been subjected to heavy animal use or have been significantly altered by subsidence or other man-induced degradation. If the reference areas are subsided or subject to subsidence the Permittee will quantitively monitor the reference areas. If damage is such that the reference area is no longer viable, an additional reference area proposal will be submitted to the regulatory authority for approval. The reference areas will be surveyed by the S.C.S. at five year intervals to determine their condition class.

The Permittee understands that the extended period of liability is ten years, unless site-specific data can be submitted which justifies a five-year period, beginning after the last period of augmented seeding, fertilizing or other mechanical practice and that the revegetated areas will be monitored the last years of liability and comparisons made with reference areas. On-site climatological data will be evaluated at the beginning of final reclamation to determine the liability period. The length of the liability period will be established based on the conditions outlined in UMC 817.116(b)(1).

4.7.6 Soil Testing, Portal & Train Loadout Areas

The Permittee tested the topsoil before it was seeded, after initial construction, to determine the type and amount of fertilizer or neutralizer required for seeding at that time. Soil analyses measured the following components:

- Micro-nutrients
- Potassium, Calcium, Magnesium
- Phosphorus
- Nitrogen
- Soil pH and Salinity
- Soil Texture

Chemical analyses for micro-nutrients was conducted by testing soil extracts with DTPA solution and measured by use of an atomic absorption analyzer. Ammonium acetate was used to extract potassium, calcium and magnesium for atomic absorption analysis. Phosphorus determination was made by using sodium bicarbonate extraction and colorimetric analysis. The Kjeldahl method was used for determination of total nitrogen. Soil texture was determined by using a Bouyoucus hydrometer method (sodium herametaphosphate dispersing agent). Soil pH was determined on a 1:1 soil/water mixture tested with an electrode pH meter. Salinity was analyzed by using a Wheatstone conductivity cell on an extract of each soil sample. These analyses correlated with the consultant's recommendation that 100 pounds per acre of available nitrogen be applied during this initial seeding.

4.7.7 Scofield Waste Rock Disposal Site

The disturbed area affected by the disposal operation will, at the request of the property owner's representative, be leveled off and reclaimed to native rangeland for subsequent use as a corral. The drainage diversion ditch will be left as constructed as it will be fully revegetated and in a stable condition.

The revegetation of the waste disposal area will be in successive stages with a stage representing the portions of the site that have been filled to design capacity. When a stage is completely full, that area will be graded and topsoil will be placed over the waste rock. At least one foot of topsoil derived from aspen

or sagebrush vegetative type areas will be placed on the fill area. The soil will be brought into the disposal site from the unit train loadout stockpile, since previous mining activity has rendered none available at the site.

Topsoil will be applied to the final layer of moderately-compacted rock waste material and the topsoil scarified to a 6" depth. The moderately-compacted final layer of fill should not be an impermeable barrier which will redirect drainage.

The soil will be spread in a manner to provide a roughened surface so that seed and mulch can remain during germination and initial growth of the seedlings. Ripping the surface prior to planting seeds will provide the necessary roughened surface.

Revegetation will be accomplished by the orderly placement, scarification of the topsoil, and seeding during the late fall.

The potential for upward migration of salts is unknown. The Permittee will analyze for electrical conductivity, sodium content, and sodium absorption ratio prior to revegetation efforts.

Fertilizer rates and applications are discussed in the soil preparation and fertilizer plan (Section 4.5).

The species to be planted and the rates per acre are shown on Table 4.7-6A.

The seeds will be sown by hand (broadcast) and a mulch will be placed atop the seeded surface as outlined in Section 4.7.2. No fiber matting will be used since all slopes are expected to be either flat or less than 1.5h:1v. Revegetation success will be evaluated. All ditches and retaining walls will be maintained

until the vegetation success standards of UMC 817.116 - 817.117 are met. No reclamation is planned for the access roadway at the request of the property owner's representative.

4.7.8 South Fork Breakout

After the area has had the soils redistributed, as outlined in Section 4.6.5, the site will be revegetated. The aspen site will use the seed mixture shown on Table 4.7-4 while the spruce-fir site will use the mixture shown on Table 4.7-5. The area will be seeded by hydro-seeding. After the area has been seeded, it will be hydro-mulched at the rate of 2,000 pounds per acre plus 140 pounds of Tacifer.

Fertilizer rates and applications are discussed in the soil preparation and fertilizer plan (Section 4.5).

4.8 HAZARDOUS & FLAMMABLE MATERIALS DISPOSAL & CONTINGENCY PLAN

4.8.1 Non-Coal Waste Materials Disposal

A facility for temporary storage of waste materials is located at the mine site. The storage facility, as shown in Map 3.2.1-1, has been constructed of reinforced concrete and has a gate to prevent loss of solid waste material. This main storage facility is used for storage of non-coal waste materials from the underground operations that are free of toxic wastes, oil, grease and other liquids. These materials consist basically of paper, wood, metal and plastic products. Since the drainage from the storage facility contains no toxic wastes, oil or grease products, it enters the normal surface drainage system and enters the sedimentation pond. The storage structure is equipped with fire extinguishers and associated support brackets. A fire hydrant is located near the structure.

Portable dumpster trash bins are located at the mine site and train loadout areas. Waste products from the surface operations and any oil, grease or liquid material containers from the underground operations are deposited directly into these trash bins.

In the course of operations, each time the temporary facility is full, the solid waste material will be loaded into one of the portable dumpsters and transported to a state approved sanitary landfill area. The current disposal site is the Price sanitary landfill. The waste removal truck will be sufficiently covered and sealed so as to prevent loss of solid waste material during transportation.

Although no toxic waste materials are anticipated, if identified, they will be stored and/or disposed of in accordance with all applicable state and federal regulations.

4.8.2 Diesel Fuel and Gasoline and Oil Storage

Diesel fuel and gasoline is stored in four buried tanks with a total capacity of 40,000 and 10,000 gallons respectively (Map 3.2.1-1). The above ground storage consists of: motor oil (2,000 gallons total), hydraulic oil (4,000 gallons total), gear oil (200 gallons total), waste oil (2,000 gallons total) and stoker oil (18,000 gallons total), Each of the above ground storage tanks is located behind impervious 8 inch walls which form a containment area which will hold the entire contents of the single largest tank plus sufficient freeboard to allow for average annual precipitation less evaporation or approximately less than 5 inches of moisture. The tanks are located and positioned so as not to affect any slope or shaft opening. The storage tanks are protected from corrosion by cathodic coat protection or other effective methods considered most compatible with existing soil conditions. The tanks will be hydrostatic or non-destructive shell thickness tested periodically to ensure that leakage into the surroundings does not occur.

The Permittee has prepared and has available at the mine site a Spill Prevention Control Plan as required to be implemented in the event of a spill or leakage of the stored fuels, oils or oil products.

4.8.3 Explosive Magazines

In compliance with Federal and State of Utah regulations, the explosive magazine is not located near power lines, fuel tanks, storage areas or other possible sources of fire (see Map 3.2.1-1). Construction material for the magazine is of a noncombustible type covered with a fire resistant material. The construction of each structure's interior entails utilization of non-sparking materials for walls and floors. Each structure is

equipped with screened ventilation openings near the floor and ceiling. The structure is bullet resistant and "Danger" signs are located such that bullets passing through the signs will not strike the magazine structure. Each magazine is equipped with a security lock designed to prevent intrusion.

The explosive magazine is primarily used to store explosives for underground construction and mining activities. The types of underground construction and mining activities could be: 1) overcast and undercast construction, 2) construction of mine sumps, 3) crossing of faults in the coal seam, and 4) mining through dike. The explosive magazine is also used to store a small amount of explosives for surface activities. These types of activities could be: 1) removing building foundation, 2) removing rocks from side hills for safety reasons, 3) excavating foundation for buildings that are in rock, and 4) cleaning plugged chutes.

4.8.4 Hazardous Materials

The Permittee has reviewed the U.S. E.P.A.'s list of hazardous materials issued under section 311 of the Clean Water Act (40 C.F.R. 116 and 117). The Permittee plans no storage of any of these hazardous materials.

4.8.5 Slides and Other Damage

Any slide which may have a potential adverse effect on public property, health, safety or the environment will be reported to the Division. Remedial measures will be decided, as appropriate, by the Permittee and the land owner and will be coordinated with the Division.

4.9 OPENING AND SEALING PLANS

Exploratory Holes, Bore Holes, and Wells

In accordance with the approved plan for exploratory drilling during 1979, all drill holes upon abandonment of drilling operations were cemented with an approved slurry. The slurry mixture was made using 5.2 - 5.5 gallons of water per bag of cement. An appropriate slurry device was lowered to the bottom of the hole and sufficient slurry pumped through the device to fill 200 feet of hole. The device was then raised 200 feet and the process repeated. The holes were thus completely plugged from the bottom to the collar using this method. As stipulated in the 1979 approved exploratory drilling plan, drill hole locations were appropriately marked. There are presently no plans to transfer any exploratory or monitoring wells to use as water wells by the Permittee.

Temporary or permanent abandonment of water and monitoring wells will be in accordance with the State of Utah Administrative Rules for Water Well Drillers, Division of Water Rights.

Shafts

In compliance with 30 CFR 75.1711-1, shafts will be capped. A cap consisting of a six inch thick reinforced concrete slab will be used as the seal. The cap will be equipped with a two inch diameter vent pipe and will extend for a distance of 15 feet below the surface of the shaft collar.

Mine Entries

In compliance with 30 CFR 75.1711-2, seals will be installed in all entries as soon as mining is completed and the mine is to be abandoned. (See Figure 4.9-A for typical portal seal.) The seals will be located at least 25 feet inside the portal entry.

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JUL 19 1989
DIVISION OF
OIL, GAS & MINING

COASTAL STATES ENERGY COMPANY
SKYLINE PROJECT

TYPICAL PORTAL SEAL

APPROVED Wm Sherrin 7-11-89		MAP OR FIGURE NO. 4.9-A
DWG. No.	REVISION R-	

Since all entries are down dip, no hydraulic seals will be needed. Prior to installation, all loose material within three feet of the seal area will be removed from the roof, rib and floor. The mine entry seals will be made of solid concrete blocks (average minimum compressive strength of 1,800 psi; tested in accordance with A.S.T.M. C-140-70) and mortar (1 part cement, 3 parts sand and no more than 7 gallons of water per sack of cement).

Seals will be installed in the following manner: The seal will be recessed at least 16 inches deep into the rib and 12 inches deep into the floor. No recess will be made into the roof. The blocks will be at least six inches high except in the top course, and eight inches wide. The blocks will be laid and mortared in a transverse pattern. In the bottom course, each block will be laid with its long axis parallel to the rib. The long axis in succeeding courses will be perpendicular to the long axis block in the preceding course. An interlaced pilaster will be constructed in the center. The seals will have a total thickness of 16 inches. The entry will then be backfilled and sloped to match the cut slope at the portal entry.

During periods of temporary abandonment, the operator will effectively barricade and post each inactive mine opening and will conduct inspection and maintenance in accordance with the requirements of 30 CFR 75.1711-3.

Should the mine workings eventually fill with water where discharge from one of the portal openings becomes a possibility, discharge control structures shall be designed and constructed in accordance with 30 CFR 75.1711. Design of these control structures will be deferred until final reclamation when need and potential discharge conditions can be better evaluated.

4.10 SAFETY AND COMPLIANCE PROGRAM

Compliance with the requirements of the Clean Air Act (42 U.S.C., Sec. 7401 et seq.) and the Clean Water Act (33 U.S.C., Sec. 1251, et seq.) is accomplished by fulfilling the conditions of a Prevention of Significant Deterioration (PSD) permit and a National Pollution Discharge Elimination System (NPDES) permit.

PSD permit application, specific to the proposed Skyline Mines project, was filed with the EPA Region VIII office on March 8, 1979 and approved on August 12, 1980. The air quality control devices and procedures proposed in the PSD permit application have been incorporated into the design of the Skyline project. The control system, as incorporated, is presented in Section 4.22 - AIR POLLUTION CONTROL PLAN.

The Permittee's NPDES permit application was approved by EPA Region VIII office on October 7, 1982 and has been renewed as required (see documents in Volume A-1, Hydrology) Control measures, in the NPDES permit application, have been incorporated into this Mining and Reclamation plan as those measures governing compliance in areas where they are duplicated or addressed by other rules or regulations.

Concurrently with the filing of the PSD and NPDES permit applications with the EPA, identical copies of the applications were filed with the appropriate state agencies. A notice of Intent to Construct was also filed with the Utah State Air Conservation Committee and a copy of the NPDES permit application was filed with the Utah State Water Pollution Committee. They were approved on January 7, 1980 and July 8, 1980 respectively.

The Permittee has incorporated procedures in its mining operation to ensure timely reporting of any spill or accident which endangers environmental values within the area affected by the Skyline mining operation and is required by law to be reported to state and/or federal agencies. Mine employees are instructed to report any such spill or accident to the Mine Superintendent or a designated representative in his absence. The Mine Superintendent or his representative will report any spill or accident to the appropriate regulatory authorities.

The Permittee intends to comply with the health and safety standards required by state and federal regulations and has incorporated the necessary protective measures into the design plan of the overall project to ensure such compliance.

4.11 PROTECTION OF HYDROLOGICAL BALANCE--PERMIT AND ADJACENT AREAS

The Permittee conducts all mine site operations in such a way as to minimize potential impact to surface and subsurface water quality. Water originating in or flowing through disturbed areas is collected by a drainage control system and suspended material allowed to settle in sediment control ponds before being discharged into the natural drainage system. Changes to the natural drainage channels were kept to a minimum. Since postmining landuse will be similar to the premining use, the hydrological aspects of the reclamation effort have been planned accordingly.

The long history of mining in the area shows that past adverse effects to water supplies by coal mining activities do not destroy the use of the water for stockwatering or irrigation. Mining in the area sometimes tends to improve the quality of the water by intercepting some ground water and reducing its contact time with underground formations. Water pumped from the mine augments low stream flows during the summer months, thus enhancing stream conditions.

4.11.1 Water Rights and Replacements

The Permittee presently owns 248 acre-feet of water rights in the Scofield Reservoir. Of these water rights, water sufficient for the Permittee's needs were exchanged for rights from wells located near the mine site and at the mouth of Eccles Canyon. (See, also, discussion of water rights, Section 2.3.5.)

The Permittee will replace the water supply of any land owner, if such a water supply is contaminated, diminished or interrupted as a result of the Skyline mining operations. If reclamation of the permit area proved unsuccessful and consequently damaged existing

water rights or if mining adversely affected flow from springs and/or seeps and damaged water rights, the Permittee would provide alternative water supplies either from drilling new wells in Pleasant Valley Canyon or by pumping water up the canyon from Scofield Reservoir.

Culinary water usage at the mine site qualifies as a public water supply and will be treated to meet State of Utah primary and secondary water standards.

4.11.2 Monitoring Program

In order to concentrate on areas of immediate impact, surface water stations located in Eccles Canyon are sampled more frequently than those on Huntington Creek during the initial phases of mining. (See Sections 2.3 and 2.4.)

As mining progresses toward the Huntington Creek area, sampling in this drainage will be increased to more closely monitor mining impacts. The monitoring schedules in Section 2.3 reflect this intensified monitoring activity.

Surface water monitoring will continue according to the monitoring schedule, presented in Section 2.3.7 and 2.4.4, throughout the mining and reclamation operations. Postmining data collection will continue at each of the stations until the reclamation effort is determined successful by the regulatory authority. The August samplings will continue to be analyzed according to Table 2.3.7-1 during the postmining period. The remaining samples are per Table 2.3.7-2.

Water quality data collected from surface and ground water monitoring stations will be submitted quarterly to the regulatory authority. These reports will normally be submitted within 90

days of the end of each quarter depending upon the date of the laboratory analysis. An annual summary will also be prepared and submitted within 90 days after the end of each calendar year.

In addition to the above outlined monitoring program, NPDES discharge permit monitoring is conducted in accordance with the stipulated permit conditions.

4.11.3 Water Quality Control

The ground water that is intercepted and brought to the surface as a result of mining operations normally has a lower dissolved solids content than would exist if the water was to continue its downward movement through the existing shale layers, picking up increased amounts of salt with distance through the rock formations. Generally, mine water is expected to occur when pockets of perched water are interrupted and drained. The Permittee believes that the limited amount of total dissolved solids (TDS) expected justifies the exclusion of complex and expensive water treatment facilities for reduction of TDS. Although suspended sediment and oil and grease may increase at the mine mouth area, these constituents will be removed by retention and sediment pond skimmers prior to any potential discharge to adjacent streams. As a result, operation of the Skyline Mines is expected to have an overall beneficial impact on water quality in the region.

4.11.4 Water Quantity - Impacts

The Blackhawk Formation, extending over the entire Skyline property, consists of interbedded layers of sandstone and shale separated by various mineable and nonmineable coal seams. The sandstone beds are generally massive while the shale layers are generally bentonitic, tending to swell when wet and decompose into an impervious clay. Investigations at springs on the project area have indicated that the shale beds prevent significant downward percolation of water through the Blackhawk Formation, with much of the water entering the upper layers and surfacing a short distance away as a spring. In addition, due to the ability of the shale material to swell and decompose into an impervious clay, fractures in the Blackhawk Formation do not act as conduits but instead as barriers to potential infiltrating water.

As a result of these observations, it has been concluded that the mining activity in the Skyline Mines will have minimum adverse

impacts on the quantity of water in the area. When subsidence occurs, the subsidence cracks should seal rapidly, preventing deep percolation of water and subsequent loss of springs and other water sources. The location of a particular spring may change by a few feet, but no significant loss of water is anticipated as a result of mining. The Skyline No. 3 Mine is currently (April 1986) pumping a monthly average of approximately 267,000 gallons per day of mine water discharge. There is a reasonably good correlation between the amount of mine water discharged and the amount of coal mined. This correlation is shown in Figure 4.11.4-A and demonstrates a trend which is expected to continue.

Although the Blackhawk Formation may be saturated above the mine workings, a relatively minor quantity of water is being encountered at each active face due to the impermeable nature of the formation and its inability to readily yield water. Water production at each active face is 10-15 gallons per minute with mine entries generally dry approximately 200 feet updip from the face. Flows of 1-2 gallons per minute occasionally continue from roof bolt holes.

Because of the westerly dip of the strata in the area, some subsurface water naturally moves from the Price River Basin towards Huntington Creek. However, because most water encountered in the mine would not be naturally discharged to the surface in the immediate area, no significant depletion will occur in the amount of water reaching either Huntington Creek or Eccles Creek.

Water quantity will remain generally unaffected due to the geological conditions in the mine area. Therefore, the Skyline Mines will have little or no adverse impact on the hydrological system.

4.11.5 Mine Facilities Drainage Area

The drainage plan for the mine surface facilities was designed by

Kaiser Engineers for the Permittee. Streams crossing the mine site are collected outside of the disturbed area and diverted into corrugated metal pipe (CMP) culvert of adequate size for the 100 year, 24-hour precipitation event. The CMP culverts are located to transfer the upstream flow under the minesite to Eccles Creek below the minesite. Diversion channels were constructed above the disturbed area to collect the runoff from the undisturbed areas and direct it to Eccles Creek.

4.11.6 Load-out Site Drainage

The drainage plan for the load-out site was designed by Kaiser Engineers for the Permittee. The creek in Eccles Canyon was diverted from its natural state to gain space. Diversion channels were constructed south of the disturbed area to collect runoff from the undisturbed areas and direct it to Eccles Creek. The disturbed area surface runoff is collected and diverted to the sedimentation pond located adjacent to the storage silos.

4.11.7 Portal Locations

The mine portals have been designed to ensure that water will not be gravity discharged from the mine. The portals will have a minimum negative (in mine) slope of four percent to prevent any gravity discharge.

4.11.8 Underground Water Treatment

The mine water encountered at the working face is collected in the face area and pumped to collection points located within each mine. The impoundments allow some time for suspended solids to settle. The water is pumped from the mine into the portal area sediment pond which is the principle treatment facility. Mechanical devices have been installed at collection points to screen grease and oil which might be present in the water before it is pumped out of the mine. All of the mine workings are located down dip from the entries which precludes gravity discharge. Upon abandonment of mining activities, the entries will be sealed as indicated in Section 4.9.

4.12 POSTMINING LANDUSE

This section presents a detailed delineation of the abandonment and reclamation steps to be taken which will allow a return to the original wildlife/grazing (rangeland) habitat landuse following the completion of mining operations.

In general, the mine site area will be returned to its original wildlife/ grazing (rangeland) habitat, the conveyor route and load-out site will be returned to the original premining use as grazing land. The new State Highway SR-264, which has been constructed through the permit area, will be left in place.

4.12.1 Method of Achieving and Supporting Postmining Landuses

Table 4.12-1 summarizes the premining, proposed postmining and alternate landuses. Maps 4.4.2-1A, 4.4.2-1B and 4.7.2-1 illustrate proposed reclamation areas and types. The following presents, in detail, the abandonment steps and revegetation/ reclamation activities which represent the method of achieving and supporting postmining landuses. The list of activities are organized in the approximate order of execution. A majority of the listed activities are additionally discussed in further detail in various sections of this Renewal Application.

Sealing of Large Diameter Openings

Miscellaneous portal openings and ventilation shafts:

- Openings will first be sealed with concrete blocks and mortar.
- Any remaining opening will be dirt backfilled.

TABLE 4.12-1

PROPOSED POSTMINING LANDUSE

Area	Present Ownership	Premining Landuse	Proposed Postmining Use	Alternative Use	Capacity To Support Proposed Use	Relationship To Existing Landuse Policies
Mine Site and Exploratory Excavations	USFS	Wildlife/ Grazing Habitat	Wildlife/ Grazing Habitat	Picnic Area	Adequate	Compatible
Conveyor and Pipeline	Private	Grazing/ Wildlife Habitat	Grazing/ Wildlife Habitat	Wildlife Habitat	Adequate	Compatible
Main Access Road	State	Forest Access and Service Road	State Road	None	Adequate	Compatible
Loadout	Private	Grazing, Picnic, and Stock Pens	Grazing, and Picnic	Wildlife Habitat	Adequate	Compatible
Waste Rock Disposal	Private	Grazing/ Wildlife Habitat	Grazing/ Wildlife Habitat	Wildlife Habitat	Adequate	Compatible
South Fork Breakout	USFS	Wildlife/ Grazing Habitat	Wildlife/ Grazing Habitat	Wildlife Habitat	Adequate	Compatible

REPLACES	TEXT
Table 4.12-1 Page 4-56	Table 4.12-1 Page 4-56 Date 07/07/89

Plugging of Small Diameter Openings

Exploratory holes and water wells not approved for abandonment monitoring or postmining landuse:

- Each hole will be cased and sealed with a cement plug.
- A monument will then be erected over sealed holes.

Removal of Buildings

Office, shop, storage, changehouses, treatment buildings, explosive storage:

- Each structure will be removed.
- Removal or fracture of foundations will follow if they are close to the surface. Deeper foundations will be covered with at least six feet of dirt.

Equipment Removal

Mining equipment, conveyors, power structure and line, coal processing and handling equipment:

- The above mentioned items will be removed.
- Support structures will then be removed and foundations fractured and covered.

Blacktop Removal

The Permittee will, upon completion of mining operations, dispose of asphalt-concrete surfaces, aggregate base, and bituminous sub-base sealant as well as other materials used in non-highway road construction, by either: 1) fracturing and burying to a minimum of two feet, or 2) removing for use as backfill material to be covered with soil.

Mine Operational System Removal

Systems such as domestic water will be phased out and removed or buried.

Area Cleanup

Solid waste generated in the abandonment operations will be collected and removed.

Backfilling of Ponds

Ponds will be drained, the sediment will be tested for toxicity and removed for disposal as appropriate, then the pond will be allowed to dry out. When the soil is dry, the railroad loadout pond will be backfilled. The portal pond will be configured as part of stream reclamation.

Stream Reclamation

The stream at the mine site will be rechannelled as shown on Map 4.4.2-1A according to the plan outlined in Section 4.19.5.

Recontouring of the General Area

Final grading and backfilling will achieve a final contour suitable for the wildlife/grazing habitat postmining landuse.

- Operational benches will not be removed. Their banks will be reduced to a 3h:1v slope; their surface areas will have a 10h:1v slope for drainage.
- Side hill cuts range between 1h:1v and 1h:2v. Most of these cuts will remain upon abandonment. Any physical support

systems used to control these cuts along with any small terraces used for stability control will also remain.

- Abandoned road banks will be sloped to an average of 1h:1v.

Distribution of Topsoil

Topsoil from the stockpiles will be spread over the disturbed areas in a manner to reduce excessive compaction.

Scarifying Areas

Operational areas will be scarified to reduce compaction and to prevent topsoil slippage. Steep slope areas which must remain after abandonment will receive special ripping to create ledges, crevices, pockets, and screes. This will allow better soil retention and vegetation establishment.

Fertilization and Neutralization

All necessary fertilization or neutralization, as determined by soil testing, will be done according to the plan in Section 4.5 - SOIL PREPARATION AND FERTILIZATION PLAN.

Seeding and Tree Planting

Vegetation will be established to prevent erosion, to optimize the edge effect and to provide cover. Perennial woody species will be emphasized along with those of proven nutritional value and ability to support wildlife. The types and amounts discussed in the revegetation section (Section 4.7) will be used.

Moisture Retention

If moisture retention is determined during operational testing to be necessary, the following systems may be used.

- Straw - Terrace benches.

- Mulch - Wood mulch may be sprayed on terrace banks.
- Soil Retention Blanket - Wood fiber held by plastic net may be used on steeper banks.

Maintenance

Fencing, irrigation, and weed control will be used only as needed, according to operational testing results.

Regrading and Reseeding

Erosion that develops in completed areas will be minimized by repeated grading, seeding and mulching.

Success Monitoring and Extended Responsibility Period

Vegetation will be monitored during the applicable period of liability as outlined in UMC 817.116 to determine success of abandonment reclamation. A determination of vegetation success will then be made.

Removal of Site Drainage Ditches and Railroad Loadout Area Sedimentation Pond

After the disturbed areas are stabilized and runoff meets the applicable state and federal standards without detention time, the site drainage system will be removed. The site drainage system areas, including the railroad loadout sedimentation pond, will then be backfilled and revegetated.

Removal of Portal Area Sedimentation Pond

The portal area sedimentation pond will be removed during early Phase I reclamation. Alternative sediment control measures such as silt fences, straw bales and check dams will be used until the area is revegetated and runoff meets the applicable standards.

Road Abandonment

The mine support roads will be reclaimed in the permit area. Culverts and blacktop surfacing material will be removed. Reclamation would then include recontouring, ripping, adding cross drains, water bars, topsoil and seed.

Compliance Documentation

Upon expiration of the responsibility period and at the time of bond release, compliance documentation will be presented by the Permittee.

4.12.2 Proposed Underground Mining Activities and Consistency with Landuse Plans

The mine site is on U.S. Forest Service land. The U.S. Forest Service has indicated that the land should be returned to wildlife/grazing (rangeland) habitat. (Manti-LaSal National Forest Land and Resource Management Plan, 1986) The Longwall underground mining system is consistent with this plan as it controls the effects of subsidence.

Final Surface Configuration

The proposed final surface contour plan would allow the side hill cuts and operational benches at the mine site to remain after abandonment. The fill banks between each bench level would be reduced to 3.0h:1v.

Various illustrations, Maps 4.4.2-1A, 4.2.2-1B and 4.7.2-1 present the proposed topography of the postmining area. The final abandonment contours have been drawn with heavier lines over the lighter original contour lines. As the drawings illustrate, the final surface drainage channels will include meanders and drop structures to allow energy dissipation. The maps include location of operational facilities for reference purposes only. Upon abandonment, all surface facilities will be removed.

4.12.3 Visual Resource Assessment to Achieve Postmining Landuse

The abandonment assessment will concentrate on how effectively final drainages and slope patterns fit into the area's general visual resources. This assessment will occur through the period of liability.

4.12.4 Recreational Resource Assessment to Achieve the Postmining Landuse

During the life of the project and with special emphasis at abandonment, recreational resources, as assessed by the U.S. Forest Service, will include a review of postmining fishing, hunting, camping, hiking, and recreational landuse. If it is found, during the liability period, that any of these activities are decreased due to the mining operation, corrective actions may be taken.

4.12.5 Mineral Resource Assessment to Achieve the Postmining Landuse

Before abandonment, the mineral resources contained within the Skyline permit area will be assessed. The abandonment assessment will ensure that oil and gas development will be possible at the conclusion of mining. Measures taken to protect the unmined coal, such as portal sealing, will also be assessed. No other mineral resources are known to be present in commercial quantities.

4.12.6 Rock Disposal Site

The assumed pre-mining land use was native rangeland. The pit area will be reclaimed to native rangeland per the reclamation

plan. The access road will not be reclaimed (see Map 4.16.1-1B) and at the request of the landowner, (see Exhibit 1) the guard rail along portions of the road will be removed during reclamation.

The representative of the owners of the leased property have, through a letter to the Application, stated that the land around the proposed disposal site will be used for grazing once the abandoned strip pit is filled. The letter is attached as Exhibit 1.

The owner's representative requests that the pit fill be leveled off so that it can be used for corrals. The leveled-off fill will be reclaimed to native rangeland per the Reclamation Plan.

EXHIBIT 1

August 27, 1982

Mr. Vernal J. Mortensen
Vice President
Coastal States Energy Co.
411 West 7200 South
Midvale, Utah 84047

Dear Mr. Mortensen:

I understand your firm needs clarification on the future use of the "strip pit" area you have under lease from the Telonis estate, to use as a mine rock waste dump site.

The land surrounding the "strip pit" area will continue to be used for grazing in the future and, as such, I would prefer the reclaimed dump site to be leveled off so it could be used for corrals and a livestock containment area if we so desire.

The improved road leading to the waste dump site should not be reclaimed, since we would need the road to allow for easier access to the dump site when working with livestock in the area.

Thank you for your consideration in this matter.

Sincerely yours,

Angelo Georgedes

Angelo Georgedes, Administrator
for the Telonis Estate

4.13.1 Sedimentation Ponds

Two sediment ponds for surface water runoff are required, one at the mine site and the second at the coal load-out site. Each pond is designed to provide adequate volume for sediment containment plus an adequate volume for a theoretical 24-hour detention of runoff from a 24-hour, 10 year precipitation event (Mine Site Pond Section 7, Volume 5 and Loadout Site Pond Section 13, Volume 5). The location and preliminary design characteristics of each of these two ponds is described in Section 3.2 - COMPONENTS OF OPERATION, subsection 3.2.1-Ponds, Impoundments and Dams. The maintenance for each pond is described in Section 3.2 - COMPONENTS OF OPERATION, subsection 3.2.6 - Procedures for Construction through Removal of Major Structures and Facilities. The reclamation timetable for removing the pond structures is presented in Section 4.2 - RECLAMATION TIMETABLE.

The design drawings for the mine site and load-out sedimentation ponds are shown in Maps 3.2.1-1 and 3.2.1-2 and Maps 3.2.1-3 and 3.2.1-4, respectively.

The area under the sedimentation ponds will not be subsided. The ponds shall be operated in accordance with NPDES Discharge Permit conditions. Operations effecting the NPDES Discharge Permit, which are not clearly defined in the permit, shall be coordinated with the Division of Environmental Health. The Permittee will operate the pond in a prudent manner and will attempt to reduce the sediment loading into Eccles Creek. Pond decanting will be utilized to minimize sediment loading into the receiving stream. When decanting operations are conducted, they will conform with applicable water quality standards including exercising the

settleable solids measurement option of the NPDES Discharge Permit during periods of storm runoff or snow melt.

The portal area sedimentation pond is recessed and, therefore, has no embankments requiring geotechnical investigations. The engineering evaluation for the load-out area sedimentation pond is discussed in Section 3.2.1 and in Volume 5.

Both sediment ponds will be inspected, at a minimum, once each calendar quarter for structural weakness, erosion, and other hazardous conditions. Any deficiencies found will be reported to DOGM. Reports are kept at the mine office and are available upon request.

The loadout area sedimentation pond was designed and built with a combined slope of 4:1. Engineering justification for departure from the recommended 5:1 combined slope is included in the Engineering Calculations, Section 1 of Volume 5. During sediment clean out of the loadout sedimentation pond, the pond shall be drained of all the water that will meet permit requirements. Water not meeting discharge requirements may be used to water roads for dust suppression, water vegetation within the area reporting back to the sediment pond or may be hauled to the portal area sedimentation pond.

4.14 PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

No public parks or historic places are located in areas affected by the Skyline mining operation. The Permittee agrees, however, to notify the regulatory authority and the Utah State Historic Preservation Office (SHPO) of previously unidentified cultural resources discovered in the course of mining operations. The Permittee also agrees to have any such cultural resources evaluated in terms of National Register of Historic Places eligibility criteria. Protection of eligible cultural resources will be in accordance with regulatory authority and Utah SHPO requirements.

4.15 RELOCATION OR USE OF PUBLIC ROADS

Relocation of Forest Development Road 50227

Forest Development Road 50227, most commonly referred to as the "Eccles Canyon Highway", and designated by the Utah Department of Transportation as SR 264 as part of the Utah State Highway system, was constructed according to Utah State and Federal highway design criteria and standards.

The original mine plan called for the construction of a by-pass road in South Fork Canyon. UDOT and USFS engineers concluded the road should be constructed in Eccles Canyon through the mine site.

SR 264 was officially placed on the Utah State Highway system in the Spring of 1986 by a formal action of the Utah State Transportation Commission and subsequent legislative approval and acceptance by the Utah State Legislature. Eccles Canyon highway, SR 264, received final grading and surfacing during the 1986 construction season.

Since the Skyline mines access and haulage roads join in such right of way line with State Road 264, and since the mine portal area was proposed to be adjacent to the public road in the original permit application submitted in 1979, the Permittee is exempt from the requirements identified in UMC 761.12(d). The Permittee is working closely with UDOT to address impacts of coal mining activities with SR 264 as follows:

1. Jersey barriers have been placed along the road from the truck loadout to the upper property entrance.

2. Present 24" stop signs at access roads have been replaced with larger 30" signs by UDOT.

3. Battery operated flashing caution signs will be installed above and below the mine's access roads on SR 264, alerting the public that coal trucks may be in use.

4. Truck drivers transporting the Permittee's coal have been individually alerted to be especially watchful and give special consideration to public vehicles traveling SR 264 to ensure their safety.

Topsoil was removed prior to initial road construction and properly protected and stored as outlined in Section 4.6 - TOPSOIL AND SUBSOIL HANDLING PLAN.

The UDOT and the USFS (Manti-LaSal Division) have finalized the jurisdictional agreement for the transfer of the Forest Development Road, 50227, commonly referred to as the Eccles Canyon Highway, from the Forest Service to the Utah Department of Transportation.

Copies of that final agreement have been requested from Mr. Dyke LeFevre, District Engineer of District 4, UDOT, Price, Utah. Upon receipt of the signed final agreement, copies will be forwarded immediately for inclusion in the Mining & Reclamation Plan.

4.16 UNDERGROUND DEVELOPMENT WASTE AND EXCESS SURFACE SPOIL

Rock and earth materials produced in the underground mines will normally be disposed of in the underground working areas. Excess material produced that cannot be stored underground will be brought to the surface and stored in a temporary gob pile (location shown on Map 3.2.1-1) until the material can be transported to the approved waste rock disposal site near Scofield, or will properly be used as fill material within the disturbed permitted area. The temporary gob pile will not exceed 6,000 tons of material.

There is approximately 35,000 cubic yards of underground development waste material at the railroad loadout area. This material is located just east of the topsoil stockpile. Toxicity tests were made on the material before DOGM gave approval for the material to be placed at this site. It is planned for this material to remain on site and be used as fill material in final reclamation as shown on Map 4.4.2-1C.

Development waste and surface spoil produced in the construction of the surface facilities and portal entries of the mine have been used as fill material for building the mine pad areas.

Approximately 2700 cubic yards of early operational waste material were used as fill at the loadout site. This material was placed on natural grade. After stripping, the topsoil is well above the 100 year flood plain for the Eccles Creek stream channel. Ground water levels in the loadout area were found to range between 4.5 and 17.7 feet; consequently, no waste material was placed below ground water level. (Reference: Report Excavation Dewatering Investigation, Loadout Area, Coastal States Skyline Coal Mine Project Near Scofield, Utah for Coastal States Energy Company, Dames and Moore Job No. 6701-019-06, Salt Lake City, Utah July

28, 1981. Copies available at minesite or at the Salt Lake City offices.)

A seep and spring survey in the immediate area of the loadout waste disposal site has identified only one source. A French drain was constructed to drain subsurface flow for part of the loadout area including that waste disposal section. Flow from this source is monitored and reported as station CS-13.

This loadout area waste material will be left at the site during reclamation but will be recontoured to achieve final configuration as shown on Plate 4.4.2-1D. During recontouring, the waste material will not be placed below groundwater table level or within the 100 year flood plain.

Other mine wastes from the sediment ponds and earthen materials from clean up of pads, ditches, etc., may be disposed of at the Scofield Waste Rock Disposal site. Sediments will be tested for toxicity before disposal. Sediment from the portal yard sediment pond may also be pumped back into the mine if suitable mined out areas are available.

4.16.1 Waste Rock Disposal General Description

A rock waste disposal site has been developed and approved at a location southeast of Scofield, Utah and approximately 3.6 air miles from the Skyline mine site (Map 4.16.1-A). The rock waste disposal site is an abandoned strip mine pit accessed by an existing road which has been upgraded.

The rock wastes are hauled by truck from the Skyline mine site (portal area) and the unit train loadout facility to the waste disposal area.

The rock disposal site and access road are located upon land owned by the Estate of George Telonis. The legal right of access and use of the lands for the disposal of rock waste has been granted to the Permittee by the heirs of the Estate in a lease effective January 1, 1982 and expiring, unless renewed, on December 31, 2011. The lands referred to in the lease include a 7.00 acre right-of-way for the disposal site access road and a 17.83 acre tract of land containing the proposed rock waste disposal site. The disposal site and access road are part of a larger area previously disturbed by surface and underground mining and never reclaimed.

Portions of the surface affected have been used for grazing after abandonment of the strip pit, although the pre-existing conditions (lack of reclamation and underground coal fires) have greatly reduced the area's potential for grazing or for any other use.

Investigations as to potential cultural resources within the area to be affected and the adjacent areas have been conducted.

Water is present only for the very brief period during and immediately following precipitation events and/or during spring runoff.

The climate of the study area is similar to that described for the lower elevations of the Skyline permit area.

The Permittee uses the rock disposal site to dispose of underground rock waste produced during mining operations which cannot be permanently stored underground due to either the lack of adequate storage room or the content of coal exceeding the limits specified in 30 CFR:75.400 through 30 CFR:75.403 which

require that combustible content of the dust on the roof, ribs or floor of an underground coal mine not exceed 35 percent in intake air and 20 percent in return air. The volume of material which must be disposed of at a surface disposal site will be a very small fraction of the total rock waste produced because of the large volume of potential underground rock waste storage areas which result from mining coal. The economics of loading, hauling and disposing of rock waste at any point other than underground effectively prohibit the extensive use of a surface rock waste storage site.

The most likely sources of waste rock which might be disposed of at the proposed site include rock produced during fault crossing and igneous dike rock encountered during mining. Ancient stream channels are infrequently of sufficient magnitude that they cannot be stored underground adjacent to the place they are encountered. Sediment from the sediment pond cleaning may also be deposited at the waste rock disposal site.

The roof and floor rock for the three mineable Skyline coal seams are estimated to be 60 percent sandstone, 30 percent shale, and 10 percent claystone. The igneous dike rock varies in composition, but is essentially comprised of 100 percent ferromagnesian minerals. The majority of dike rock which would require surface disposal is anticipated to be very similar to basalt and would be very durable and extremely resistant to weathering. The volumetric swell factor for the igneous and sedimentary rock is estimated to be 30 percent.

The site is estimated to have a storage volume of 131,000 cubic yards.

The Permittee estimates that approximately 1,600 tons or 1,077 cubic yards (at 110 lb/cubic ft. density) per year of rock will be disposed of at the site.

4.16.2 Waste Rock Disposal Development Plan

The development of the rock disposal site required upgrading the existing unpaved access road to the abandoned pit as well as the development work to convert the abandoned strip pit into a disposal site.

A. Access Road

The access road to the disposal site followed the alignment of the existing unimproved access road. Approximately 3,158 feet of the unimproved pre-existing road was upgraded to comply with the standards set forth for Class II roads in UMC 817.160 to 817.164, inclusive. Ditches along the road and the swales crossing the road were designed and constructed to pass the 10 year, 24 hour storm (Volume 5, Section 14). The gravelled surface road is approximately 16 feet wide with guard rails where needed. Locally-derived gravel was spread uniformly on the road to provide a layer approximately four inches thick.

Near-surface portions of the coal seams which were mined and then burned have subsided. Other areas have developed subsidence cracks which transfer the coal fire combustion products to the surface. No evidence of subsidence or of coal fires have been observed under or within ten or more feet from either side of the existing road. Truck drivers look for surface evidence of subsidence and, should subsidence occur under or within ten feet of the road, good engineering practices will be employed in backfilling depressions and compacting the subsided area. A subsidence monitoring program is not needed due to the absence of current mining and the inferred low density of underground development beneath the access road alignment.

B. Disposal Site

The preparation of the disposal site entailed:

1. Emplacement of drainage controls to redirect surface waters around the site and into the original, pre-strip mining drainage system.

2. The emplacement of non-combustible fill material to form a barrier across the floor and along the walls of the abandoned strip pit where coal seams were exposed and where cracks or fissures are venting from adjacent coal fires.

3. The construction of a fence and gate to control access to the disposal site.

4. Some shrubs located high along the north side of the pit will be removed just prior to the time the area they occupy will be covered with waste rock. The sparse grass and weeds will not be removed.

The present course of the drainage from the canyon to the east of the abandoned strip pit was re-routed around the abandoned strip pit in order to redirect the flow into the original stream course (Map 3.2.8-1). An open channel and one swale were used to redirect the water flow.

The swale to redirect the drainage across the access road and into the original stream channel was constructed of concrete.

The Permittee searched for seeps or springs in the downslope area west of the disposal site during the spring of 1984. No seeps or springs were found.

The compacted non-combustible fill was emplaced along the floor and walls of the pit in order to isolate the coal seams and venting cracks or fissures in the highwall from the material to be disposed of in the pit. Where required, approximately four feet of compacted material was placed on the floor and along the wall. The material to isolate exposed coal seams and venting cracks or fissures along the walls is built up and compacted in lifts during normal rock disposal operations after the initial 4 feet high barrier was constructed. Drainage onto the floor of the pit is directed to a pre-existing sump at the east end of the abandoned strip pit.

There were two locations in the pit where coal is exposed. The exposure in the west end of the pit required sealing before any dumping of waste was undertaken. The initial 4 feet high barrier was built up of noncombustible material and was obtained from the slope detritus along the highwall. The material was dumped alongside and on top of the coal and compacted to form the barrier between the exposed coal and material to be dumped.

The second location where coal is exposed is in the extreme east end of the pit in the highwall. This location will probably never require sealing since the pit will not reach the location upon attaining final fill configuration.

During recontouring, the waste material at the railroad loadout will all be used as on-site fill. The material will be spread in 1 to 2 foot lifts and compacted. Cover will be at least as deep as the cover over the waste material at the Scofield disposal site.

4.17 SUBSIDENCE CONTROL PLAN

This section describes in further detail the Permittee's mine plan design, ensuring subsidence effects of the Skyline Mine produce minimum environmental impact. Section 3.1 - SKYLINE MINING OPERATION PLAN describes in detail the proposed methods of coal extraction and mine development which were selected partly on subsidence and nonsubsidence criteria. Section 2.2 presents the detailed geological information which provided an analytical base for mine plan and subsidence control design. The following subsections describe the principal factors involved in measuring and controlling subsidence resultant of the proposed mining operations.

4.17.1 Subsidence Probability Survey

Planned subsidence will occur from mining within the Permit area as shown on Map 4.17.1-1. Careful review of the permit area shows that the following areas could face potential subsidence impact which may be of concern: Mountain Fuel Supply gas pipeline and U-264 which cross the permit area. These potential affected areas are identified on Map 4.17.1-1. Upper reaches of Electric Lake Reservoir, upper Huntington Creek, Bolger Creek and South Fork of Eccles Creek will not be subsided as shown on Map 4.17.1-1.

4.17.2 Mining Methods

The mining methods to be used by the Permittee include longwall mining, room and pillar mining with pillar removal, and room and pillar mining with pillars left in place. Certain room and pillar mining systems are designed to provide full support and will prevent subsidence. Subsection 3.1.5 contains descriptions of the mining methods to be implemented.

10
15
14
13
WASHOUT ZONE
PIPELINE
HIGHWAY
HIGHWAY
22
23
SOUTH FORK ECCLES CREEK
BUFFER ZONE
NORTH
27
26
PLANNED SUBSIDENCE AREAS
MAINS-APPROX. LOCATION
50% EXTRACTION-PIPELINE BUFFER
HUNTINGTON CREEK
PIPELINE
CREEK BUFFER ZONE & EVALUATION AREA
34
35
ELECTRIC LAKE & INLET BUFFER ZONE
HIGHWAY
PIPELINE
CREEK
BOULGER CREEK
ELECTRIC LAKE & INLET BUFFER ZONE
Utah Fuel Company
A SUBSIDIARY OF THE COASTAL CORPORATION
EXTENT OF PLANNED AND CONTROLLED SUBSIDENCE AREAS
DESIGNED BY: MARK BUNNEL DATE: 12-6-90
DRAWN BY: K. BOYD LAKE DWG. #:4.17.1-1

Full extraction areas include room and pillar panels with pillar removal and longwall panels. Both methods of mining are planned subsidence areas. The potential extent of these projected full extraction areas is shown on Map 4.17.1-1. Subsidence prediction work has shown the expected maximum planned and controlled subsidence will vary from 0 to 24 feet, assuming that the total cumulative extraction from the three mineable seams will not exceed 30 feet.

4.17.3 Subsidence Effect Prevention Measures

It is anticipated that the planned subsidence will result in a generally uniform lowering of the surface lands in broad areas, thereby limiting the extent of material effect to those lands and causing no appreciable change to present land uses and renewable resources. The Permittee established a subsidence monitoring program in the early stage of mining for use in reviewing the surface effect of mining and as an aid in future mine planning.

Supportive mining planned under the natural gas pipeline has been designed for a maximum extraction of 50% as shown in Map 4.17.1-1 to prevent any surface movement for a 25-foot zone on each side of the pipeline. Wherever the pipeline and creek buffer zones coincide, creek buffer zone requirements take precedence. A minimum pillar safety factor of 1.5 will be utilized in pillar design for each pillar influencing the nonsubsidence zone beneath the pipeline. If a yield pillar/barrier system is used, the critical area will not influence the surface. The width of the area of supportive mining is equal to 50 feet (25 feet on each side of the pipeline centerline no surface movement) plus the tangent of 22° draw angle as shown in the 1988 Annual Report and included in Vol. 4, multiplied by the overburden depth of the mined coal bed:

o Nonsubsidence Mining Width = 50 feet + (2 X tan 22° x depth)

The width of the supportive mining area will be adjusted, as appropriate, when future information and monitoring shows it to be necessary.

The use of a 22 degree draw angle is substantiated by current subsidence over Skyline Mine No. 3. Plate 4.17.3-1 shows draw angles from 6 locations around the longwall mining block calculated at various orientation. The subsidence data were generated by aerial techniques. In every instance the draw angles are less than 22 degrees. The draw angle data are summarized as follows:

Location	Cave Perimeter Elev	Surface Elevation At O Line	Horiz. Distance	Draw Angle
A	7895'	9319'	420'	16 Deg.
B	7978'	9355'	433'	17 Deg.
C	8042'	9522'	390'	15 Deg.
D	8112'	9364'	492'	21 Deg.
E	8178'	9270'	125'	7 Deg.
F	8146'	9522'	290'	12 Deg.

Contouring of aerial subsidence data around uneven, step-like cave perimeters as shown in zones 1 and 2 (Plate 4.17.3-1) can produce deceptively large apparent draw angles. More accurate

determination of draw angles occurs adjacent to the outermost corners of the cave zones (draw angles E and F). Zone 3 shows an apparent negative draw angle, likely due to the large unmined block of coal in the underlying panel.

The 22 degree draw angle is conservative and conforms to the permittee's knowledge of subsidence experience from other comparable mining activity in the Wasatch Plateau.

There will be no mining caused subsidence under either the Electric Lake Reservoir, Upper Huntington Creek and Bolger Creek inlets to the reservoir, and no mining from which subsidence at a 22-degree (from vertical) angle of draw would influence either these reservoir inlets or the high-water level of Electric Lake Reservoir. Map 4.17.1-1 shows the Electric Lake and inlet buffer zone within which there will be no full extraction mining. The width of the buffer zone was calculated as follows:

- Buffer zone width = tan 22° x overburden depth

The width of the buffer zone has been calculated using the overburden depths to the coal seams.

There is a very substantial tonnage of coal which lies to the west of Upper Huntington Creek and Electric Lake Reservoir, which the Permittee plans to mine.

Mains within the Huntington Creek buffer zone shown on Map 4.17.1-1 will be a full support room and pillar mining system. These mains will be designed to avoid short or long-term surface affects from mining. Prior to abandonment of these Mains, measures will be taken to ensure no surface subsidence is induced due to failure of the entries, as mutually agreed with regulatory agencies.

No mining will be conducted beneath Electric Lake. Full support room and pillar mining under upper Huntington Creek, Bolger Creek, South Fork of Eccles Creek and Electric Lake buffer zones with pillars no smaller than 75 x 75 ft (95 x 95 ft. centers) and no more than five 20 ft. wide entries will be allowed. Variation from the specified minimum pillar size and maximum number of entries will not be allowed unless geotechnical data is consented to by the regulatory agencies, which shows no short- or long-term mining-related damage or alterations of stream flows. A minimum of three permanent subsidence monitoring points will be installed and monitored over existing full support room and pillar sections for long-term study of any potential subsidence. Data from these points will be included in the yearly subsidence report.

Full extraction mining techniques under the creek buffer zone and evaluation areas shown on Map 4.17.1-1 will only be proposed if evidence shows surface effects, if any, can be mitigated. Full extraction mining techniques and associated mitigation plans must first be approved by the Division/U.S. Forest Service.

Drill holes show that there are clay rich shale layers present which will likely swell into an impervious clay when wet. This characteristic is expected to seal possible subsidence cracks to prevent downward migration of water and subsequent loss of springs and other water sources based on information supplied by Roy Full (Volume A-3).

4.17.4 Mitigation of Subsidence Effects

Surface structures which may be effected by subsidence include the Permittee's buildings and facilities incidental to the coal operation, the natural gas pipeline which crosses the coal lease area, and roads within the area.

EXHIBIT 1

Coastal States Energy Company
175 East 400 S.•Suite 800•Box 3•Salt Lake City, UT 84111
a subsidiary of The Coastal Corporation (801) 596-7111

July 17, 1989

Mr. Dyke LeFevre
Director, District 4
Utah Department of Transportation
P.O. Box R
Price, Utah 84501

Re: State of Utah Highway SR-264-Subsidence Impact Agreement

Dear Mr. LeFevre:

Since SR-264 traverses areas which are proposed to be mined by Coastal States Energy Company (Coastal), portions of SR-264 may be affected by subsidence from Coastal's underground coal mining operations. This letter agreement is to set forth the obligations and rights of Coastal with respect to subsidence from Coastal's Skyline mining operations, and the effects therefrom, if any, on SR-264.

If accepted and agreed to by the Utah Department of Transportation (UDOT), UDOT has no objection to and will allow Coastal's mining operations being conducted, as proposed by Coastal, within the area of influence of SR-264. In consideration for such authorization, Coastal agrees to repair promptly all damage, such as surface impacts, to SR-264 due to subsidence caused by the mining activities at Coastal's Skyline Mines.

If UDOT agrees to the provisions contained herein, please sign all three copies of this letter agreement and return one of which to Coastal.

Very truly yours,

Vernal J. Mortensen
Senior Vice President

VJM/jm/0201c

Agreed and accepted this 19th day of July, 1989

Dyke LeFevre
Director, District 4
Utah Department of Transportation

Howard Richardson
Assistant Director
Utah Department of Transportation

Should subsidence damage any of the surface structures despite the planned subsidence prevention measures, the Permittee will arrange for their repair. Any subsidence related damage to SR 264 will be repaired by the Permittee in accordance with the DOT Subsidence Impact Agreement dated July 17, 1989 (see Exhibit 1).

Hydrologic information during a four year period at the Skyline Mine indicates that there is a reasonably good correlation between the amount of mine water discharged and the amount of coal mined (see Drawing 4.11.4-A). Our mine water is being produced from the Blackhawk Formation. Data from our approved water monitoring program indicate our mine dewatering is not affecting any surface springs or seeps. Our experience is showing that the migration of water through the aquifer is extremely slow to the extent that the water should be considered "perched or trapped water."

At this point in time it is difficult to suggest any mitigation of impacts or reclamation on renewable resources that are impacted by undermining, since we can only assume those impacts and their effect. Mitigation measures will be contingent upon the findings of the subsidence monitoring program. Surface subsidence experienced to date, as shown in the 1987 and 1988 annual reports, has been less than 50% of the mining height even after 2 years have passed. As data are collected, methods of mitigation will be formulated. This will be done in coordination with appropriate regulatory agencies. Since subsidence may continue to occur after final mining, the monitoring program will continue until it is determined by the Permittee in cooperation with the regulatory agency that it is no longer needed, or subsidence has stopped.

Impacted water rights, if any, will be replaced as discussed in Section 2.5.2.

4.17.5 Subsidence Monitoring Program

The Permittee has chosen to establish a subsidence monitoring program using aerial photogrammetrics patterned after a program developed by the Manti-LaSal National Forest to determine the effects of underground coal mining on surface renewable resources and surface improvements. The monitoring program secures adequate baseline data prior to any subsidence to quantify the existing surface renewable resources and surface improvements on and immediately adjacent to the permit area. The baseline data was established so that future programs of observation can be incorporated at regular intervals for comparison. The monitoring program establishes a system to locate, measure, and quantify the progressive and final affect of underground mining activities on the surface renewable resources and surface improvements. The system utilizes techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the permitted area. The continuum of data shall incorporate and be an extension of the baseline data.

A network of control monuments consistent with the desired photogrammetric map accuracy are being established over both the permit area and the immediate adjacent areas not expected to be disturbed by subsidence. The monuments are constructed as survey control points for monitoring the effects of subsidence on surface renewable resources and surface improvements (Map 4.17.5-1). The monuments are located and tied to a state plane coordinate system which is the same for both the surface and mine control surveys. This allows the surface survey to be superimposed over the subsurface mine workings. The monuments have the X, Y, and Z coordinates accurately measured and established by ground survey methods.

The initial aerial photography covers the entire permit area and will be either color or black and white, flown at a scale such that elevations to within one foot vertically and horizontally (± 0.5') can be attained by photogrammetric methods. It is anticipated that the nominal or mean scale will be 1:6,000 for a 6" focal length camera, unless aerial constraints such as safety dictate flying at a high altitude, but will not exceed 1:7,200. This photography was used for constructing the initial baseline surface map. It also provides the master base to assist in documenting changes caused by subsidence.

To aid in the collection of additional base data on surface renewable resources, color infrared aerial photography (CIR) of the permit area may be utilized. If this technique is used, the photographs will be of the same scale as the other aerial photography.

Subsequent annual black and white or color photography for subsidence monitoring will cover the area mined and the area to be mined in the next 18 months (plus angle of draw). Subsequent CIR photography for monitoring surface resource trends will be flown as needed.

On all aerial photography for both the baseline data and subsequent flights, a photographic overlap of 30 percent between adjacent flight lines and an average of 60 percent overlap of photographs along the same flight line will be obtained. The baseline data will be digitized to show the undisturbed pre-subsided ground elevations and will use a grid with a nominal mean grid scale of 200 x 200 feet. The subsequent flights for subsidence will also be digitized using the same grid scale as the baseline to show the elevational deviation from the baseline elevations. The digitized information will be submitted annually to the regulatory agency after subsidence commences.

An on-the-ground visual inspection will be made annually of the ground surface of subsidence areas (including angle of draw).

This inspection will attempt to locate, photograph, and document the presence of subsidence effects to surface improvements, tension cracks, fissures and other surface effects.

The subsidence monitoring data could be used to determine: 1) the critical width across the pressure arch; 2) the draw angle; 3) the ratio of observed subsidence to predicted maximum subsidence (S/Smax); 4) the relationship between mining and onset of subsidence and the correspondence between the face advance and subsidence profile development; and 5) the bulking factor.

A special three year subsidence monitoring program will be conducted to study the general effects of subsidence related to full extraction coal mining on stream flows in the upper reaches of Upper Huntington Creek and Burnout Creek drainages. The results of this special monitoring program will be used to project future mining areas beneath small perennial and perennial streams and to determine the affects, if any, of full extraction mining on perennial streams in this area.

The monitoring program will proceed as follows:

	Description	Who	When
1.	Install parshall flumes for stream flow monitoring as shown on plate 2.3.6-1.	Skyline	July 91
2.	Select and install monitoring for spring flows in the subsidence areas as shown on plate 2.3.6-1.	Skyline	July 91

	Description	Who	When
3.	Install subsidence monitoring adjacent to stream drainages on a maximum 200 ft. centers as shown on plate 2.3.6-1. Points will be 3' rebar with no concrete.	Skyline	July 91
4.	Develop summary report of observed subsidence effects on stream drainages as well as surface and subsurface hydrology to date.	Skyline	Dec. 91
5.	Monitor stream, spring, and subsidence points — monthly during field season. Map any surface cracks that form.	Skyline	June-Nov. 91 June-Nov. 92 June-Nov. 93*?
6.	Year-end summary reports	Skyline	Jan. 92 & 93
7.	Final report	Skyline	Jan. 94
8.	Evaluation and review	Skyline, DOGM & USFS	Feb. 94

4.17.6 Subsidence Control

The Permittee plans to conduct the underground mining operations so as to prevent subsidence from causing material effect to the surface and to maintain the value and reasonable forseeable use of that surface in accordance with the preceding subsidence control plan.

4.17.7 Public Notice

Since the surface ownership of the areas of planned subsidence is vested in the United States and is under the authority of the U.S. Forest Service, the annual subsidence monitoring report will be provided to them and to the regulatory authority.

ADDITION	TEXT
Section 4.17 Page 4-82	Section 4.17 Page 4-82A Date 06/14/91

4.18 FISH AND WILDLIFE PLAN

The Permittee is conducting the Skyline project operations in a manner which minimizes disturbances and adverse impacts on fish, wildlife, and the related environmental values identified in environmental baseline studies. The design of the Skyline Project incorporates many of the suggestions and proposals of the various environmental consultants to provide acceptable environmental protection features.

4.18.1 Aquatic Resources - Eccles Creek

During construction activities, sections of Eccles Creek were diverted, channelized and relocated causing some disturbance of the aquatic communities. These construction activities were conducted in accordance with approved plans and were monitored for impact. The construction effort also included stream enhancement for those sections which were permanently altered. Post construction rehabilitation has included revegetation and other improvements to the riparian habitat.

A more complete discussion of the impact and plans for the aquatic community can be found in Section 2.8 - AQUATIC RESOURCES, and in Section 4.19 - STREAM DIVERSIONS. The revegetation plan is addressed in Section 4.7. Hydrologic impacts are discussed in Sections 2.3 and 2.4.

4.18.2 Terrestrial Wildlife Resources

Eccles Canyon Road, which nearly parallels the conveyor route, has a posted speed limit. This measure seems to minimize the number of animal-vehicle collisions in Eccles Canyon. Warning signs indicating animal crossings will be installed along the Eccles Canyon Road in the vicinity of each animal underpass of the overland conveyor after it is constructed. The Permittee will continue consultation with various agencies to determine additional measures to be taken to reduce road kills of big game.

Power transmission lines for underground mining and related activities in the permit area were designed and constructed to comply with the guidelines set forth in "Environmental Criteria for Electric Transmission System" (USDI, USDA (1970)). Power distribution was designed and constructed in accordance with REA Bulletin 61-10 "Powerline Contacts by Eagles and Other Large Birds".

If necessary, a wire fence will be erected and maintained around the perimeter of the portal area or portions thereof to protect grazing stock and wildlife. The fence design will be submitted to the regulatory authority prior to construction. Other ventilation shafts and structures will be similarly fenced, covered or otherwise protected if required. While the ponds contain no toxic-forming materials, the Permittee agrees to exclude wildlife from such ponds should it become necessary. No persistent pesticides will be used unless approved by the regulatory authority as part of a reclamation management plan.

The Permittee also agrees to participate in the prevention, suppression, and control of forest, range, and coal fires, even though these fires may not be part of an approved management plan. The Permittee on occasion conducts a conservation training program for mine employees. This program conducted by personnel of the Utah Division of Wildlife Resources has been included as part of the routine mine training schedule.

Additional information on wildlife can be found in this document in Section 2.9 - TERRESTRIAL WILDLIFE and Section 2.10 - RAPTORS.

The South Fork Breakout is located in an Elk Calving area. Construction of the face up area should be done after calving season. The tributary to South Fork is a contributing stream for aquatic insect drift to the fishery in Eccles Creek. Construction operations were done in a manner to minimize disturbances and influences on the stream.

4.19 STREAM DIVERSIONS

The objective of the stream channelization and runoff diversion channelization program has been to minimize impacts to the surface water quality of the Skyline project area. Stream diversions and channelizations were undertaken pursuant to an approved Army Corps of Engineers 404 Permit, and with the approval of the regulatory authority and of the Division of Wildlife Resources. No additional diversions of Eccles Creek are planned until final reclamation, at which time the streams in the portal area will be returned to the surface.

4.19.1 Mine Site Stream Diversion

The confluence area of the three tributaries of Eccles Creek form a crowsfoot drainage pattern at the mine site. The combined drainage area for these streams is approximately 778.12 acres (Map 3.2.4-2). The precipitation from a 100 year, 24-hour rainstorm is expected to be about 3.50 inches (Section 2, Volume 5). After infiltration losses, surface runoff will be approximately 0.80 inches based on the assumption that the overland flow from the majority of the watershed is essentially non-existent. The resulting total peak runoff flow would be about 419.67 cfs (Section 2, Volume 5). The proposed culverts are designed such that during the winter months, adequate through-put spacing remains sufficient even if ice accumulates inside the culverts.

The culverts for use in the northern tributary are 48 inches in diameter and approximately 600 feet in length to a point of connection with a 72-inch diameter culvert. The northwest tributary culvert is 48-inches in diameter and approximately 836 feet long. The Northwest culvert was extended approximately 100 feet in 1990 to accommodate the expanded North coal storage area. This culvert connects into a 60-inch diameter culvert. The culvert for the southwest tributary is 48 inches in diameter and approximately 846 feet long, and also connects into the 60-inch culvert. The 60-inch culvert originates at the confluence of these two 48-inch culverts and continues for approximately 526 feet to the confluence with the north 48-inch culvert. From this point a 72-inch culvert extends for approximately 1,058 feet to a point beyond the portal area.

The inlet for each culvert was constructed of concrete with a trash rack installed to prevent drift material from plugging the culverts. Riprap was used at each inlet structure to minimize erosion. A rock structure was constructed, during Highway construction by UDOT, immediately downstream of the outlet structure.

4.19.2 Mine Site Diversion Channels

Mine site diversion channels were designed and constructed around the perimeter of the disturbed area to prevent overland flow from reaching the sedimentation pond. These channels were designed to carry the peak flow resulting from a 100 year, 24-hour precipitation event. The precipitation from a 100 year, 24-hour rainstorm is expected to be approximately 3.5 inches. After infiltration losses, surface runoff is anticipated to be approximately 0.80 inches.

The channels were placed beyond the mine site facilities, as shown on Map 3.2.1-1. Ditches DU-2 and DU-3 were each extended in 1990 to accommodate the expanded area for the North coal storage area (see Vol. 5 Section 5 for design calculations). The channels are triangular or trapezoidal in shape. Section 5, Volume 5 gives detailed as-built information for these channels.

ADDITION TO	TEXT
Section 4.19 Page 4-86	Section 4.19 Page 4-86A Date 12/20/90

4.19.3 Coal Storage Stream Diversion (RRLO)

To provide sufficient area for coal loadout facilities at the mouth of Eccles Canyon, approximately 600 feet of stream channel were relocated to the north, next to the canyon road. This was done after receiving appropriate approvals. The new channel was designed to safely pass the 100 year, 24-hour precipitation event. The peak flow expected will be approximately 1186 cfs (Section 13, Volume 5). The new channel is trapezoidal in shape and 10 feet wide at the bottom with a top width of 19 feet. The new channel was constructed with 20 foot center meanders within a 19 foot wide zone so that the loss of stream length is minimized and original gradient is preserved. The stream water channel, with a mean width of 4 feet, was diverted to meander within the created 10 foot wide channel. Log deflectors, log dams or large rocks were used to force the instream meanders. The original stream channel was 600 feet long compared to the new channel of 500 feet resulting in a loss of 100 feet of stream. The pre-construction gradient was 0.024 compared to the new channel gradient of 0.027 resulting in an increase of 3 foot vertical drop per 1,000 feet of stream length. The log dams, 12 to 15 inches high and spaced at 80 to 120 foot centers, prevent washout of spawning gravels and cause the stream waters to dig pools on the downstream side. The log dams have notched top logs to help confine the flow to a narrow channel during low flow periods. The log dams are sufficiently low to allow even the highest flow to pass over the top without flooding of the channel banks.

The created stream bottom, installed per an approved plan, contain a combination of gravels appropriate for both fish spawning and macroinvertebrate reproduction purposes. Stream banks were riprapped in potential erosional areas with all other stream bank areas composed of soil revegetated with grasses, some willows and other scattered trees.

4.19.4 Coal Storage Diversion Channel (RRLO)

The coal storage diversion channel was designed and constructed to carry the peak runoff from a 10 year, 24-hour precipitation event. The peak runoff flow is expected to be approximately 18.41 cfs. The channel is located just south of the coal storage facility. Map 3.2.1-3, Section 10, Volume 5 shows the typical ditch design.

When the coal storage facility is no longer required, the channel will remain until the area has been stabilized. With the completion of revegetation and stabilization activities, the channel will be backfilled, topsoiled and revegetated.

4.19.5 Reclamation of Diversions and Channels - Portal Area

Reclamation after cessation of mining will be directed towards providing the needs of the macroinvertebrates since this area is not directly used by the fish of Eccles Canyon. Reclamation will include removal or burial of the culverts, replacing the stream into a channel providing optimal substrates for macroinvertebrate production, revegetation of riparian zones, riprapping stream banks and channels.

Whether a culvert is removed or buried will be determined by the depth that the culvert is buried. If the culvert can be economically removed, it will be. The culverts not removed will be bulk headed and backfilled with a slurry or other acceptable

backfilling measure. The UDOT culvert in the southwest fork will be uncovered at the permit boundary and the stream will enter the open channel. The open channel will again enter a UDOT culvert going under SR 264 at the permit boundary at the east end of the disturbed area. Any culvert left in place will have a minimum of four feet of cover backfill over it.

The natural stream channels above the disturbed area contain a good natural supply of high quality macro-invertebrates. The stream channel stabilization work should provide an excellent environment for the natural drift of upstream macro-invertebrates. To assist in the adequacy review of the protal area channel reclamation effort, Maps 4.19.5-1 through 4.19.5-4 have been included, which show stream channel cross sections in the three forks above the disturbed area and in Eccles Creek below the disturbed area.

The design of the reclaimed channels is shown in Map 4.4.2-1A, 4.4.2-1B and 4.4.2-1B1 and is generally described herein. The final design, with engineering documentation, is included in the Engineering Calculation section of Volume 5.

The access roads to both well houses will be removed and will be reclaimed to UDOT specifications. At a minimum, these access roads, pads and culverts will be removed, the stream channel will be reconstructed consistent with the existing channel, and the road slope to the creek will receive the same treatment as now exists above and below the pad. The culverts at the well houses will handle the 10 year, 24 hour storm (Volume 5, Section 3).

The recently installed on-site NOAA weather station enables collection of precipitation data on a 15 minute basis. To

complete determination of runoff coefficients, flood crest gauges will be installed in at least two of the stream culverts. Flow will be determined using pipe size and slope. Using the site specific runoff coefficients, the reclaimed stream channel will be appropriately sized and properly armored.

The North, Northwest and Southwest Forks and Eccles Creek below the forks will be built mostly on a slope between 2 percent and 4 percent. Space drop areas where the slope varies from 10 percent to as high as 16 percent for short distances (Section 18, Volume 5).

In areas of steep slopes the channel will be rip-rapped with large rocks varying from one foot to three feet in diameter. Cobbles and coarse gravel will be placed among the boulders.

The stream channel on the flatter slopes (2 percent to 4 percent) will be covered with coarse gravel (1-3 inches diameter) and rubble (up to one foot in diameter). The bottom of the channel will be shaped so that the depth of flow will approach 11 inches even during very small flows.

Riparian vegetation will be established to reference standards along the stream and along any cut slopes near the stream.

4.19.6 Reclamation of Diversions and Channels - Loadout Area

The diverted section of Eccles Creek will be left in place after mining operations are complete, since restoration to the original channel would only cause unnecessary disturbance. The culverts into the loadout area will not be removed since these culverts are replacements for those in place prior to construction.

Calculations addressing the drainage and stability requirements of UMC 817.133 may be found in Volume 5.

The diversion channels will be handled the same as those at the portal area.

4.19.7 Diversion Channel at Rock Disposal Site

A diversion channel has been installed as shown on Map 4.16.1-1B. The swale to redirect the drainage across the access road and into the original stream channel was constructed of concrete.

The swale outlet was lined with 4 inch x 4 inch or larger rock to reduce exit velocity of water from the swale. Engineering Calculations for the waste disposal site channel design are included in Volume 5.

4.19.8 South Fork Breakout

A new road was constructed which crossed a drainage way to the South Fork of Eccles Creek. This drainage way flows in all but extremely dry years. When the creek crossing was constructed, the top soil was removed with a track hoe to help minimize disturbance to the channel itself. The culvert was placed in the existing channel, and then the road fill placed over it.

During reclamation, the fill material will be removed and then the culvert lifted out of the channel. Top soil will then be placed back on the disturbed area with a track hoe and the area reseeded. Although no permanent disturbance to the channel is planned or expected, if it should occur it will be rip-rapped with a gradation of material from 4" to a maximum size of 38" (Section 18, Volume 5).

All culverts used for access to the area will be completely removed from the area during final reclamation.

This final reclamation plan outlines the minimum reclamation to be accomplished. At the time of final reclamation, a meeting will be held with the U.S. Forest Service to determine if additional reclamation work over-and-above that outlined in the plan is needed.

PAGE 4-91

HAS BEEN DELETED

FIGURE 4.19.7-A HAS BEEN INCORPORATED INTO

THE ENGINEERING CALCULATIONS, VOLUME 5

REPLACES	TEXT
Figure 4.19.7-A Page 4-91	Figure 4.19.7-A Page 4-91 Date 07/12/89

4.20 TRANSPORTATION FACILITIES - ROADS, CONVEYORS, RAIL SYSTEMS

It is the intent of the Permittee to ensure that the activities associated with the maintenance and reclamation of surface acreage disturbed for transportation facilities be conducted in compliance with all state and federal regulations and are planned in a manner most appropriate for the control and mitigation of related environmental impacts.

This section describes in detail the major engineering and design features selected to mitigate transportation related erosion and air and water pollution resulting from the Skyline Mine operations.

Road design was performed by registered, qualified professional engineers in accordance with all available design technology. There are no Class III roads proposed for the transportation system of the Skyline Mines operation. Reclamation activities, to be conducted for each area of surface disturbance, will follow the applicable procedures described in Sections 4.4, 4.5, 4,6 and 4.7. In all cases, topsoil and vegetation were cleared only to the extent necessary to accommodate road and ditch construction. Stabilization and initial revegetation of all cut and fill slopes resulting from road construction was performed during the first seasonal opportunity.

4.20.1 Transportation Roads

Eccles Canyon Road

The Eccles Canyon Road has been improved from the mouth of Eccles Canyon (Highway U-96) to the Fairview Canyon Road (Highway U-31). This road has been included in the State Highway System with the designation of SR-264 and is the responsibility of UDOT.

Mine Access Road

The mine access road is classified as a Class I road and runs from the mine #3 portal to the maintenance complex area. The certification statement for this road is shwon on page 4-93B. Drawings 3.2.4-1 and 3.2.6-2A show a typical cross section of the mine access road and related ditches. Since the length of the road is approximately 1,200 feet, no road culverts were installed. As shown in the design, the steepest portion of the access road is a 10.0% grade sustained for 250 feet. No other grades on the access road exceeds 10.0%. There are no switchbacks on the access road. None of the access road cut exceeds 1h:1v in unconsolidated material and .025h:1v in rock. The access road is be 20 feet wide with a 3 foot height berm and concrete jersey barriers at the shoulder. The road is flat with a drainage ditch against the highwall. The drainage ditch has been designed to safely pass the peak from a 10 year, 24 hour precipitation event (Section 6, Volume 5). No trash racks and debris basins have been installed, as the ditch will be cleaned periodically. The road is surfaced with crushed gravel. Once mining is completed, the road will be topsoiled and terraces will be constructed to prevent soil erosion

Water Tank Access Road

Access to the water tank area is via Utah State Highway SR-264.

Breakout Area Access Road

The road which was constructed to obtain access to the breakout area in the South Fork of Eccles Creek will be reopened during final reclamation. After the face up area has been reclaimed, the new temporary access road, the small opening at the mouth of the canyon and the road where the topsoil was stored will be returned to the approximate original contour and seeded with the approved seed mixture.

The access road up the side canyon will be reopened to accomplish final reclamation work at the breakout area. After reclamation work is completed at the breakout area, the road will be returned to approximate contour and seeded with the approved seed mixture. All culverts and the trash rack used in the project will be removed from the area. All disturbed areas will be seeded as outlined in Section 4.7.2.

The road from the Forest boundary to the mouth of the side canyon will be ripped, outsloped, water barred and blocked so that vehicle traffic cannot use the road.

4.20.2 Overland Conveyor Belt

The location of the upper two thirds of the conveyor is on a bench on the north slope of Eccles Canyon, while the lower one third will be supported by towers and trusses. The steepest portion of the conveyor is a negative 26.33 percent grade sustained for 430 feet. The average negative grade of the conveyor route is 9.39 percent and the average positive grade is 8.37 percent. Cut slopes along the route do not exceed 1h:1v in unconsolidated materials and 1h:4v in rock. As part of the air quality control program, the belt and transfer points will be enclosed to reduce fugitive dust.

Utah Fuel Company
a subsidiary of The Coastal Corporation
P.O. Box 719 • Helper, Utah 84526 • (801) 637-7925
Salt Lake (801) 596-7111

December 11, 1989

I certify that the Mine Access Road, the Truck Loop around the portal area Sediment Pond, and the Truck Dump road at the Railroad Loadout area are Class I roads and that they were designed and constructed within the permit area in accordance with UMC 817.151-154 and are shown on Maps No. 3.2.1-1 and 3.2.1-3.

Wm W. Shriver

William W. Shriver
Registered Professional Engineer

4.20.3 Railroad System

The grade of the railroad does not exceed 3 percent Cut slopes do not exceed 1h:1v in unconsolidated materials. Vegetation was cleared only to the width necessary to accommodate the track ballast and associated ditch construction.

The Denver and Rio Grande Western Railroad Company designed the rail haulage system and ensure that no refuse coal, acid producing or toxic material will be used in the rail ballast which will contaminate surface drainage. The rail haulage system was designed to maintain the water quality of runoff from the facilities in Pleasant Valley Creek.

4.20.4 Loadout Access Road

The loadout access road is classified as a Class I road and runs from the truck dump area to the silo area. Drawing 4.4.2-1D shows a typical cross section of the access road. To prevent water from entering a disturbed area, a 30 inch CMP was installed half way down. There are no switchbacks on the access road. None of the access road cuts exceed 1h:1v in unconsolidated material and 0.25h:1v in rock. The access road is 20 feet wide with a 3 foot high berm at the shoulder. The road is slightly tilted toward the berm so that water will stay on the disturbed area. No trash racks and debris basins have been installed as the road is periodically regraded. The road is surfaced with crushed gravel. Once mining is completed, the road will be topsoiled and terraces will be constructed to prevent soil erosion.

4.20.3 Railroad System

The grade of the railroad does not exceed 3 percent. Cut slopes do not exceed 1h:1v in unconsolidated materials. Vegetation was cleared only to the width necessary to accommodate the track ballast and associated ditch construction.

The Denver and Rio Grande Western Railroad Company designed the rail haulage system and ensure that no refuse coal, acid producing or toxic material will be used in the rail ballast which will contaminate surface drainage. The rail haulage system was designed to maintain the water quality of runoff from the facilities in Pleasant Valley Creek.

4.20.4 Loadout Access Road

The loadout access road is classified as a Class I road and runs from the truck dump area to the silo area. Drawing 4.4.2-1D shows a typical cross section of the access road. To prevent water from entering a disturbed area, a 30 inch CMP was installed half way down. As shown in Drawing 4.7.2-2, the as-built grade of the road is 7.03 percent. There are no switchbacks on the access road. None of the access road cuts exceed 1h:1v in unconsolidated material and 0.25h:1v in rock. The access road is 20 feet wide with a 3 foot high berm at the shoulder. The road is slightly tilted toward the berm so that water will stay on the disturbed area. No trash racks and debris basins have been installed as the road is periodically regraded. The road is surfaced with crushed gravel. Once mining is completed, the road will be topsoiled and terraces will be constructed to prevent soil erosion.

4.21 RETURN OF COAL PROCESSING WASTE TO ABANDONED UNDERGROUND WORKINGS

The Permittee does not plan to construct or utilize coal processing facilities as a part of the Skyline project. Therefore, no coal processing waste will be generated. Excess spoil, mine development waste, coal waste and sediment pond waste will be deposited at the waste rock disposal site near Scofield.

conflicts w/ P. "sediment pond cleanout"

4.22 AIR POLLUTION CONTROL PLAN

Prior to any construction effort at the mine site Permittee filed an application for Preconstruction Review and Prevention of Significant Deterioration (PSD) with the EPA Region VIII office and a Notice of Intent to Construct with the Utah Air Conservation Committee. All requested approvals were obtained as required. The submitted application for PSD review isolated potential fugitive dust emissions as the principal air pollutant. An annual emissions report is submitted to the Utah Air Conservation Committee in accordance with the requirements of Section 26-13-23, Utah Code annotated, 1953, as amended. Emissions from the coal handling operations are significantly reduced by the moisture (approximately 10%) inherent in the run-of-mine coal.

4.22.1 Fugitive Dust Sources

The following sources of dust emissions have been identified:

1. Conveyors and Chutes
2. Crushers and sizing equipment
3. Truck Dumping
4. Silos
5. Stockpile Surfaces
6. Equipment Activity
7. Front-end Loading
8. Truck Travel and Unpaved Roads
9. Mobile Equipment

Emissions factors used in preparation of the annual reports are taken from EPA publication AP-42, Section II, 5/83, or from information provided by Bureau of Air Quality personnel.

4.22.2 Description of Emission Sources and Controls

1. Conveyors and Chutes

All permanent conveyors are fully covered and originate and terminate either underground or at facilities equipped with dust control. Open conveyors are used infrequently. Chutes are either adjustable or are set at minimum drop height.

2. Crushers and sizing equipment

Prior to distribution the coal is passed through a single crusher facility. Emissions from the crushing operation are limited by the use of a baghouse for dust control. Stoker coal is screened out at the railroad loadout silos. Fugitive emissions are limited by the use of a baghouse.

3. Truck Dumping

That portion of the coal moved by truck is handled almost exclusively by bottom dump trailers which reduces the coal drop height. The trucks routinely haul 40 tons per load, however, during certain inclement weather conditions, the trucks may use a single trailer which reduces the load to 20 tons. Truck dumping at the site is normally to a grizzly at the railroad loadout site which feeds the silos, but may be into a stockpile during overflow and emergency conditions, when a mechanical/electrical condition prohibits the use of the conveyor system.

4. Silos and Bins

Several silos are used in the coal handling operation. Coal from the mine is stored in an 8,000-ton capacity run-of-mine silo pending transfer to the crusher facility. Coal from the crusher is currently moved to a 200-ton capacity tipple bin. (After the canyon conveyor is completed, the flow of coal through the tipple bin will be greatly reduced.) Coal awaiting train loadout is currently stored in two 15,000-ton capacity silos. A 225-ton bin

is located at the train loadout for surge control. Fugitive emissions from all of the silos and bins are controlled by a baghouse at each silo.

5. Stockpile Surfaces

The mine plan has been approved permitting open storage of coal at two sites on the mine property. These stockpiles are used as surge control for those times when production exceeds the immediate demand. The coal for the North coal storage area normally is transported to the area via a conveyor to a stack tube, and is reclaimed with underground feeders and a conveyor. The South coal storage area is an emergency area and will not normally be used, except when a mechanical/electrical condition prohibits the use of the stacking or reclaim system in the North coal storage area.

While stockpiles are normally susceptible to wind, site specific weather data (Radian Corporation, 1979) indicate wind velocities at Skyline lack sufficient magnitude to create a problem.

6. Equipment Activity

Heavy equipment, such as front-end loaders, used in the movement of coal causes some emissions from wheel contact with dry surfaces. Only the emissions from such heavy equipment are monitored. No attempt is made to analyze emissions from light vehicular activity.

7. Front End Loading

Coal from the South coal storage stockpile is loaded into trucks by front-end loaders. Coal in the North coal storage area will normally be transferred by conveyor belt; however, in emergency conditions, when mechanical/electrical breakdown prohibits the use of the reclaim system, coal may be loaded out of this pile with a front end loader. While drop height is minimized, up rushing air, displaced by the coal, tends to cause some emissions. These emissions are low due to the inherent moisture of the coal.

8. Truck Travel on Unpaved Roads

Normal movement of coal by truck from the tipple loadout and the movement of coal at the South coal stockpile is over some unpaved roads. Truck wheels disturb the road base silt, creating minor fugitive dust emissions.

9. Mobile Equipment

This category includes engine emissions from heavy diesel equipment. Engine emissions from small gasoline powered vehicles are not quantified.

4.22.3 Air Quality Control Monitoring

The Permittee contracted with Radian Corporation to prepare the baseline air quality study for the mine area and to design an air quality monitoring program for use throughout the life of the Skyline Mines. A copy of the Radian report can be found in Appendix Volume A-1.

The Permittee uses this monitoring program and new technology as approved by the Bureau of Air Quality to determine the effectiveness of fugitive dust control measures. Adjustments to the dust suppression measures are considered on the basis of monitoring program evaluations.

The air pollution control plan is based upon the requirements of the Bureau of Air Quality and upon preventative measures initiated by the operator.

The following describes the Permittee's ongoing and proposed Monitoring Programs.

4.22.4 Operational Procedures and Monitoring

To achieve minimal emissions the following operational steps will be taken:

1. All emission control equipment shall be properly installed, maintained and operated.

2. No visible emissions from any point shall exceed 20 percent opacity as measured by 40 CFR 6C, Appendix A, Method 9.

3. Mine personnel shall be certified annually to measure opacity.

4. Normally coal shall be transferred primarily by covered conveyor, except truck haulage will be used for the South Coal stockpile operation, when a mechanical/electrical condition prohibits the use of the North coal storage area. The use of open conveyors shall be minimized.

5. Water or chemical suppressant sprays shall be applied on unpaved roadways as required to meet opacity limitations.

After the conveyor in Eccles Canyon has been constructed an air quality monitoring program will be initiated to characterize operational baseline.

Network Descriptions

Monitors will be placed at three locations: 1) near the crushing operations at the mine portal site; 2) near the load-out facilities at the base of Eccles Canyon; and 3) in Clear Creek, Utah. High-volume (hi-vol) samplers will be placed at all three locations to collect 24-hour total suspended particulate (TSP) measurements. At least one portable weather monitoring station will be used to record wind speed, wind direction and temperature on a continuous basis. The location of the portable weather station(s) may change from time to time and will be selected so as to sufficiently characterize the wind flow pattern in and along Eccles Canyon. The on-site NOAA weather station will be used when practical.

Program Duration

The monitoring program will continue for a minimum of 12 months following commencement of overland conveyor operation. At the end of the first six months of monitoring, the data collected up to that time will be reviewed to determine if the program objectives are being met. If necessary, adjustments will be made in instrumentation, monitor locations or sampling frequency to improve the usefullness of the data collected in the second six

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months. Continuation of the monitoring program beyond the 12 month duration will depend upon findings of unacceptable TSP concentrations.

Sampling Frequency

Meteorological parameters will be recorded continuously on strip charts. Particulate samples (24-hour) will be taken at all locations simultaneously from midnight to midnight every third day.

Quality Assurance

Appropriate quality assurance activities will be performed to ensure the quality and usefulness of the data collected. The program will be conducted in accordance with guidelines for operations and quality assurance as established by the EPA or by the Utah Bureau of Air Quality.

4.23 ALLUVIAL VALLEY FLOORS

Introduction

The loadout area could potentially be classified as an alluvial valley floor even though it has no agricultural valley. Therefore, under the provisions of UMC 785.19 (c)(1) the following information is submitted as documentation that the area is neither arid nor semi-arid and consequently does not require a special permit for coal mining activities.

4.23.1 Climatological Conditions

Figure 12 of Jeppson et al. (1968) indicates that the normal annual precipitation in the Skyline permit area varies from 25 inches at the mouth of Eccles Canyon where the coal storage and unit train load-out facility is located to over 30 inches at the portal area. Altitude appears to have a large influence on precipitation (Mundorff, 1972) with the higher elevations experiencing more rain and snowfall. Site specific precipitation records are available to Clear Creek (latitude 39° 39', longitude 111° 09', elevation 8,300 feet) and Scofield (latitude 39° 44', longitude 111° 09', elevation 7,700 feet previously known as Winter Quarters), and recently at the Skyline mine portal area. As shown in the annual summary of NOAA Climatological Data for Utah, the long-term annual mean precipitation at Clear Creek in 1956 was 21.65 inches, and the mean annual precipitation at Scofield (Winter Quarters) between 1893 and 1924 was 19.46 inches. These amounts correspond quite closely to the values shown on maps by Jeppson et. al. (1968) although they are slightly lower than Jeppson's values. This fact seems to confirm that the generalized precipitation data given in Jeppson et. al. (1968) are quite accurate relative to the vicinity of the Skyline permit area.

Figure 25 of Jeppson et. al. (1968) indicates that annual potential evapotranspiration in the permit area varies from about 17 to 19 inches, with the higher rates being at the lower elevations. Because precipitation significantly exceeds potential evapotranspiration (an ideal or upper limit of actual evapotranspiration), it is by definition not reasonable to classify the climate of the area as arid or semiarid.

4.23.2 Consumptive Use

As previously stated, the major drainages in the Skyline permit area are Eccles Canyon and Huntington Creek Canyon. There are no known flood irrigation systems in drainages similar to these drainages in the general area of the Skyline Mine. The lack of flood irrigation practices is due to several factors, including a very short growing season, steep gradients of canyon floors, shallow soil, and the abundance of precipitation. Flood irrigation practices in the drainages associated with the Skyline property are restricted to the lower elevations where conditions are more favorable.

Vegetational consumptive use is as described in the following paragraphs.

Silver sagebrush (Artemesia cana) and various grasses and sedges dominate the small alluvial valleys of the Skyline permit and adjacent areas. Data presented by Sturges (1977; see Table 4.23.1) indicate that big sagebrush (Artemesia tridentata) consumptively uses an average of 13.8 inches of water annually. Sturges has suggested that the average values presented in Table 4.23-1 be increased by 20 percent to reflect climatic differences between the areas and the fact that silver sagebrush commonly extends its roots below the water table. Thus, the sagebrush portion of the riparian communities in the Skyline permit area can be expected to consumptively use 16.5 inches annually.

The SCS-modified Blaney-Criddle method (U.S. Soil Conservation Service, 1970) was used to estimate the consumptive use of grasses in the riparian zones of the property area. No estimate was made of water used by the sedges because of their lower use relative to the grasses. For the purposes of calculation, it was assumed that the pasture grass crop growth stage coefficient curve given by the U.S. Soil Conservation Service (1970) would adequately describe the water use condition of the riparian grasses. Further, a conservative growing season of June through October was assumed. The data are presented in Table 4.23-2.

4.23.3 Conclusions

Normal annual precipitation in the Skyline permit area varies from 18 to 30 inches. Annual consumptive use of water by native riparian plants in the area varies from less than 13.1 inches for sedges to approximately 16.5 inches for silver sagebrush. Because of the large difference between precipitation and water use, the area cannot be classified as arid or semi-arid.

TABLE 4.23-1

CONSUMPTIVE USE OF WATER BY BIG SAGEBRUSH

(FROM STURGES, 1977)

PRECIPITATION			SOIL MOISTURE DEFICIT		WATER USE
Year	mm	inches	cm	inches	(inches)
1969	116	4.57	24.6	9.69	14.26
1970	161	6.34	20.5	8.07	14.41
1971	77	3.03	22.1	8.70	11.73
1972	121	4.76	20.6	8.11	12.87
1973	137	5.39	29.3	11.54	16.93
1975	58	2.28	25.9	10.20	12.48
				Average	13.78

TABLE 4.23-2

CONSUMPTIVE USE CALCULATIONS FOR RIPARIAN GRASSES IN THE SKYLINE PERMIT AREA

Month	t* (°F)	P** (%)	K_c**	K_t	K	U inches
June	52.1	10.06	0.92	0.59	0.54	2.83
July	58.7	10.19	0.92	0.70	0.65	3.86
August	57.7	9.53	0.91	0.68	0.62	3.42
September	50.5	8.38	0.87	0.56	0.49	2.06
October	40.7	7.76	0.79	0.39	0.31	0.97
				Total		13.14

*Clear Creek, Utah station (from Utah Division of Water Resources, 1975)

** From U.S. Soil Conservation Service (1970)

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2. Mundorff, J. C. 1972. Reconnaissance of Chemical Quality of Surface Water and Fluvial Sediment in the Price River Basin, Utah. Utah Department of Natural Resources, Division of Water Rights, Technical Publication No. 39. Salt Lake City, Utah.

3. Sturges, D. L. 1977. Soil Moisture Response to Spraying Big Sagebrush: A Seven-Year Study and Literature Interpretation. USDS Forest Service Research Paper RM-188. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.

4. U.S. Soil Conservation Service. 1970 (revised). Irrigation Water Requirements. U.S. Dept. of Agriculture. Technical Release No. 21.

5. Utah Division of Water Resources. 1975. Hydrologic Inventory of the Price River Basin. Utah Department of Natural Resources. Salt Lake City, Utah.

4.24 SUPPORT FACILITIES NOT LOCATED WITHIN THE PERMIT AREA

The mining operation plan does not require the Permittee to construct any additional support facilities located beyond the designated permit boundaries.

4.25 EXPLORATION

All exploration for coal shall be performed according to an approved exploration plan. The Permittee will comply with all state and federal laws and regulations applicable to coal exploration activities.

The Permittee began exploratory core drilling during 1979, with an exploration plan approved by the Area Mining Supervisor of the United States Geological Survey and by the United States Forest Service. Drill logs from the 1979 and previous drilling are included in Appendix Volume A-4.

Other than core drilling, methods utilized included high-resolution seismic, resistivity - IP, magnetometer, VLF-EM, and magneto-tellurics. The Permittee will continue to utilize such techniques as approved by proper regulatory authority.

CROSS REFERENCE INDEX

UMC REGULATIONS BY SUB-SECTIONS

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N/A	817. 50b 1ii	
N/A	817. 50b 2	
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N/A	817. 55c 5	
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N/A	817. 57c 2	
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4.8, 3.29	817. 65l 2	
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Mine Plan References:	Regulation Number:	
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4.8, 3.29	817. 68d	
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Mine Plan References:	Regulation Number:	
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Mine Plan References:	Regulation Number:	
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Mine Plan References:	Regulation Number:	
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Mine Plan References:	Regulation Number:	
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N/A	817. 82a 3	
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Mine Plan References:	Regulation Number:	
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N/A	817.122a	
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N/A	822. 12c	

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N/A	822. 14	Alluvial Valley Floors: Monitoring
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N/A	822. 14a 4	
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N/A	823. 11a	
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N/A	823. 12a	
N/A	823. 12a 1	
N/A	823. 12a 2	

Mine Plan References:	Regulation Number:	
N/A	823. 12a 3	
N/A	823. 12b	
N/A	823. 13	Prime Farmland: Soil Stockpiling
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N/A	823. 14d	
N/A	823. 14e	
N/A	823. 14f	
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N/A	823. 15c 2	
N/A	823. 15c 3	
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N/A	827.11	Applicability
N/A	827.12	Coal Processing Plants: Performance Standards

Mine Plan References:	Regulation Number:
N/A	827.12a
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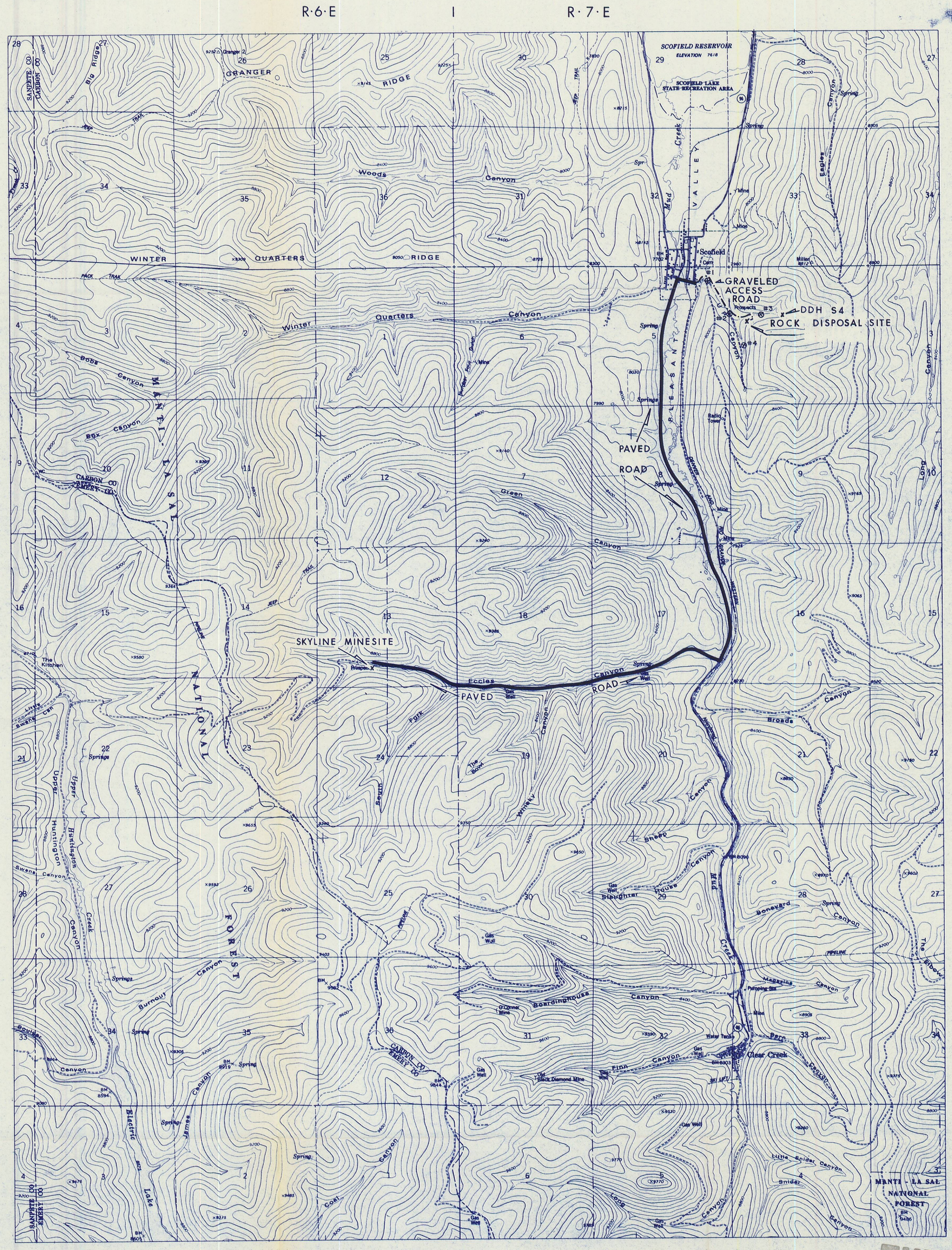
N/A	827.12d
N/A	827.12e
N/A	827.12g
N/A	827.12h
N/A	827.12i
N/A	827.12j
N/A	827.12k
N/A	827.12l
N/A	827.12m
N/A	827.12n
N/A	827.12o



LEGEND

WATER SAMPLE POINT ——— ⊗

FILE COPY
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SEP 21 1987
DIVISION OF OIL GAS & MINING

APPROVAL	DATE	SCALE 1" = 2000'	DATE
		DESIGNED BY GEORGE KENZY	JAN, 82
		DRAWN BY J. HARR	1-82
		CHECKED BY Keith W. Beel	5-84
		APPROVED BY D. Johnson	6-84
		APPROVED BY	

USGS TOPO MAP OF SCOFIELD 7.5 MIN. QUAD 1979

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER No. 5566 DOUGLAS E. JOHNSON STATE OF UTAH
Douglas E. Johnson

COASTAL STATES ENERGY COMPANY
SKYLINE PROJECT

ROCK DISPOSAL SITE AREA

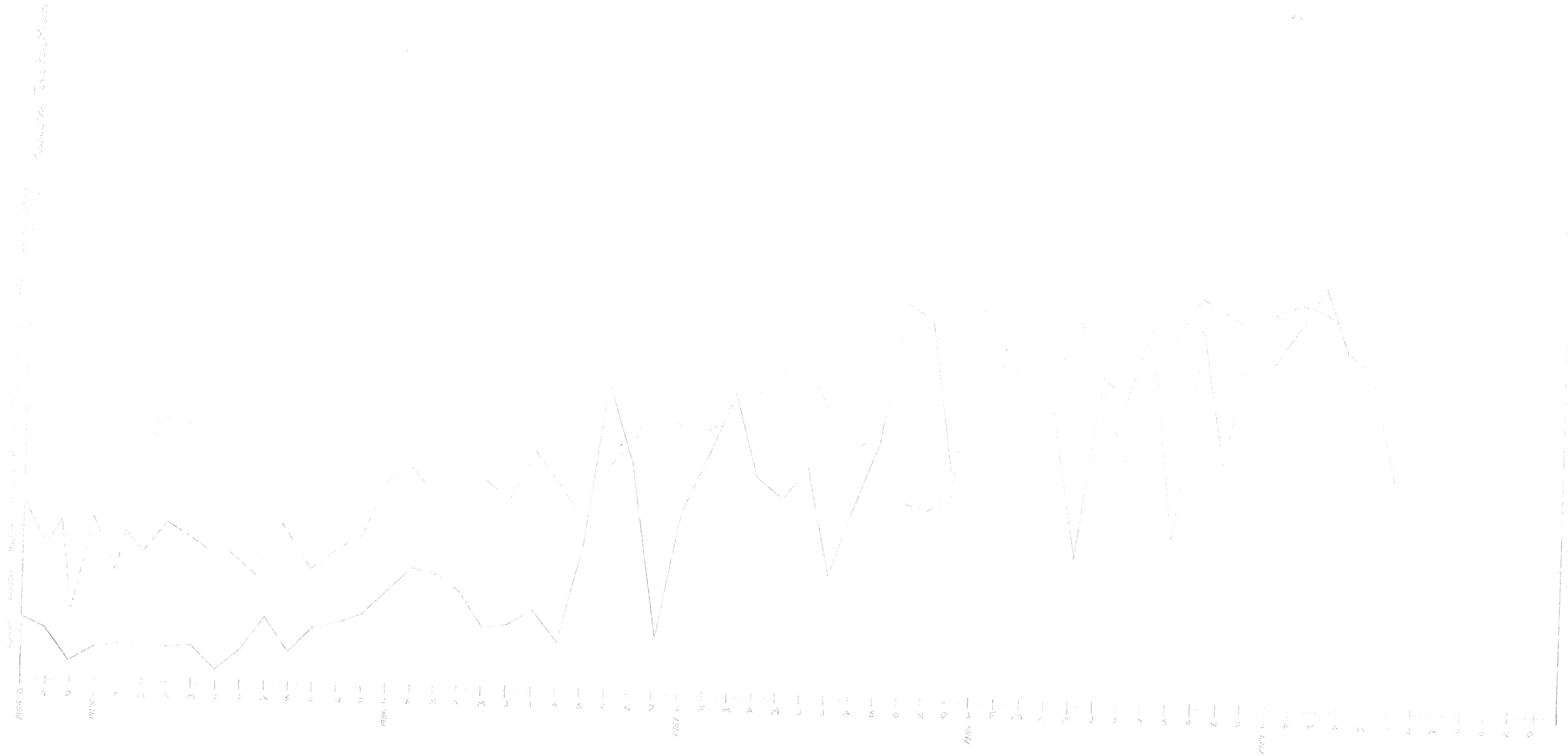
JOB No.

DWG. No. CJ4D003

REVISION R-

MAP OR FIGURE NO. 4.16.1-1A

CJ4D003



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DATE	REVISION	DFT CHK	APP.

		DATE
DESIGNED BY:	K ZOBELL	7-89
DRAWN BY:	DANA DEAN	7-89
CHECKED BY:	KZ 7-89 KW 7-89	
APPROVED BY:		
APPROVED BY:		
REFERENCE DWGS.		

PROFESSIONAL SEAL

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH, 84526

TITLE

MINING PRODUCTION VS WATER DISCHARGE

REV. NO.	LOCATION	MAP NO.
	SHEET 1 OF 1 SCALE	DWG. NO. 4-11-4-A

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NO.	DATE	REVISION	BY	CHK	APP
1					
2					
3					
4					
5	7-20-87	Show Fence Overlays, 'V' Ditch, Silt Fence & Exempt Area			
6	7-16-87	Changed Disturbed Permit & Bonding Boundary, & Gate			

PROFESSIONAL SEAL

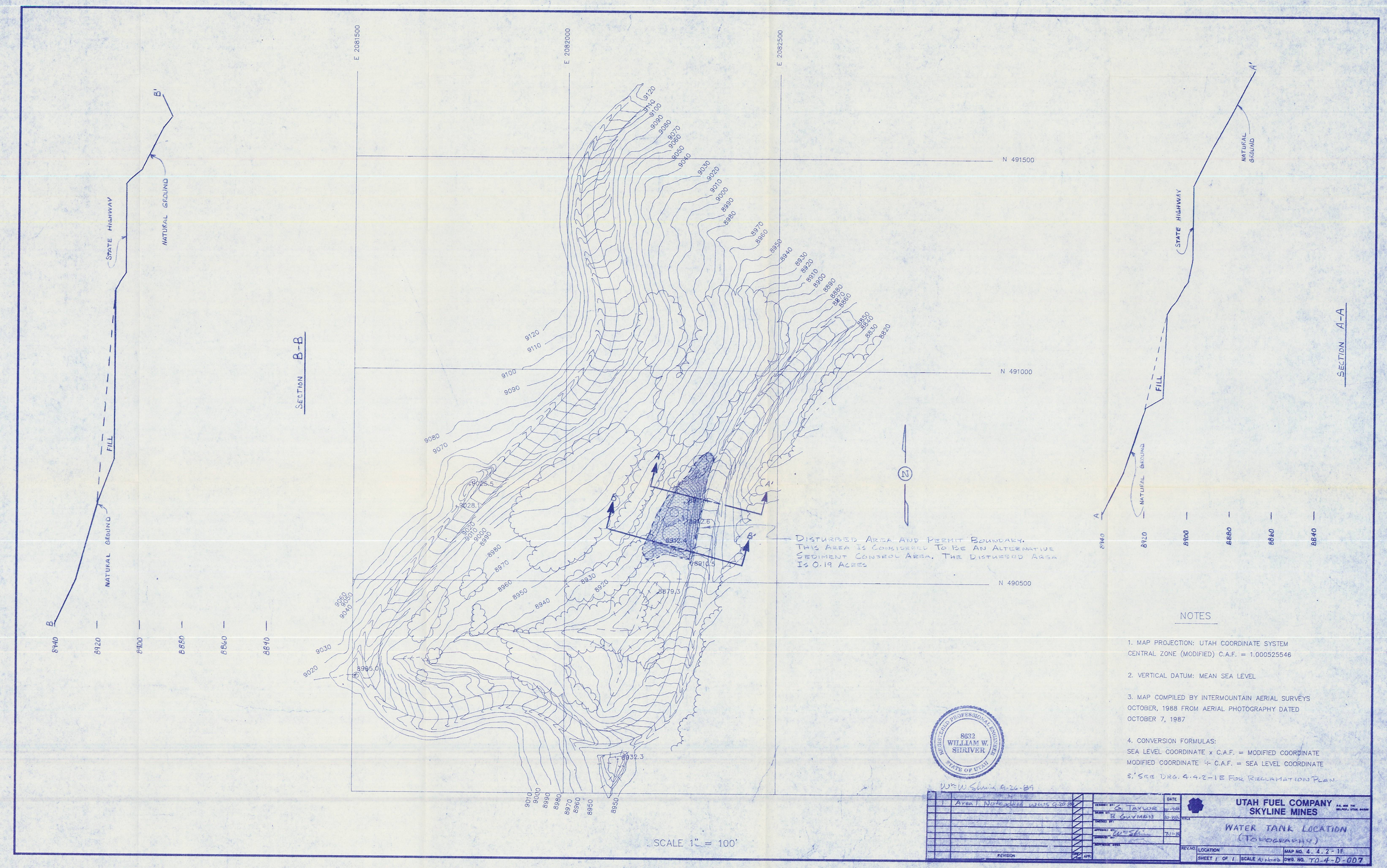
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
REFERENCE DWG.

UTAH FUEL COMPANY
SKYLINE MINE

FINAL RECLAMATION VEGETATION PLAN
RRLO

REV NO. | DESCRIPTION | DWG NO. 4-7.2-2
SHEET | SCALE | OF | DWG. NO.

PREPARED BY UTAH FUEL COMPANY
AERIAL SURVEYS INC. 30 West 2550 South Salt Lake City, Utah 84115-4012



NOTES

1. MAP PROJECTION: UTAH COORDINATE SYSTEM CENTRAL ZONE (MODIFIED) C.A.F. = 1.000525546

2. VERTICAL DATUM: MEAN SEA LEVEL

3. MAP COMPILED BY INTERMOUNTAIN AERIAL SURVEYS OCTOBER, 1988 FROM AERIAL PHOTOGRAPHY DATED OCTOBER 7, 1987

4. CONVERSION FORMULAS:
SEA LEVEL COORDINATE x C.A.F. = MODIFIED COORDINATE
MODIFIED COORDINATE ÷ C.A.F. = SEA LEVEL COORDINATE

5. SEE DWG. 4.4.2-1E FOR RECLAMATION PLAN.

REGISTERED PROFESSIONAL ENGINEER 8632 WILLIAM W. SHRIVER STATE OF UTAH

Wm W Shriver 9-26-89

REV. NO.	REVISION	APR.
1	Area Noted wms 9-20-89	

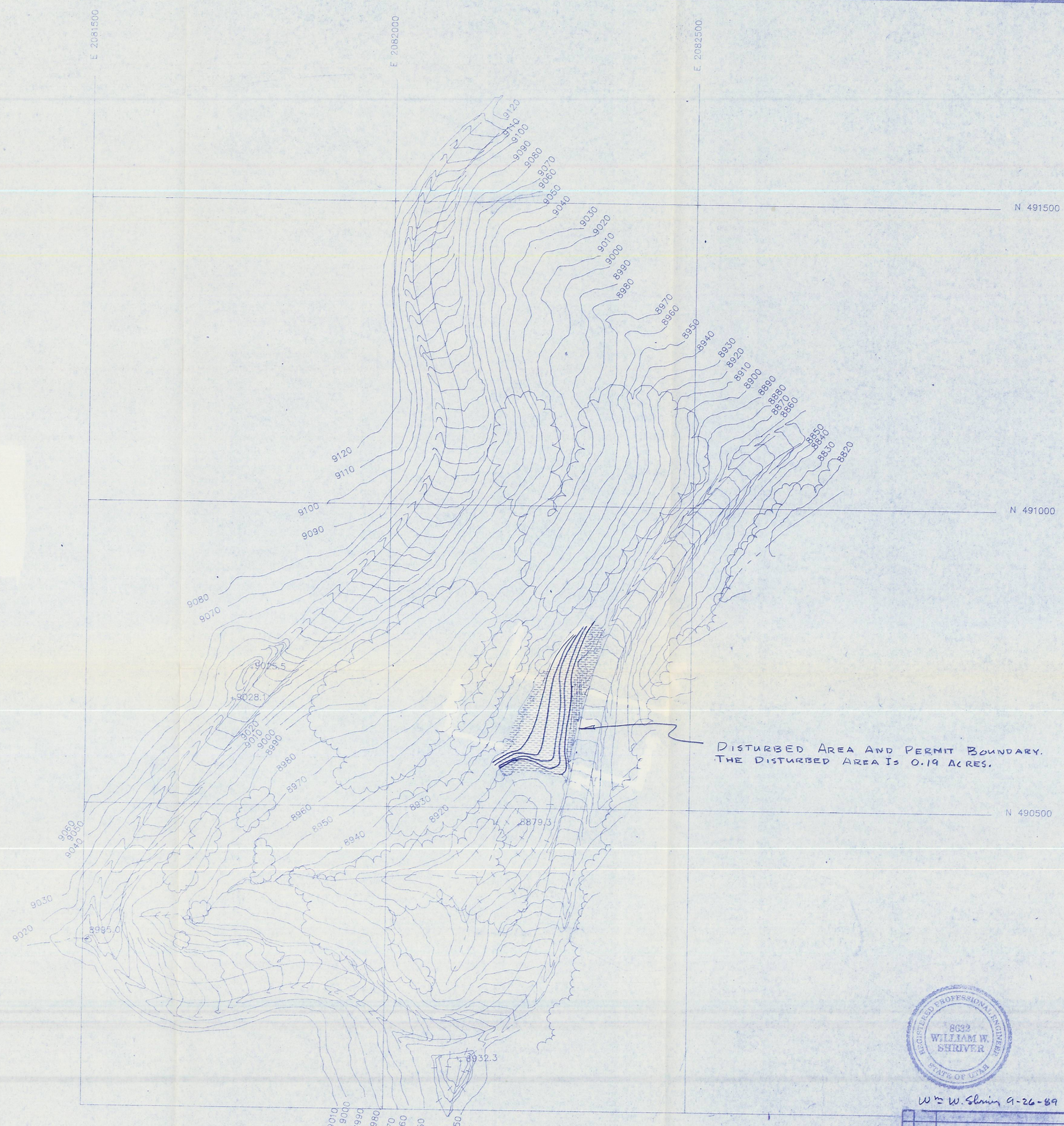
		DATE
DESIGNED BY	G. TAYLOR	10-1-88
DRAWN BY	B. GUYMAN	10-1-88
CHECKED BY		
APPROVED BY	Wm Shriver	7-11-88
SUPERVISOR		

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719 HELPER, UTAH 84526

TITLE: WATER TANK LOCATION (TOPOGRAPHY)

LOCATION
SHEET 1 OF 1 | SCALE As shown | MAP NO. 4.4.2-1F | DWG. NO. TO-4-D-007

Received 10.1.90



SCALE 1" = 100'

NOTES

1. MAP PROJECTION: UTAH COORDINATE SYSTEM CENTRAL ZONE (MODIFIED) C.A.F. = 1.000525546

2. VERTICAL DATUM: MEAN SEA LEVEL

3. MAP COMPILED BY INTERMOUNTAIN AERIAL SURVEYS OCTOBER, 1988 FROM AERIAL PHOTOGRAPHY DATED OCTOBER 7, 1987

4. CONVERSION FORMULAS:
SEA LEVEL COORDINATE x C.A.F. = MODIFIED COORDINATE
MODIFIED COORDINATE ÷ C.A.F. = SEA LEVEL COORDINATE

5. SEE DRG. 4.4.2-1F FOR PLOT PLAN TOPO.

REGISTERED PROFESSIONAL ENGINEER
8622
WILLIAM W. SHRIVER
STATE OF UTAH

W. W. Shriver 9-26-89

REVISION		APP.	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
APPROVED BY: W. W. Shriver 7-11-89
SUPERVISOR DATE:

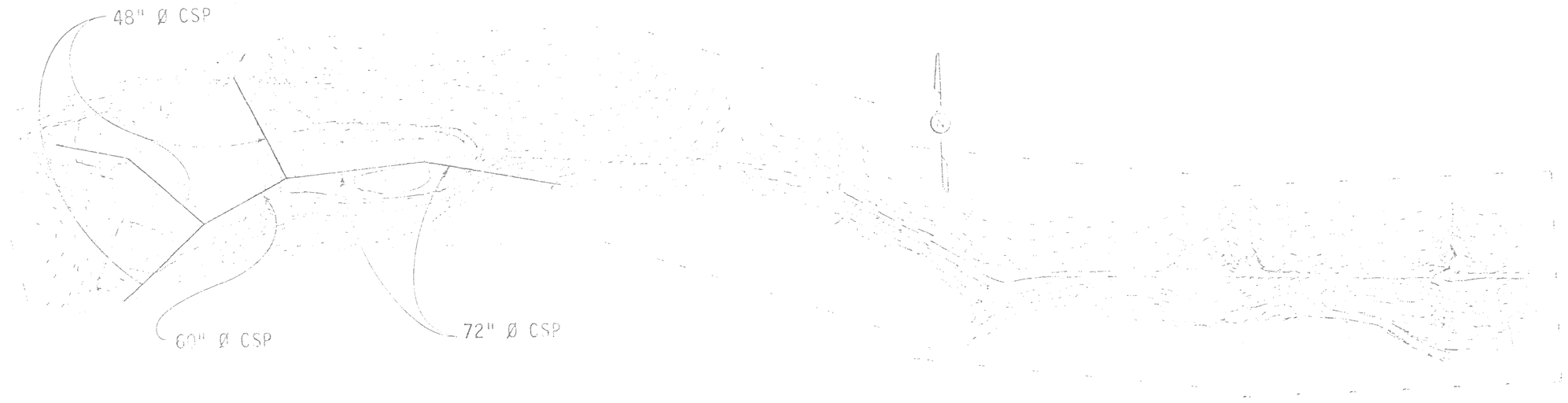
UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719, HELPER, UTAH 84526

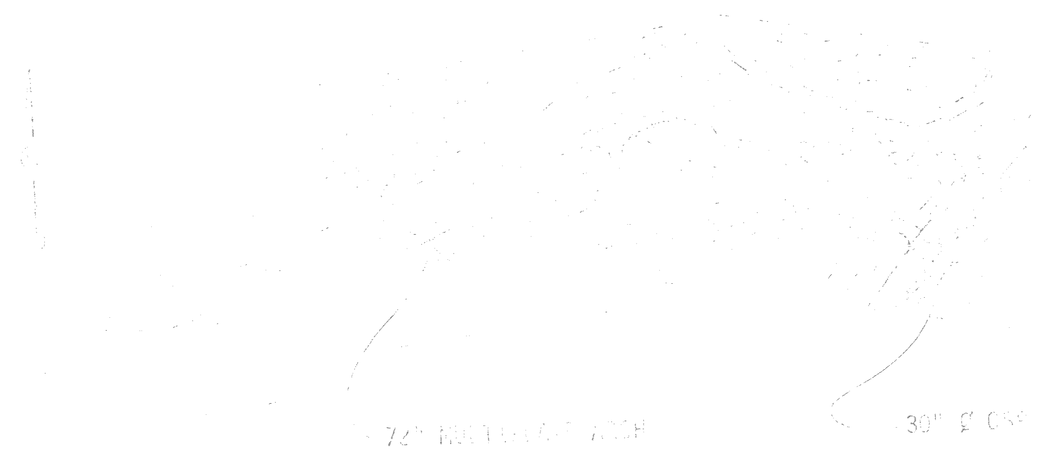
TITLE
WATER TANK LOCATION
RECLAMATION PLAN

REV. NO. | LOCATION | MAP NO. 4.4.2-1E
SHEET 1 OF 1 | SCALE As shown | DWG. NO. TO-4-D-007

Received 10.1.90

WATER TANK AREA





WASTE ROCK DISPOSAL AREA

REV.	DESCRIPTION
IV	SUBMITTED FOR REVIEW
I	DRAFT
II	FOR REGULATION

FILE COPY

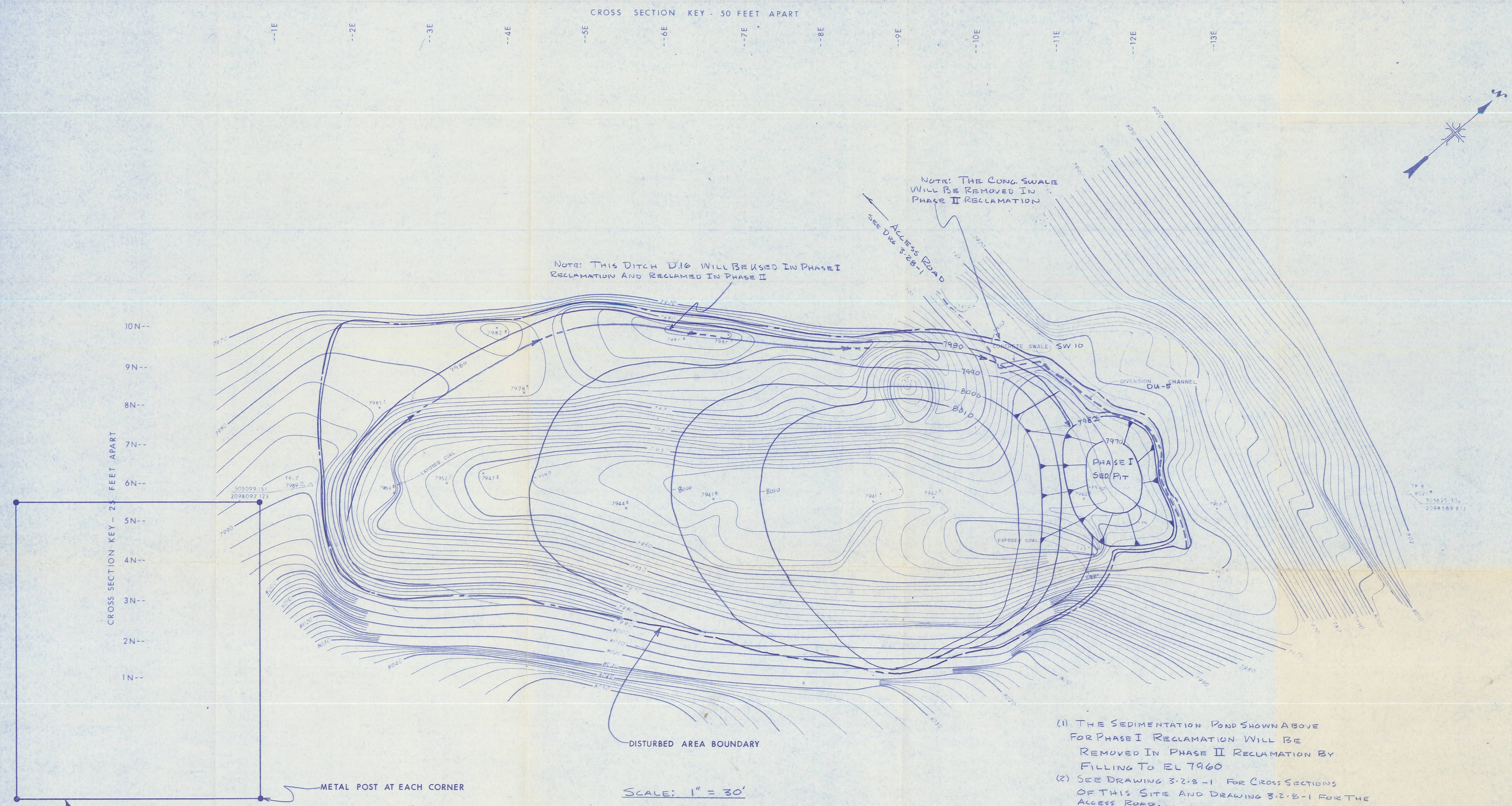
RECEIVED
JUL 19 1999
DIVISION OF
OIL, GAS & MINING

PHASED RECLAMATION

NO.	DATE	REVISION	BY	CHK.	APP.

LOCATION	DWG. NO. 4.2-1
SHEET 1 OF 1 SCALE AS NOTED	DWG. NO.

Reproducibility checked by Permastore/APS Micro in INTERMOUNTAIN ANALYTICAL SURVEYS, Salt Lake City, Utah on 04/19/97



SCALE: 1" = 30'

(1) THE SEDIMENTATION POND SHOWN ABOVE FOR PHASE I RECLAMATION WILL BE REMOVED IN PHASE II RECLAMATION BY FILLING TO EL 7960

(2) SEE DRAWING 3.2.8-1 FOR CROSS SECTIONS OF THIS SITE AND DRAWING 3.2.8-1 FOR THE ACCESS ROAD.

(3) THE DISTURBED AREA FOR THIS SITE IS 1.57 ACRES AND THE DISTURBED AREA FOR THE ROAD IS 0.1 ACRES FOR A TOTAL DISTURBED AREA OF 1.67 ACRES

RECEIVED 10.1.90

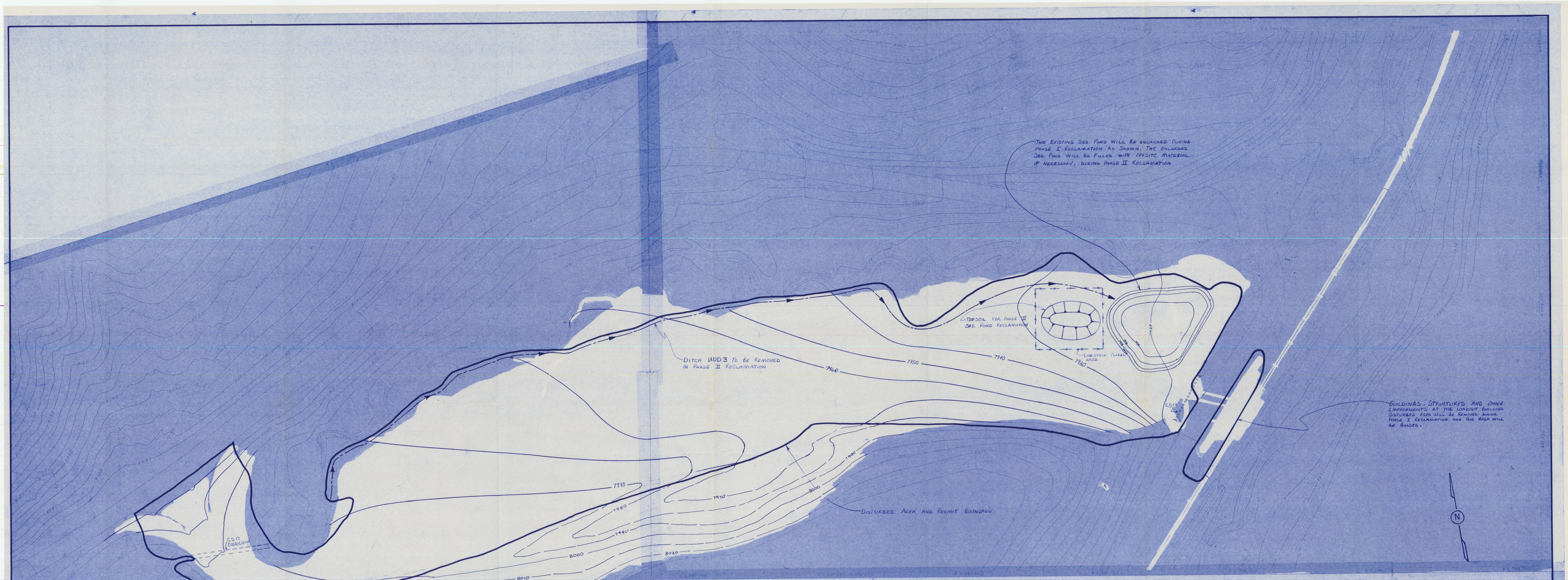
APPROVAL	DATE	SCALE 1" = 30'	DATE
		DESIGNED BY G KENZY & BOYLE ENGINEERING	1981
		DRAWN BY H	1/82
		CHECKED BY G KENZY	1/82
		APPROVED BY Douglas E Johnson	11-88
		APPROVED BY W. Shiu 7-5-89 KH 7-5-89	
REV. 1 REV 2		PHASE I & PHASE II RECLAMATION NOTE Notes Added WWS, Contours, Corrected	WWS 7-1-89 DEJ 7-5-89

PROFESSIONAL SEAL: REGISTERED PROFESSIONAL ENGINEER NO. 5565 DOUGLAS E JOHNSON STATE OF UTAH

COASTAL STATES ENERGY COMPANY
SKYLINE PROJECT

ROCK DISPOSAL SITE
RECLAMATION PLAN

JOB No.
DWG. No. CIHD004
REVISION R-
MAP OR FIGURE NO. 4.16.1-1B



NOTES

1. DU2 WILL BE BACKFILLED DURING PHASE II RECLAMATION TOGETHER WITH THE SEDIMENTATION PONDS

2. ALL CULVERTS WITHIN THE DISTURBED AREA EXCEPT CD12 AND CD10 WILL BE REMOVED DURING RECLAMATION. IN PHASE I RECLAMATION CD10 WILL BE REPLACED WITH A NEW 61-1" x 61-1" PIPE ARCH, (CD17). CD12 WILL REMAIN AS A PORTION OF THE RECLAMED SITE

3. THE DISTURBED AREA ON THIS MAP IS 13.82 ACRES

NO	DATE	REVISION	APP
1	9-22-89	Contours Corrected, Data Revised, Notes Added	
2	10-6-89	Changed Contour at Sed pond	

		DATE
DESIGNED BY:	R. CASELL & W. LAWVER	7-89
DRAWN BY:	S. GUYMON	7-89
CHECKED BY:		
APPROVED BY:		
APPROVED BY:		
REFERENCE DWGS.		

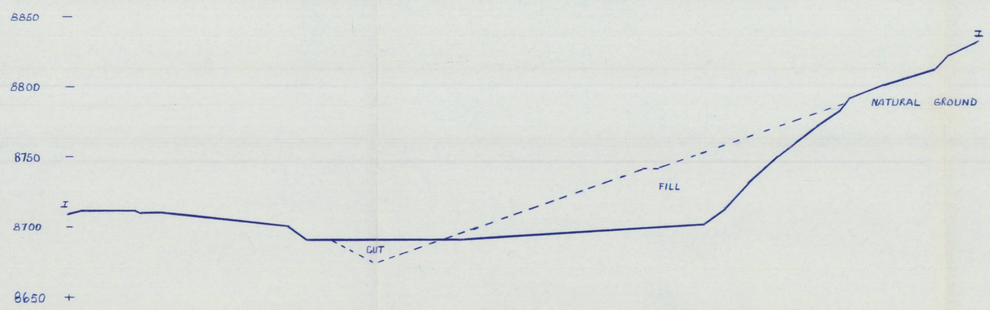
PROFESSIONAL SEAL

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH 84526

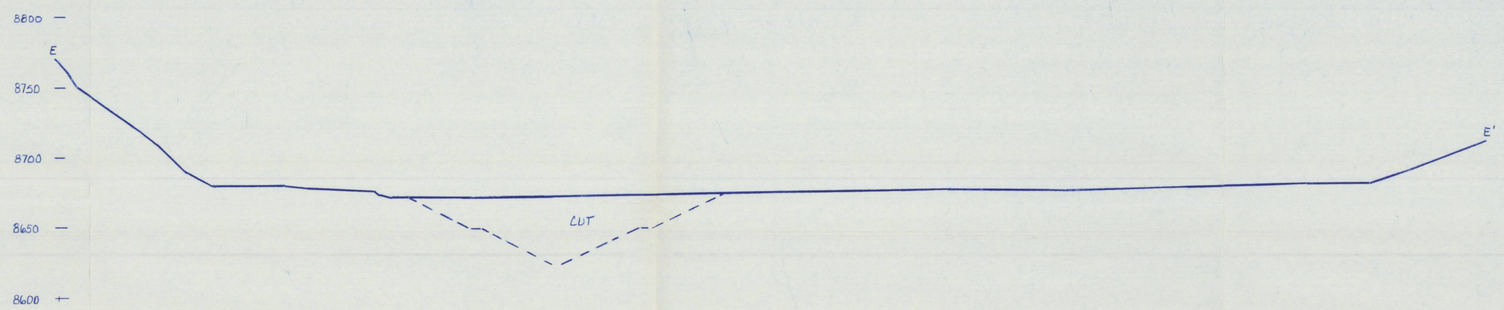
TITLE
LOADOUT SURFACE FACILITIES
RECLAMATION PLAN

Received 10-1-90

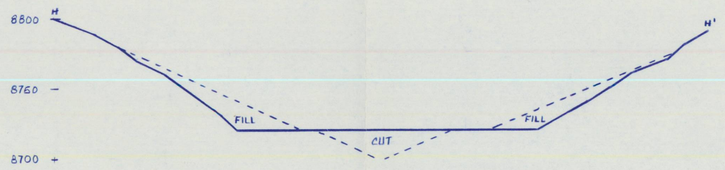
REV. NO.	LOCATION	MAP NO. 4.4.2-1C
	SHEET 1 OF 1 SCALE 1" = 50'	DWG. NO.



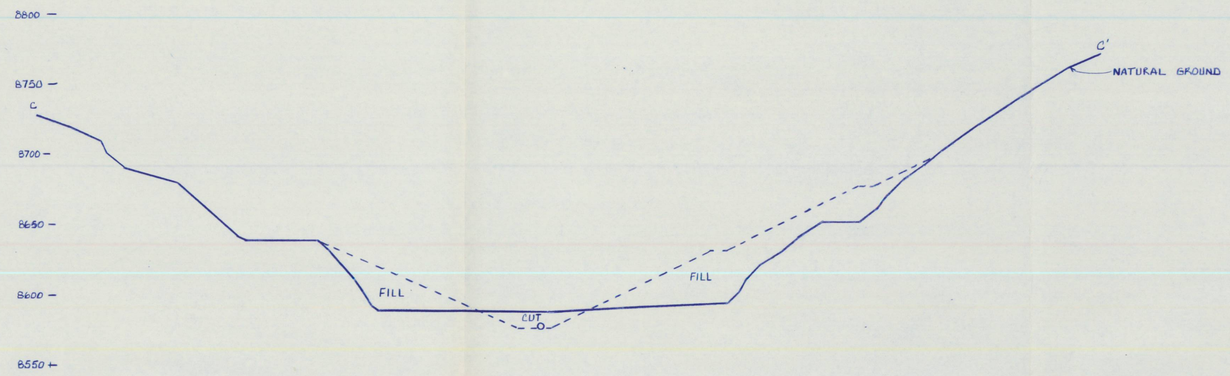
SECTION I-I



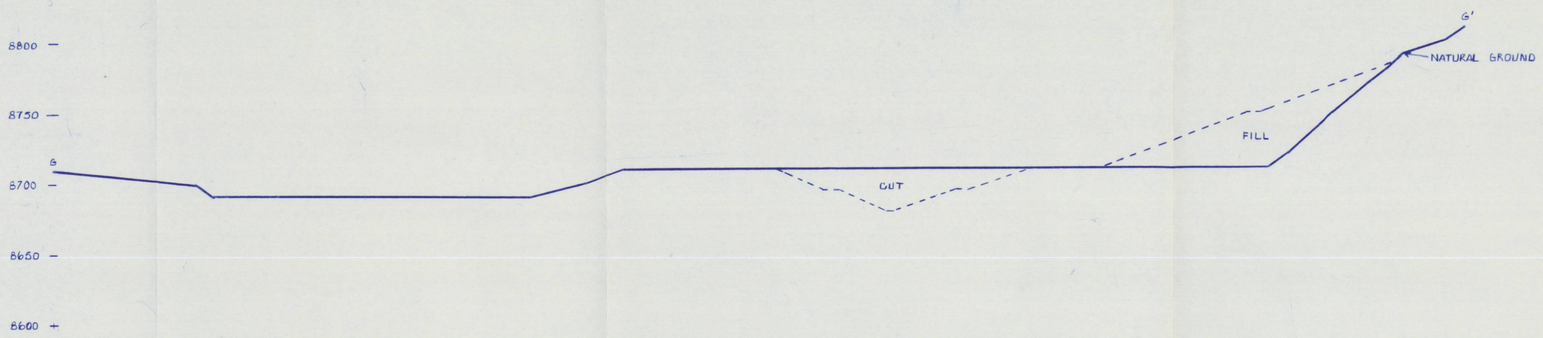
SECTION E-E



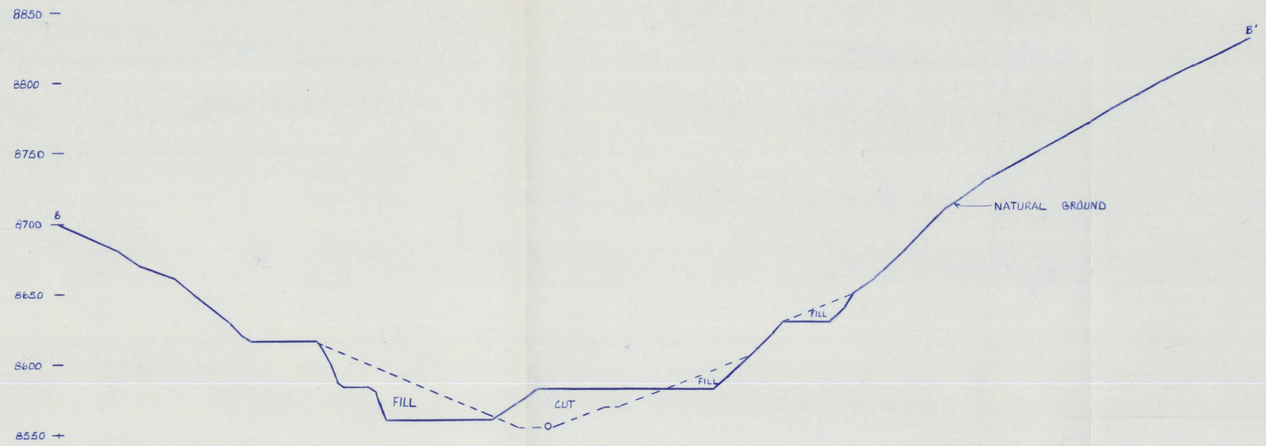
SECTION H-H



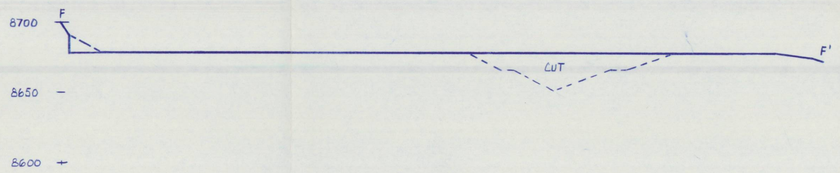
SECTION C-C



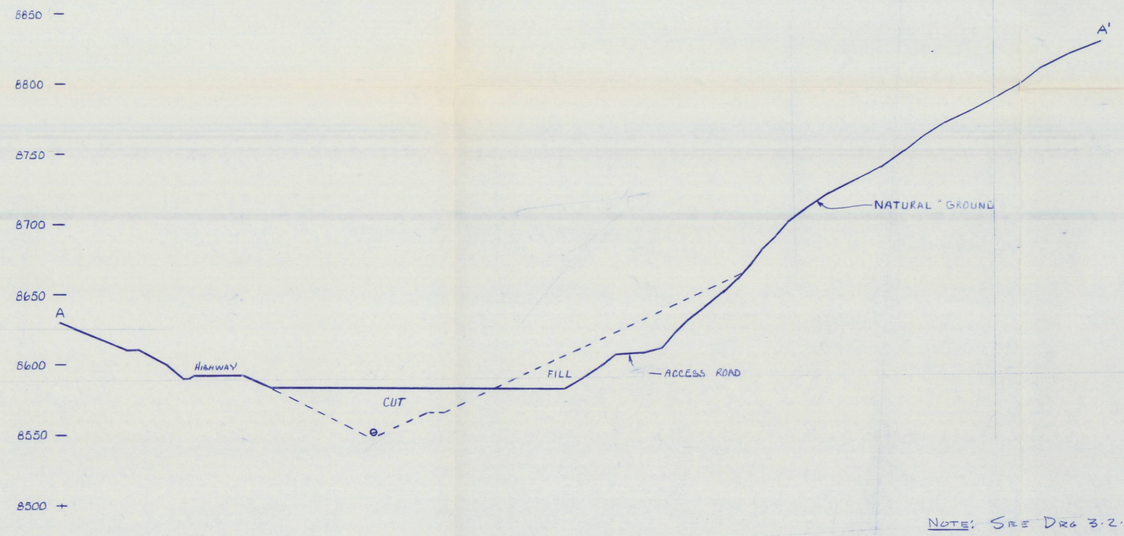
SECTION G-G



SECTION B-B



SECTION F-F



SECTION A-A

NOTE: SEE DRG 3.2.1-1, MINE SURFACE FACILITY PLOT PLAN AND 4.4.2-1A, MINE SURFACE FACILITIES RECLAMATION PLAN FOR SECTION LOCATION AND DETAILS

NO.	DATE	REVISION	DRG	APP.

		DATE
DESIGNED BY:	G. TAYLOR	7-84
DRAWN BY:	B. GUYMAN	7-84
CHECKED BY:	WWS	7-84
APPROVED BY:	W. Shirley	7-11-84
APPROVED BY:		
REFERENCE DWGS.		

PROFESSIONAL SEAL

9-25-84 W. Shirley

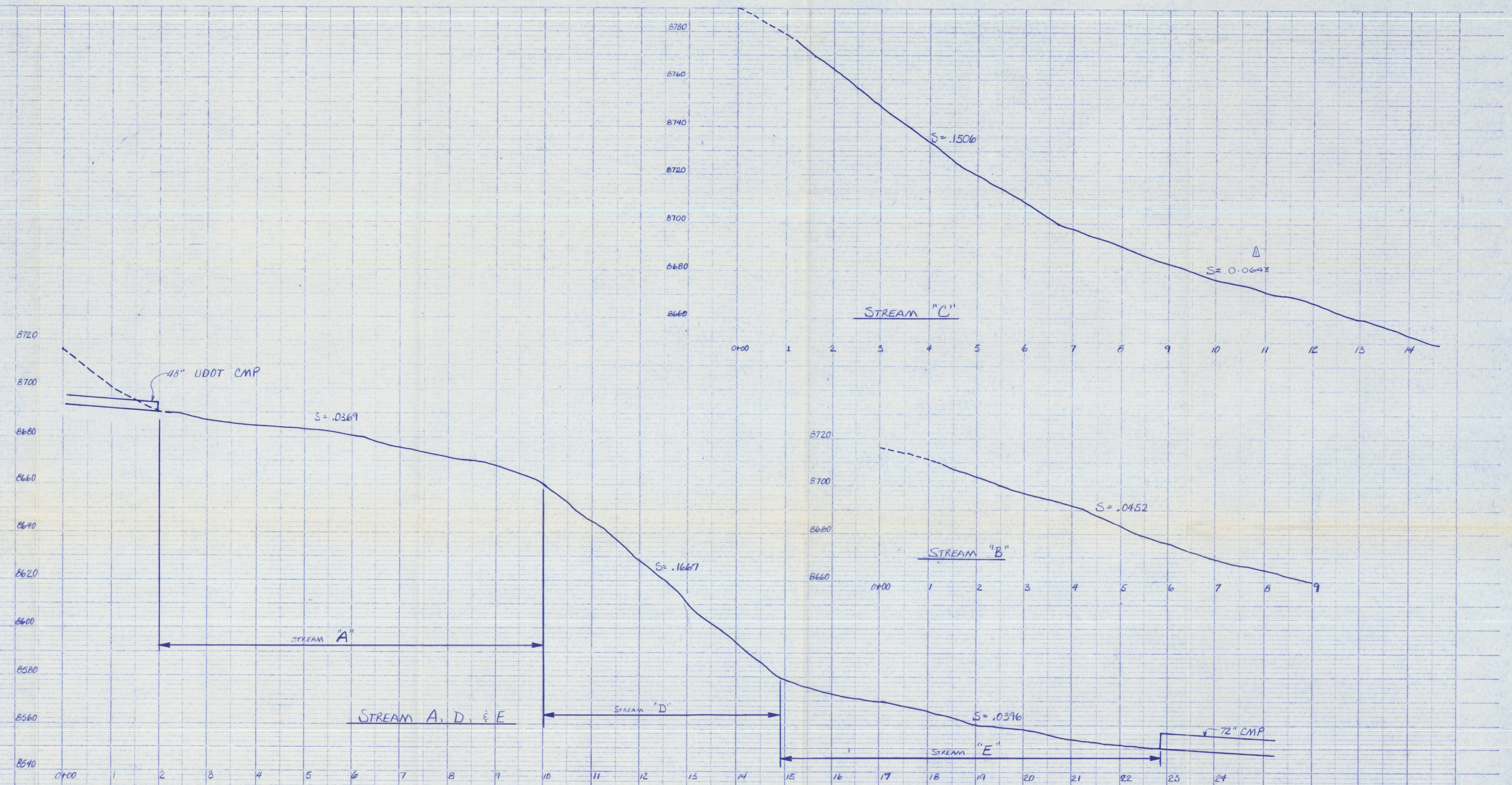
UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH 84526

TITLE

MINESITE CROSS SECTIONS

Received 10-1-90

REV. NO.	LOCATION	MAP NO. 4.4.2-1B
	SHEET OF SCALE: 1"=50' u.f.v.	DWG. NO.



NO.	DATE	REVISION	DRW	CHK	APP.
1	9-20-89	SLOPE OF STREAM "C" CORRECTED			

DESIGNED BY: TAYLOR & SHRIVER
DRAWN BY: B. GUYMON 7-89
CHECKED BY: ZCH 7/89
APPROVED BY: WS 7-89
APPROVED BY:
REFERENCE DWGS.

PROFESSIONAL SEAL: REGISTERED PROFESSIONAL ENGINEER 8632 WILLIAM W. SHRIVER STATE OF UTAH
W. Shriver 9-26-89

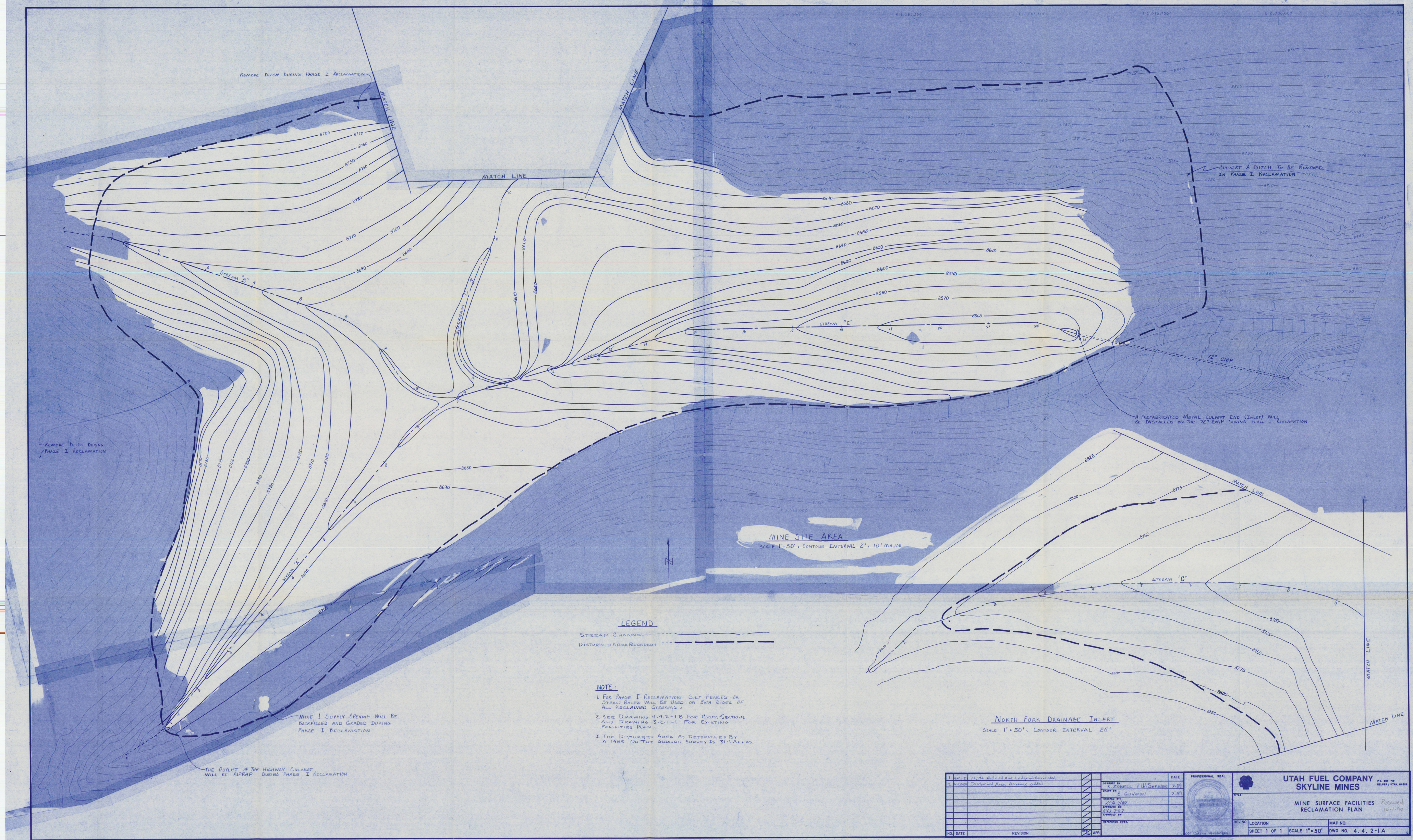
UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH 84526

TITLE: **MINESITE RECLAMATION**
STREAM GRADIENTS

Received 10.1.90

REV. NO.	LOCATION		MAP NO.
	SHEET 1 OF 1	1"=100 H / SCALE 1"=100 V	DWG. NO. 4. 4. 2-1 B1

NOWATA ENGINEERING CO. 100764



LEGEND

STREAM CHANNEL

DISTURBED AREA BOUNDARY

NOTE:

1. FOR PHASE I RECLAMATION SILT FENCES OR STRAW BALES WILL BE USED ON BOTH SIDES OF ALL RECLAIMED STREAMS.
2. SEE DRAWING 4.4.2-1B FOR CROSS SECTIONS AND DRAWING 3.2.1-1 FOR EXISTING FACILITIES PLAN.
3. THE DISTURBED AREA AS DETERMINED BY A 1985 ON THE GROUND SURVEY IS 31.1 ACRES.

NO.	DATE	REVISION	APR.
1	4-25-89	Note Added And Legend Corrected	
2	9-12-89	Disturbed Area Acreage Added	

		DATE
DESIGNED BY:	R. CORELL / W. SHRINER	7-87
DRAWN BY:	S. GUNNION	7-87
CHECKED BY:	7-24-87	
APPROVED BY:	7-27-87	
APPROVED BY:		
REFERENCE DWGS.		

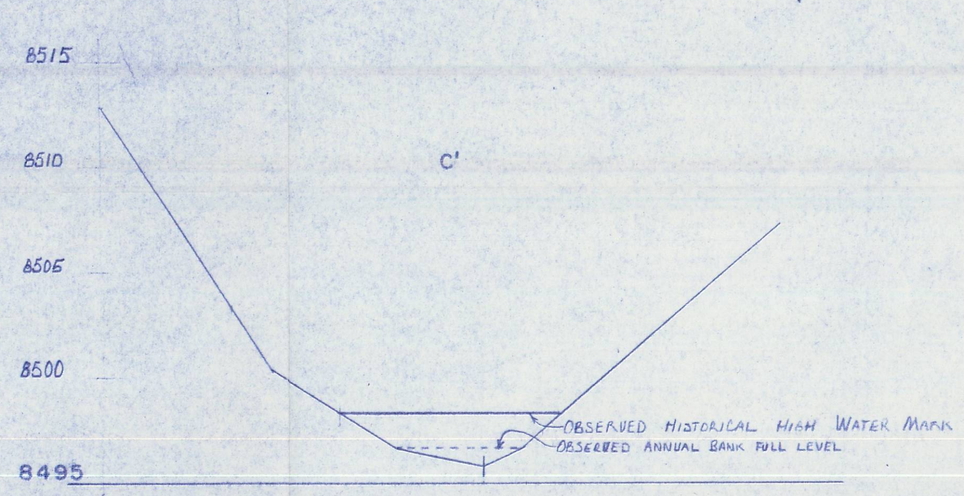
PROFESSIONAL SEAL

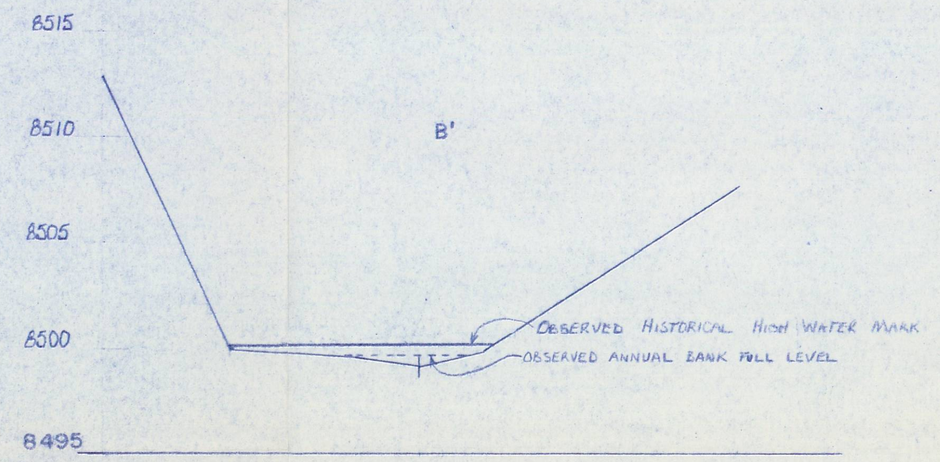
UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH 84526

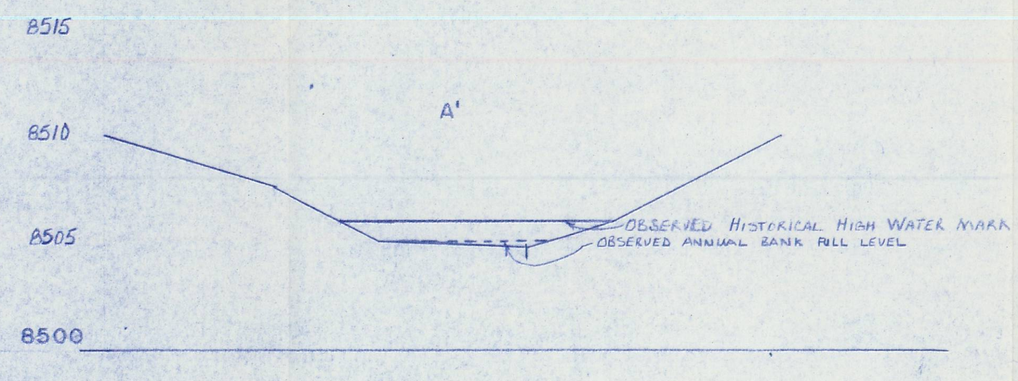
TITLE: MINE SURFACE FACILITIES RECLAMATION PLAN

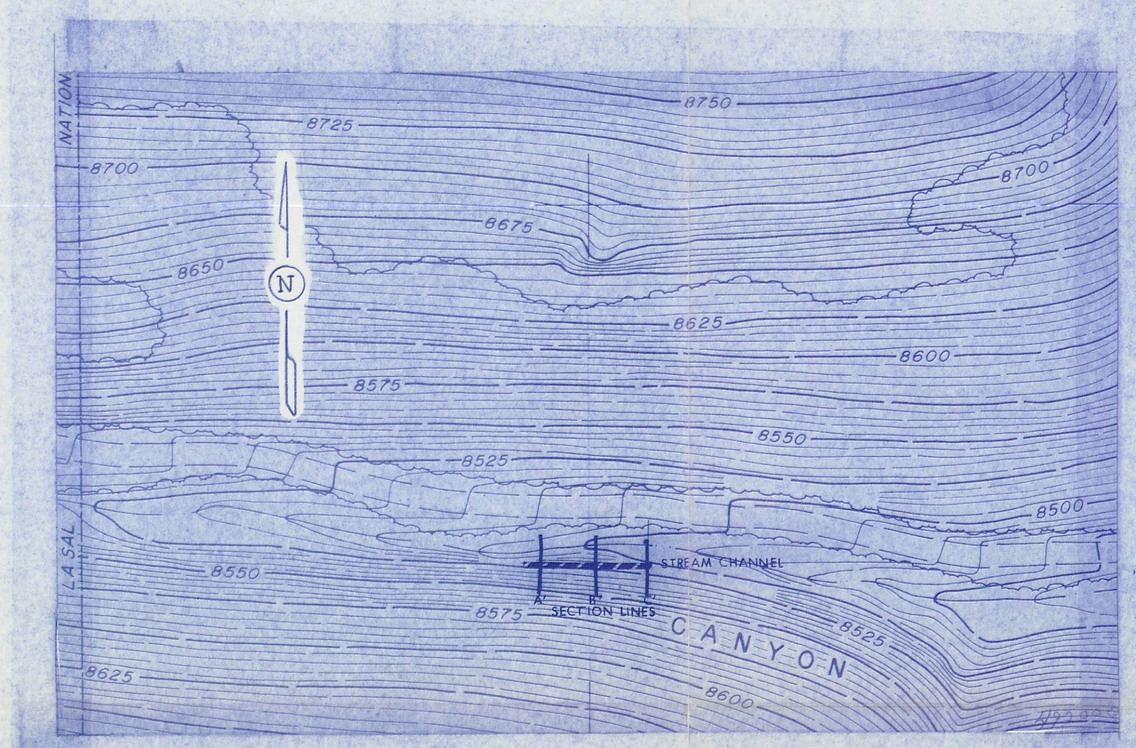
Received 10-1-90

REV. NO.	LOCATION		MAP NO.
	SHEET 1 OF 1	SCALE 1"=50'	DWG. NO. 4.4.2-1A









PLAN SHOWING LOCATION OF SECTIONS ON MAIN ECCLES CREEK

1" = 100

NOTE:

1. THE CROSS-SECTIONS SHOWN ARE FROM A FIELD SURVEY DATED 10-27-87. (SURVEY BY ART RICHARDSON AND BRUCE GUSMAN. RECORDED IN SURFACE FIELDBOOK #1 & 2.)

NO.	DATE	REVISION	DRW	CHK	APP.

		DATE
DESIGNED BY:		
DRAWN BY:	AGR	7-89
CHECKED BY:		
APPROVED BY:		
APPROVED BY:		
REFERENCE DWGS.		

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER 8632 WILLIAM W. SHRIVER STATE OF UTAH

William W. Shriver 9-26-89

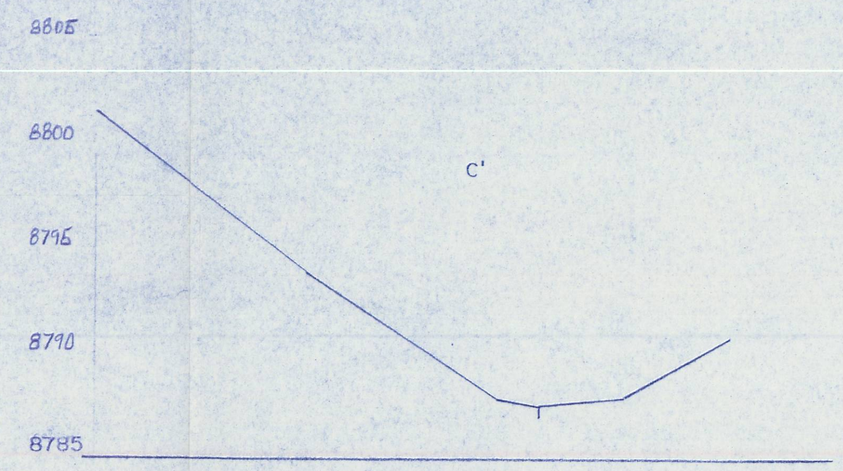
UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH, 84526

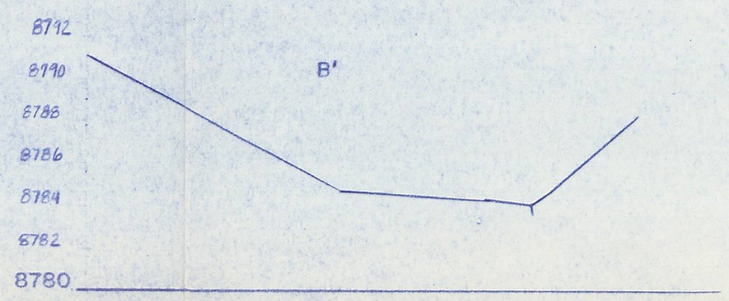
TITLE
CROSS SECTION
MAIN CHANNEL ECCLES CREEK

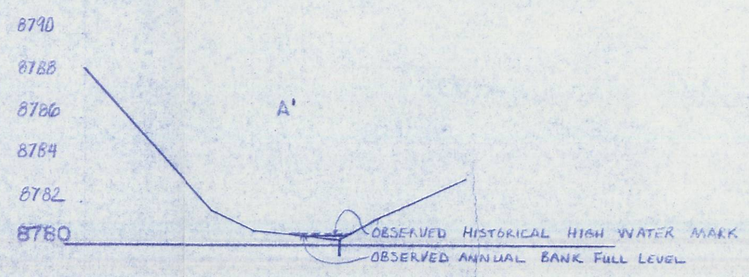
Received 10-1-90

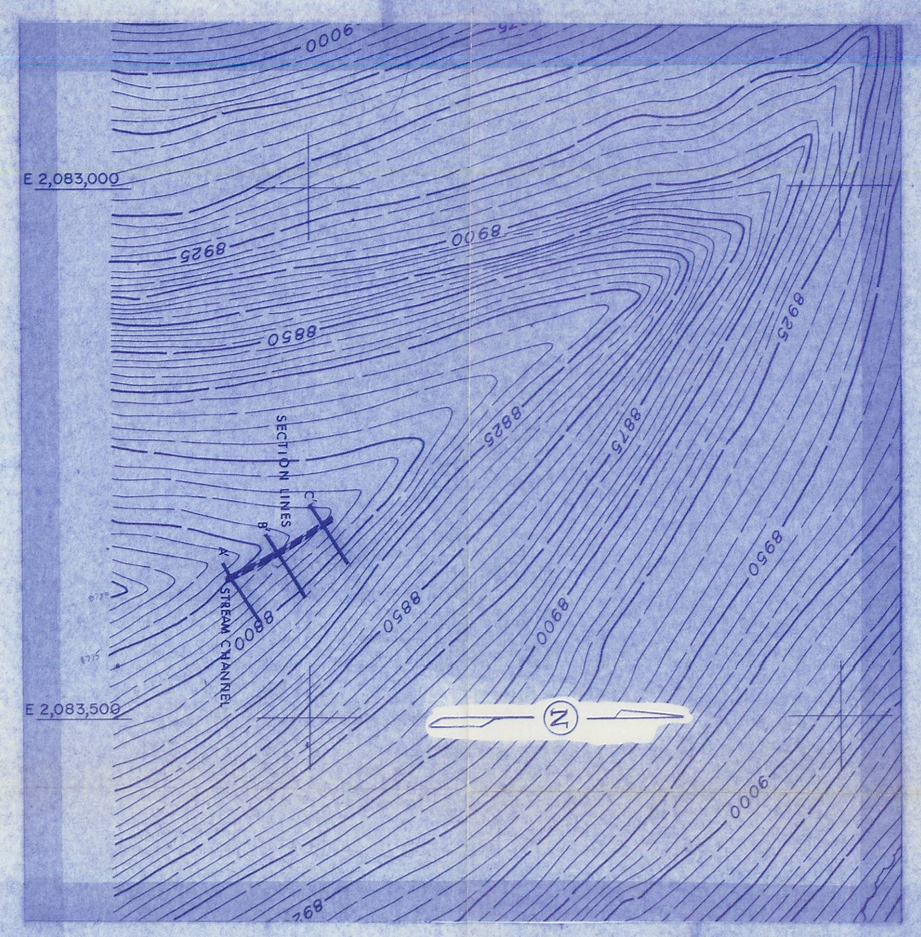
REV. NO.	LOCATION		MAP NO. 4.19.5-4
	SHEET 1 OF 1	SCALE 1" = 5'	DWG. NO.

MORGAN ENGINEERING CO.
108764









PLAN SHOWING LOCATION OF SECTIONS ON NORTH FORK CREEK
1" = 100'

NOTE:

1. THE CROSS-SECTIONS SHOWN ARE FROM A FIELD SURVEY DATED 9-24-87. (SURVEY BY ART RICHARDSON AND BRUCE GUNNION. RECORDED IN SURFACE FIELDBOOK #1.)

NO.	DATE	REVISION	DWN CHK	APP.

	DATE
DESIGNED BY:	
DRAWN BY: AGR	7-89
CHECKED BY:	
APPROVED BY:	
APPROVED BY:	
REFERENCE DWGS.	

PROFESSIONAL SEAL
REGISTERED PROFESSIONAL ENGINEER
8632
WILLIAM W. SHRIVER
STATE OF UTAH

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH. 84526

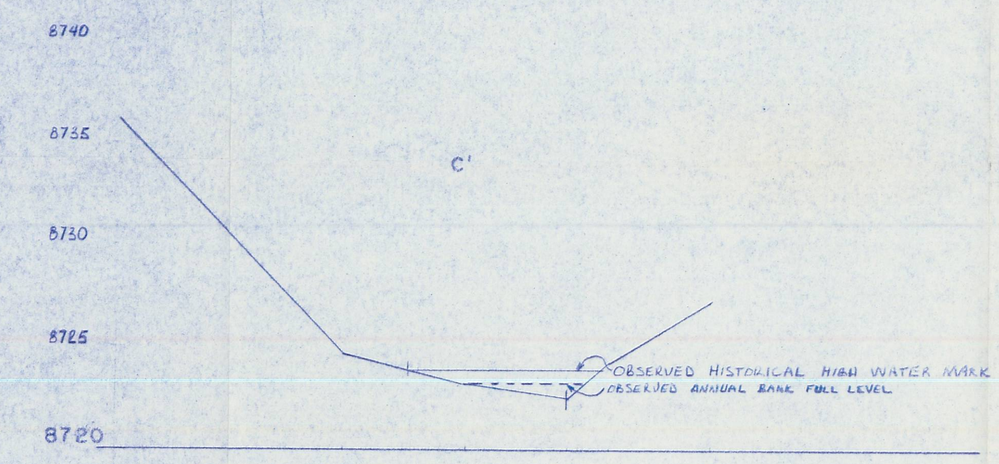
TITLE
CROSS SECTION
NORTH FORK OF ECCLES CREEK

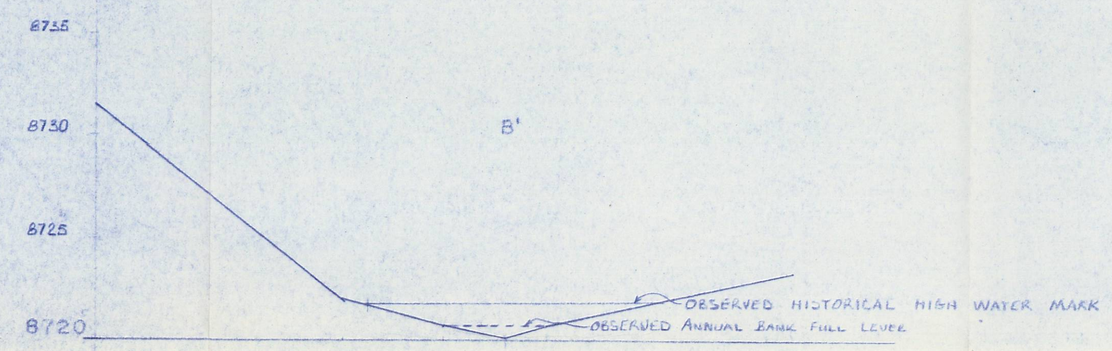
Received 10-1-90

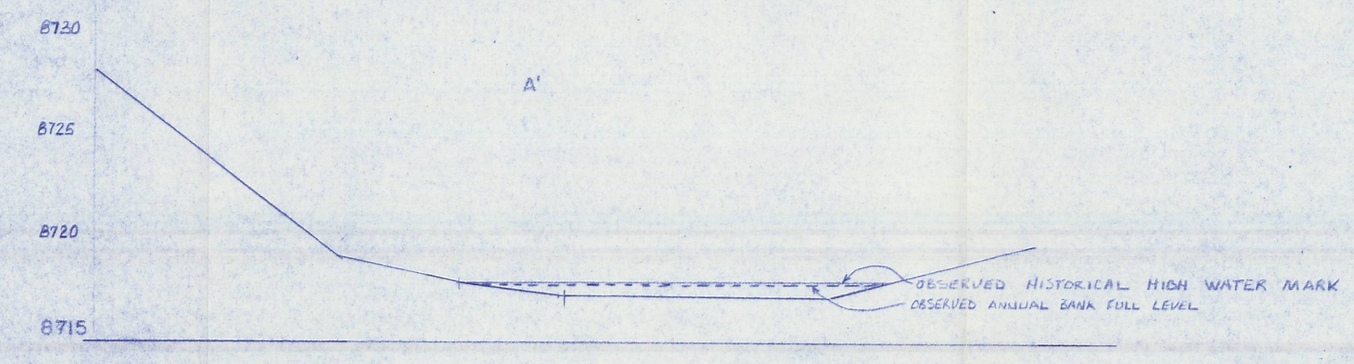
REV. NO.	LOCATION	MAP NO. 4.19.5-3
	SHEET 1 OF 1 SCALE 1" = 5'	DWG. NO.

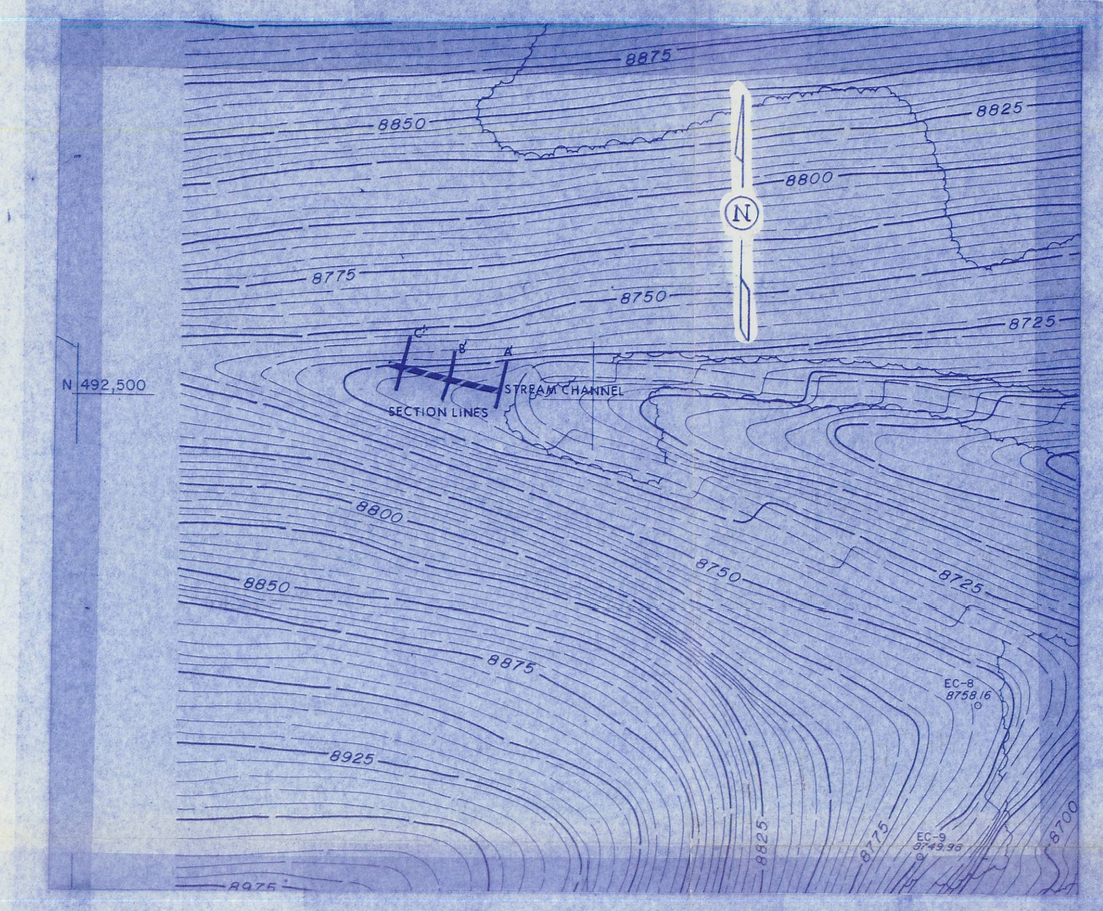
DWG NO.

HANSEN ENGINEERING CO.
108784









PLAN SHOWING LOCATION OF SECTIONS ON MIDDLE FORK CREEK

1" = 100'

NOTE:

1. THE CROSS-SECTIONS SHOWN ARE A FIELD SURVEY DATED 9-24-87. (SURVEY BY ART RICHARDSON AND BRUCE GUYMON. RECORDED IN SHREAVE FIELDBOOK #1.)

NO.	DATE	REVISION	DRW CHK	APP.

	DATE
DESIGNED BY:	
DRAWN BY: AGR	7-89
CHECKED BY: WWS	9-26-89
APPROVED BY:	
APPROVED BY:	
REFERENCE DWGS.	

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER 8832 WILLIAM W. SHRIVER STATE OF UTAH

W W Shriver 9-26-89

UTAH FUEL COMPANY
SKYLINE MINES

P.O. BOX 719
HELPER, UTAH. 84526

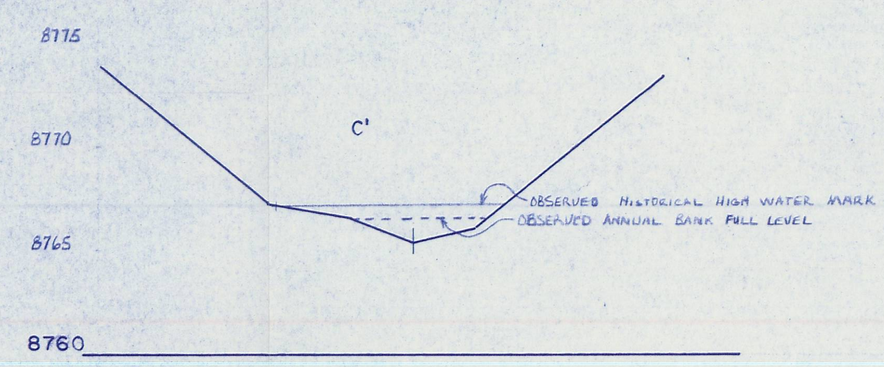
TITLE

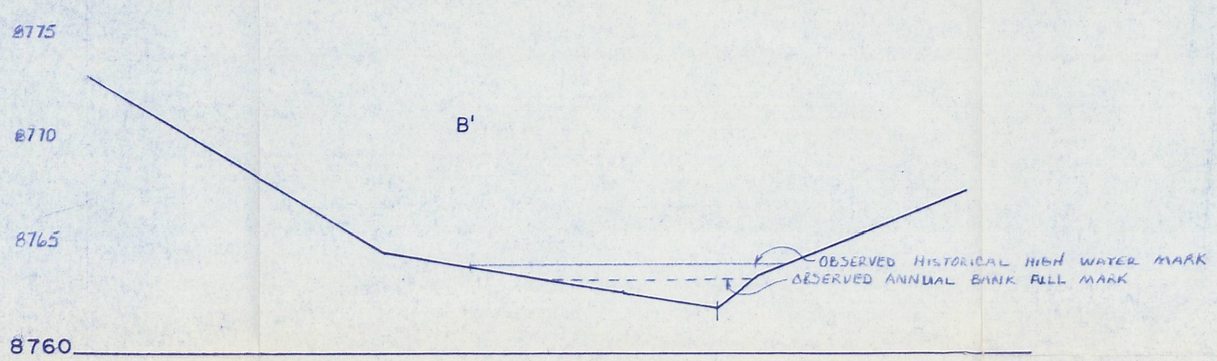
CROSS SECTION
MIDDLE FORK OF ECCLES CREEK

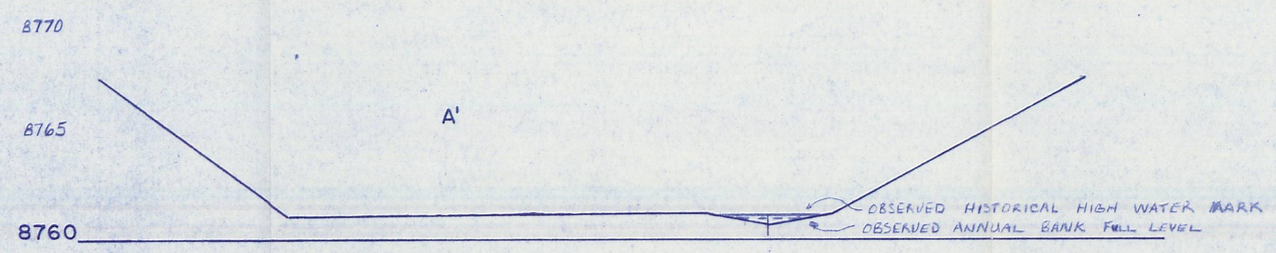
Received 10.1.90

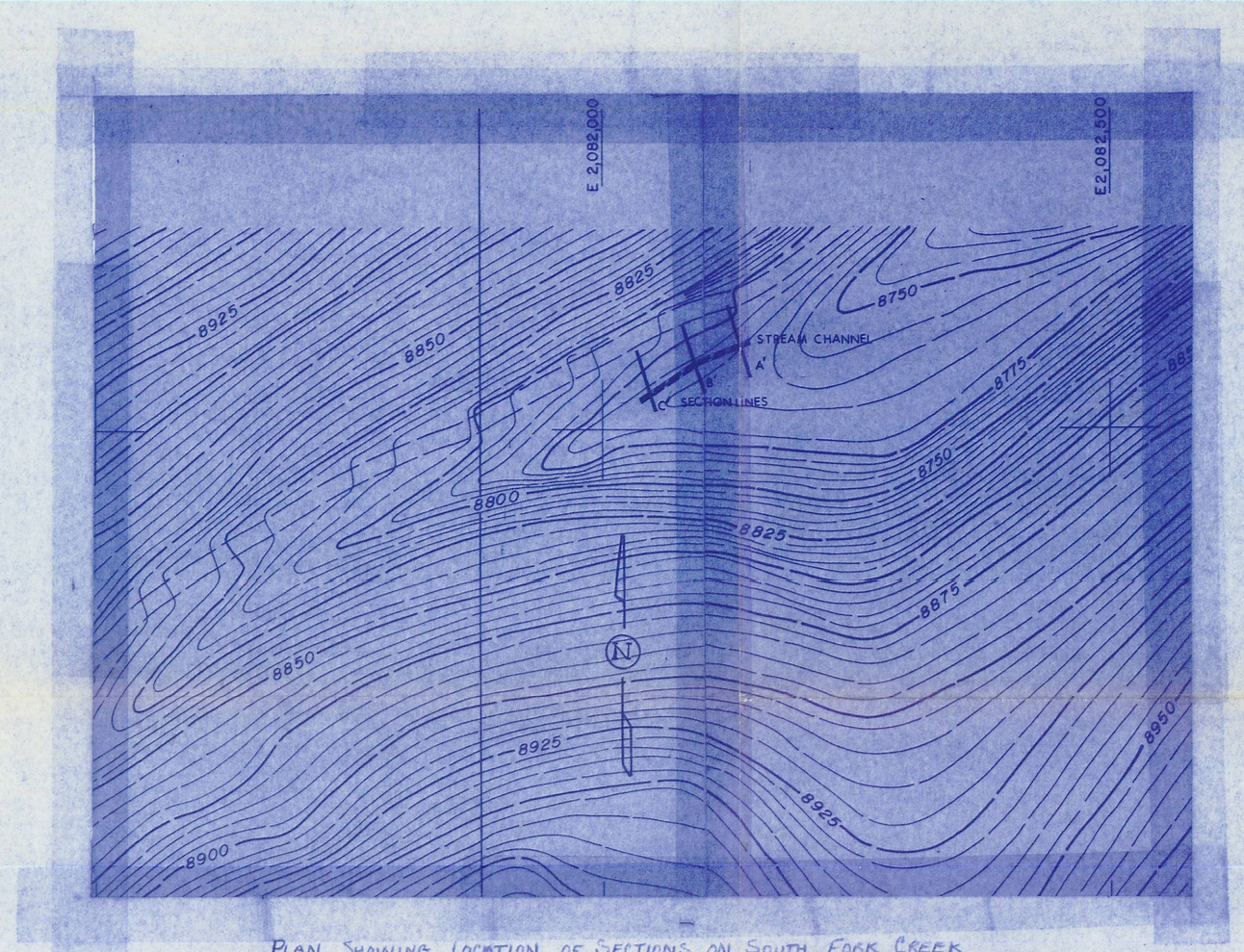
REV. NO.	LOCATION	MAP NO. 4.19.5-2
	SHEET 1 OF 1 SCALE 1" = 5'	DWG. NO.

LOKEN ENGINEERING CO.
108764









PLAN SHOWING LOCATION OF SECTIONS ON SOUTH FORK CREEK
1" = 100'

NOTE:

1. THE CROSS-SECTIONS SHOWN ARE A FIELD SURVEY DATED 9-23-87.
(SURVEY BY ART RICHARDSON AND BRUCE SLUYMON. RECORDED IN SURFACE FIELDBOOK #1)

NO.	DATE	REVISION	DRW CHK	APP.

		DATE
DESIGNED BY:		
DRAWN BY:	AGR	7-87
CHECKED BY:		
APPROVED BY:		
APPROVED BY:		
REFERENCE DWGS.		

PROFESSIONAL SEAL
REGISTERED PROFESSIONAL ENGINEER
8632
WILLIAM W. SHRIVER
STATE OF UTAH

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH. 84526

TITLE
CROSS SECTION
SOUTH FORK OF ECCLES CREEK

Received 10-1-90

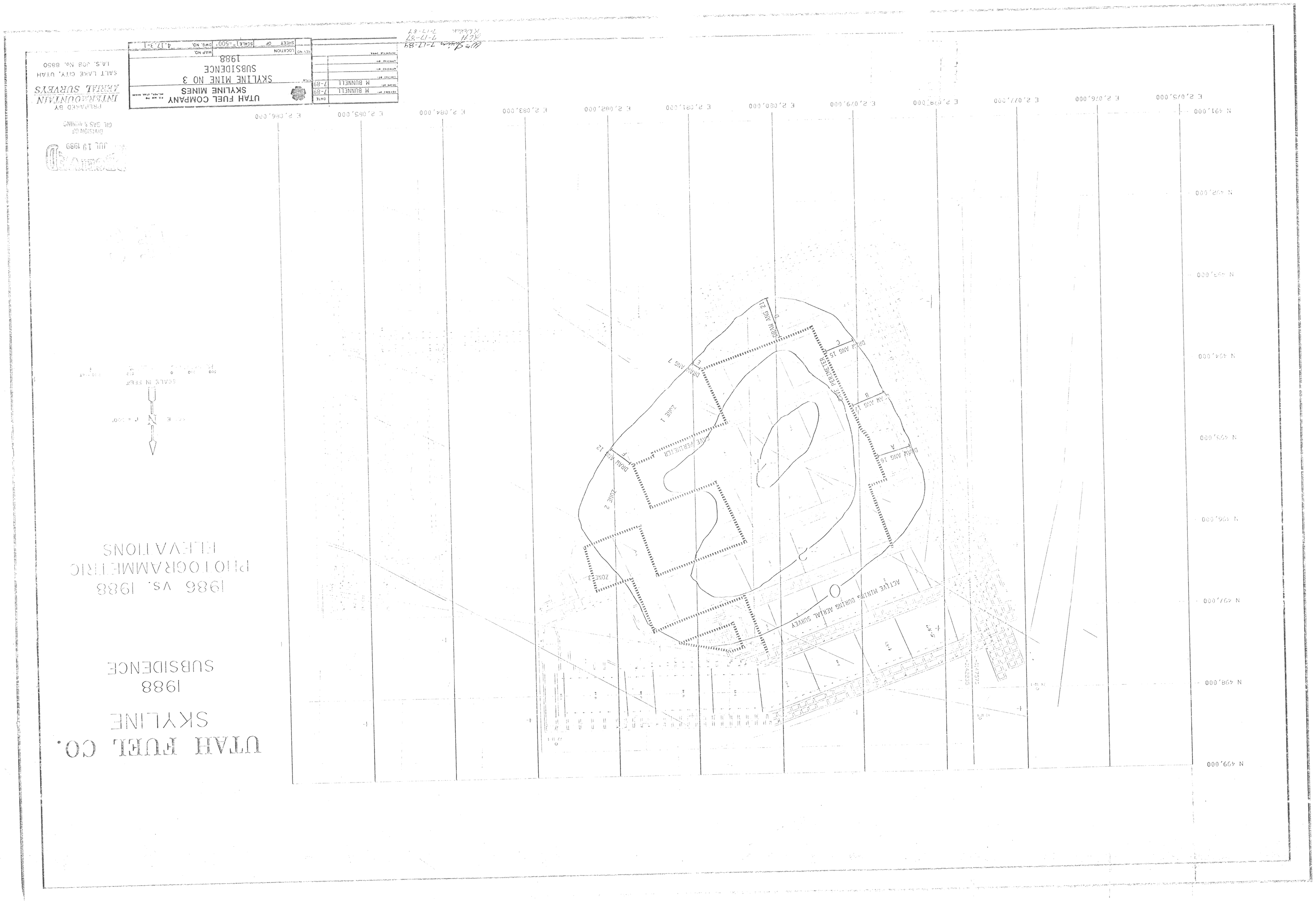
REV. NO.	LOCATION	MAP NO. 4.19.5-1
	SHEET 1 OF 1 SCALE 1" = 5'	DWG. NO.

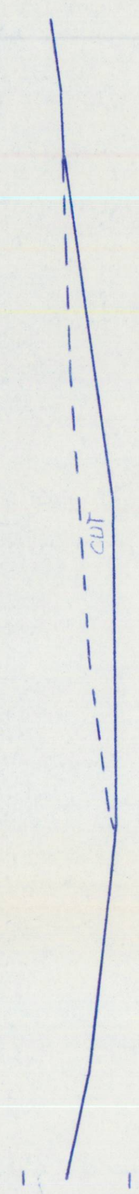
MONSEN ENGINEERING CO.
55074

FILE COPY
RECEIVED
JUL 19 1989
DIVISION OF
OIL, GAS & MINING

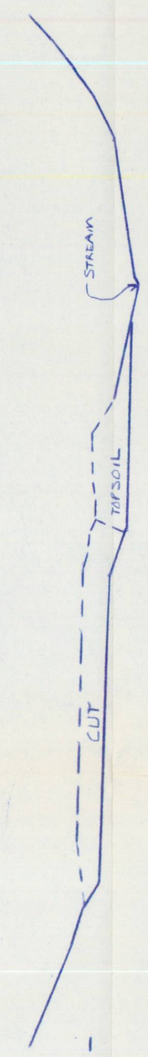
UTAH FUEL COMPANY
SKYLINE MINES

SUBSIDENCE MONITORING POINTS

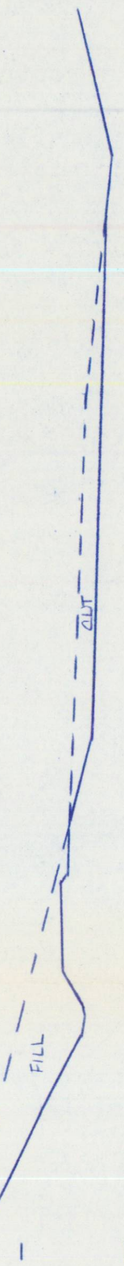

UTAH FUEL CO.
SKYLINE
1988
SUBSIDENCE
1986 VS. 1988
PHOTOGRAMMETRIC
ELEVATIONS
SCALE IN FEET
ACTIVE MINING DURING AERIAL SURVEY
ZONE 1
ZONE 2
ZONE 3
DRAW ANG 7
DRAW ANG 12
DRAW ANG 21
DRAW ANG 15
DRAW ANG 16
DRAW ANG 1
CAVE PERIMETER
CAVE PERIMETER
N 499,000
N 498,000
N 497,000
N 496,000
N 495,000
N 494,000
N 493,000
N 492,000
N 491,000
E 2,075,000
E 2,076,000
E 2,077,000
E 2,078,000
E 2,079,000
E 2,080,000
E 2,081,000
E 2,082,000
E 2,083,000
E 2,084,000
E 2,085,000
E 2,086,000
UTAH FUEL COMPANY
SKYLINE MINES
SKYLINE MINE NO 3
SUBSIDENCE
1988
M BUNNELL 7-89
M BUNNELL 7-89
4.17.3-1
SCALE 1"=500'
SHEET OF
MAP NO.
LOCATION
DWG. NO.
REVISED BY
DIVISION OF
OIL GAS & MINING
JUL 19 1989
PREPARED BY
INTERMOUNTAIN
AERIAL SURVEYS
SALT LAKE CITY, UTAH
A.S. JOB No. 8850



SECTION A-A

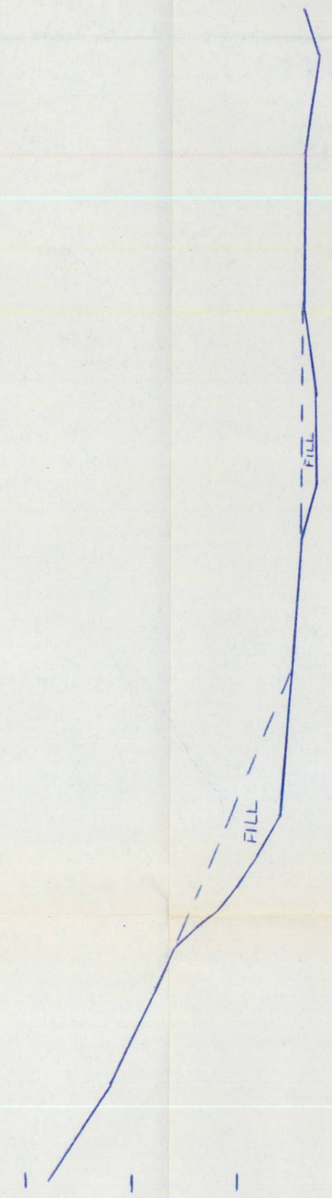


SECTION B-B



SECTION C-C

SECTION D-D



SECTION E-E
SCALE 1" = 50' TYP

NOTE: SEE DWG 3.2.1-3 LOADOUT FACILITIES, DRAINAGE & PERMIT BOUNDARY MAP AND 4.4.2-1C LOADOUT SURFACE FACILITIES RECLAMATION PLAN FOR SECTION LOCATIONS AND DETAILS

NO.	DATE	REVISION	DRW CHK	APP.
1	9-26-89	Scale Added		

		DATE
DESIGNED BY:	G TAYLOR	10-88
DRAWN BY:	B. GUYMAN	10-88
CHECKED BY:	[illegible] 7/89 K. [illegible] 2-89	
APPROVED BY:		
APPROVED BY:	W. Shriver	7-11-89
REFERENCE DWGS.	3.2.1-3	

PROFESSIONAL SEAL
REGISTERED PROFESSIONAL ENGINEER
8632
WILLIAM W. SHRIVER
STATE OF UTAH

W. Shriver 9-26-89

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH 84526

TITLE
RECLAMATION CROSS SECTION
RAIL LOADOUT

Received 10-1-90

REV. NO.	LOCATION		MAP NO. 4.4.2-1 D
	SHEET OF	SCALE 1" = 50'	DWG. NO.

DWG NO.

BOWSER ENGINEERING CO.
108764