

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300

DAVE SELDON
MANAGER
SOUTHWEST DIVISION



PLEASE ADDRESS ALL CORRESPONDENCE TO:
224 S. CARBON AVE., PRICE, UT 84501
OFFICE TEL. (801) 637-7540

CO-OP MINING COMPANY
P.O. Box 300
Huntington, Utah 84528

November 10, 1983

Sample identification
by

CO-OP Mining

Bear Canyon
Hiawatha Seam

Kind of sample
reported to us Coal

Sample taken at Bear Canyon

Sample taken by Co-op Mining Co.

Date sampled xxxx

Date received 11-4-83

Analysis report no.57-14270

SHORT PROXIMATE ANALYSIS

As Received Dry Basis

% Moisture	7.95	xxxxx
% Ash	9.55	10.37
Btu/lb	11641	12646
% Sulfur	0.50	0.54

% Air Dry Loss = 5.03
Moisture, Ash-free Btu = 14109
Pounds of SO₂ per 10⁶ Btu = 0.85
Moist, Mineral matter free Btu * = 12992
(Based on as rec'd moisture)*
Pounds of Sulfur per 10⁶ Btu = 0.43
% Residual moisture = 3.07

RECEIVED
NOV 18 1983

.JB/cj

DIVISION OF
OIL, GAS & MINING

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Jack Blas

Manager, Price Laboratory



Charter Member

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

SCOPE:

Co-Op Mining Company, in an attempt to implement future reclamation on a previously disturbed mining site in Bear Canyon, Bear Canyon Mine, determined that they had a deficiency of approximately 1800 cu. yds. of top soil. In order to offset this deficiency, two courses of action were investigated:

1. To utilize existing material which was down cast along the old portal access road.
2. To purchase a suitable top soil off site and haul it to the proximity of the mine.

In order to determine feasibility and suitability of both the materials and the methods, the following soil inventory and survey were conducted:

Methodology

On March 24, 1984, M. A. Coonrod, Compliance and Permitting Coordinator for the mine, sampled soil along the old portal road, top soil purchased off site and the existing top soil pile. The sample procedure for each site is as follows:

Existing Topsoil Stockpile (Sample ID-P1)

A randomly selected spot was determined by walking 10 paces up the pile from a random point selected by throwing a marker onto the pile. A 14" tile spade was utilized to excavate a hole 24" in depth and approximately 18" in diameter. A sliver of soil approximately 1" x 4" was sliced from the top to bottom of the excavation. The material was placed in a clean plastic bag and sealed (approximately 3 lbs.) Rock larger than approximately 1" diameter were avoided in containerizing the sample.

Loadout-Alternative Soil Substitute (Sample ID-P2)

Co-Op has purchased approximately 80 acres along the Price river, Carbon County, Utah. A portion of the site had the top soil stripped and stockpiled. The same sample methodology as implemented on the existing topsoil pile at the mine was utilized at this alternative soil substitute.

Road Fill (Sample ID FR-3, st 1,3 & 6)

This material was sampled at 200' intervals from the down slope of the fill in the area of the portal road intersection to the non-coal storage site along Bear Creek. Each sample was taken 3' from the toe of the downcast material. A 14" tile spade was used to excavate approximately 1' into the fill material and a grab sample (app.1 lb. of material) was taken at each site. All samples were consolidated into 3-5 gallon plastic buckets labled 1,3, and 6.

At the conclusion of the survey, all samples were consolidated and mixed. From this consolidated material, a sample of approximately 8 lbs. was placed into a clean plastic bag. All samples were hand carried to Standard Laboratories north of Huntington, Utah on March 24, 1984.

Results and Conclusions:

Attached are copies of the laboratory results. It appears that all materials on site as well as the off site substitute are compatible and capable of establishing and maintaining a diverse vegetative community consistent with the existing reference area.

Prior to implementing reclamation, all soil will be tested again to determine the need for both, type and quantity of desired fertilizers to insure rapid establishment of vegetation?

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UMC 7883.25 Cross-Sections, Maps and Plans

The applicant has not completely addressed this requirement. The following remains incomplete:

- (a) The elevation and locations of test borings and core samplings were not supplied.
- (c) Columnar outcrop sections denoted on Figure 2 in Appendix 6-A have not been located and identified on a map.
- (d) A coal cropline map was submitted but strike and dip of the coal to be mined was not addressed.
- (f) The extent of subsurface water on Plate 3-4 was not characterized in a cross-section.

See Appendix 6-A

UMC 783.25 Cross-Sections, Maps and Plans

- (a) See Plate 6-A
- (c) See Figure 3.4-1, 3.4-2, 3.4-3, 3.4-4 Reference p. 3-20 thru 3-21. Above figures will supercede Appendix 6-A.
- (d) See Plate 6-A
- (f) The "Water Area" shown on Plate 3-4 is in the old, abandoned workings. These workings are sealed off and are inaccessible. The area is assumed to have been used as a sump in the previous mining, and we have no evidence as to the extent as well as to the souce of the water that is or was contained therein. It is therefore not possible to characterize this area in a cross-section.

Drill Log Data

<u>Drill Hole</u>	<u>Elevation</u>	<u>B.C.</u>	<u>B.C. Ele</u>	<u>H</u>	<u>H Ele.</u>
#1	7600	9.5-11.1	7535	6.3	7431
#2	7800	8.6-11.2	7488	0	-
#3	8900	12.0'	7291	5.4'	7252
#4	9200	7.7'	7478	5.1'	7447
#5	9450	13.9-15.5	7580	5.4'	7536

UMC 784.20 Subsidence Control Plan

The applicant has not completely addressed this section. A survey of renewable resource lands has not been presented. The applicant's assessment of the effects of potential subsidence on renewable resource lands has not been included. NOTE: the issue of renewable resource lands was raised under the heading UMC 784.20 in the February 24, 1983 and August 31, 1983 DOC/TD documents. This issue was inadvertently omitted from the March 1984 DOC/TD document by the Division.

See Appendix 3-5-8

Survey Renewable Resource Lands and Potential of Subsidence Impacts

APPENDIX 3-5-8

SURVEY RENEWABLE RESOURCE LANDS
AND POTENTIAL OF SUBSIDENCE IMPACTS

JUN 25 1984

SURVEY OF RENEWABLE RESOURCE LANDS
CO-OP BEAR CANYON PERMIT AREA AND
POTENTIAL IMPACTS OF SUBSIDENCE

On June 13, 1984, an aerial survey was conducted of the entire Bear Canyon Mine Permit Area as well as all surrounding areas which could feasibly be impacted by subsidence. The results of that survey are as follows:

- (1) Hydrologic Balance: There are no seeps and/or springs above the area of the coal beds. No surface water was observed other than Bear Creek which lies beyond the potential area of subsidence.
- (2) Timber: There is no marketable timber within the area and the terrain is so steep as to preclude the establishment and/or harvest of such.
- (3) Vegetation (Ref. grazing): The bulk of the area is high priority wildlife habitat. Potential impacts were evaluated in cooperation with UDWR Personnel. The results of that evaluation are discussed under Impacts.

The terrain is inhospitable to domestic grazing and is not utilized as such under present or future land use practices.

- (4) Fish and Wildlife: The absence of water precludes the presence of fish. The entire area of influence is utilized by a wide variety of wildlife.
- (5) Paleo-Archeo: There are no known sites within the area as documented by ground Paleo-Arch survey, Appendix 5-1.

- (6) Man-Made Structure: There are no man-made structures within the area of influence other than a small unauthorized jeep trail on the northern rim of the permit area.
- (7) Minerals, Oil & Gas: There are no oil and/or gas wells within the area and no known mineral reserves.

Potential Impacts

No negative impacts to renewable resources are anticipated other than potential impacts to wildlife.

Mr. Larry Dalton, Resource Analyst Utah Division of Wildlife Resources and the State's foremost authority on potential impacts of subsidence on wildlife, inspected the site on June 18, 1984. The results of that investigation in part are as follows:

Considering the absence of spring, water sources, the negative potential impacts of subsidence within the Bear Canyon Permit Area could easily be offset by potential positive aspects.

On the negative side: Loss of riparian area and/or water sources is of greatest concern, followed by loss of vegetation from methane gas leaking to the surface from an underground works. Considering the lack of riparian area or water sources above the coal seam, this concern is not warranted. Secondly, Co-Op has never encountered methane gas underground so there is little concern relative to potential vegetation loss, and last, the loss of nests due to escarpment failure.

On the positive side: The tension fractures resulting from subsidence along the steep side hills are frequently utilized by big game as movement corridors. The fractures and rubble provide escape cover for a variety of wildlife species as well

as additional habitat for burrowing and denning animals. While there is concern over the potential loss of nests as a result of escarpment failure, there is also a potential for additional nesting sites to be created through this gravitational shearing of escarpment surfaces.

UMC 784.23 Operation Plan: Maps and Plans

The applicant has not completely addressed this requirement. Cross-sections of disturbed and undisturbed ditches have not been submitted. Cross-sections of the Bear Canyon stream channel were not certified prior to the March 1984 DOC/TD document. The April 30th response omitted not only the certification but also the original cross-sections.

See Appendix 3-2

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JUN 25 1984

UMC 784.14 Reclamation Plan: Hydrologic Balance

The applicant has not completely addressed this requirement. The applicant has not provided maps, plans and cross-sections to depict postmining drainage patterns. Clarification of a statement in the MRP regarding "horizontal drainage patterns," a postmining drainage map, cross-sections depicting postmining topography and drainage, specific measures for stabilizing reclaimed drainage channels and details on measures proposed for reclamation of the main stream channel where it is currently culverted were not submitted as required. The previous MRP had proposed a log check dam configuration for reclaiming the Bear Canyon stream channel. This proposal was removed by the April 30, 1984 response and the only inference to reclaiming the stream channel is the depiction of eight-inch riprap shown on Plate 3-2.

See Appendix 3-2 and Plate 3-2A
 3-G (Road Reclamation Plan)
 Scale House Approved Modification Letter-
 Approvals end of MRP

Appendix 3-2

RECLAMATION PLAN - DRAINAGE CHANNELS

RECLAMATION PLAN - DRAINAGE CHANNELS

The following information is a direct excerpt from April 25, 1984 MRP Submittal and Approved Scale House Modification, October 12, 1983:

Upon final reclamation, all disturbed areas will be recontoured to near natural configuration, drainage channels will be re-established.

"PHASE # 4 DRAINAGE CHANNEL STABILIZATION AND RECONSTRUCTION

In conjunction with the recontouring, all drainage areas will re-establish to approximate original configuration. In order to minimize the loss of soil, all drainages will be lined with hygronomy blankets for approximately 10 feet above and below the areas of disturbance. In addition, where conditions warrant, rock rip rap may also be utilized to add yet another parameter of stability." (excerpt Chapter 3, pg. 3-119)

Plate 3-2A illustrates the postmining alignment of the stream channels and those areas where additional rip-rap is anticipated.

The above procedures coupled with the use of soil tac in application has proven an excellent method of stabilization of disturbed areas until vegetation is re-established. Rate of application is discussed in detail Chapter 9, pages 9-16, April 26, 1984 MRP Submittal.

That portion of Bear Creek which is presently culverted is to be reclaimed as stated in the Approved Scale House Modification October 12, 1983. For convenience a copy of that approved plan is attached herein with the addition of the Engineering Certification as requested on May 11, 1984.

PHASE # 4 DRAINAGE CHANNEL STABILIZATION AND RECONSTRUCTION

In conjunction with the recontouring, all drainage areas will re-establish to approximate original configuration. In order to minimize the loss of soil, all drainages will be lined with hygronomy blankets for approximately 10 feet above and below the areas of disturbance. In addition, where conditions warrant, rock rip rap may also be utilized to add yet another parameter of stability.

from Appendix 2 - G

MODIFICATION DEFICIENCIES

UMC 817.44 Hydrologic Balance: Stream Channel Diversions

The methodology which the Co-Op Mining Co. contemplates implementing upon final abandonment and reclamation of that portion of Bear Creek in the vicinity of the Scale house are as follows:

1. To use a large track mounted excavator in conjunction with a small backhoe and crawler tractor to remove the 60' culvert and to regrade the opposing banks on approximately a 3 to 1 slope to facilitate revegetation and to enhance the establishment of a riparian zone. (Note fig. 1 for the present stream configuration and projected after reclamation).
2. To construct small holding ponds along the channel utilizing native materials. The actual methodology is to incorporate 2 logs approximately 10 to 14" in diameter, trench into the bank back approximately 10' on both sides of the creek channel, secure the logs together in a stacked manner with 36" anchor bolts, buried for approximately 10 feet with approximately 36" of fill material decreasing to 0" as the stream channel is approached. An 18" wide by 5" deep notch cut along the top of the upper log in the center of the creek channel, to create a centralized spill-way. Once the logs are secured into the channel, rock rip-rap should be laid on the up stream side to a height equal to the height of the log retainer and continued up stream for a distance of 36" decreasing in height so as to be level with the original rip-rapped channel. Then by utilizing a backhoe, a pit approximately 3' in diameter should be dug at the fall line of the spillway and lined with large rock 2' +. The log-pond configuration should be repeated at approximately 50' intervals along the course of the creek channel to create a stepped configuration along the area of disturbance.

The intent of the holding ponds created by the log-rock dam is to fill with sediment and minimize the down stream migration

of this potentially detrimental source of silt and convert it into a potentially beneficial, enriched, growth media to facilitate the enlargement and establishment of riparian vegetation. Over a course of time the water holding capability of the ponded area will decrease as the ponds fill with sediment, however, the small ponds at the base of the spillway should remain relatively free from sediment and due to the small surface areas and depth, they will hold water over an extended period during dry seasons. A diagram is attached for your review. (See fig. 2).

The methodology is one which has been successfully implemented by myself on various areas to facilitate both water holding and enhancement of riparian zones and has been proven successful.

UMC 817.44 Paragraph 2

A 93-R and a 404 permit have been applied for. See appendix "A", and a copy of the approvals will be forwarded to your office on our receipt.

JUN 25 1984

UMC 817.47 Hydrologic Balance

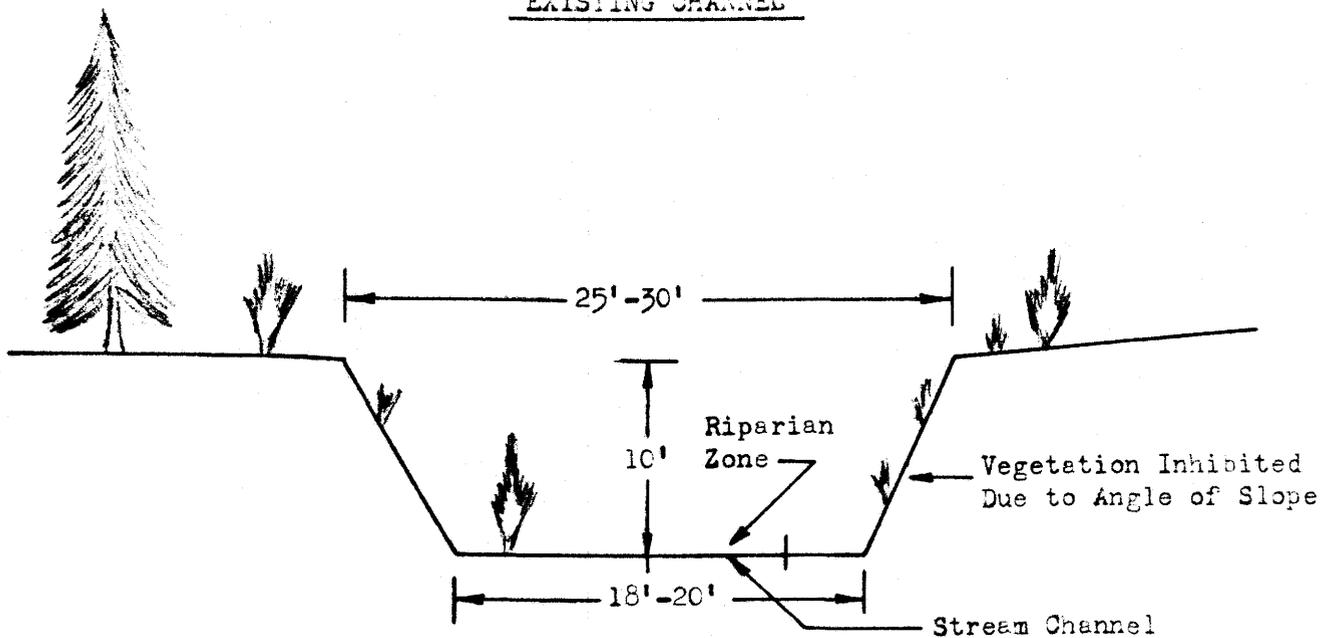
Co-Op is committed to use 12+ material in lieu of D-50 unless The Division of Oil, Gas, & Mining recommends an alternative.

UMC 817.103 Covered Coal & Acid & Toxic Forming Materials

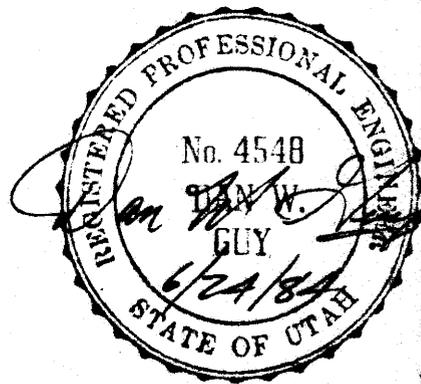
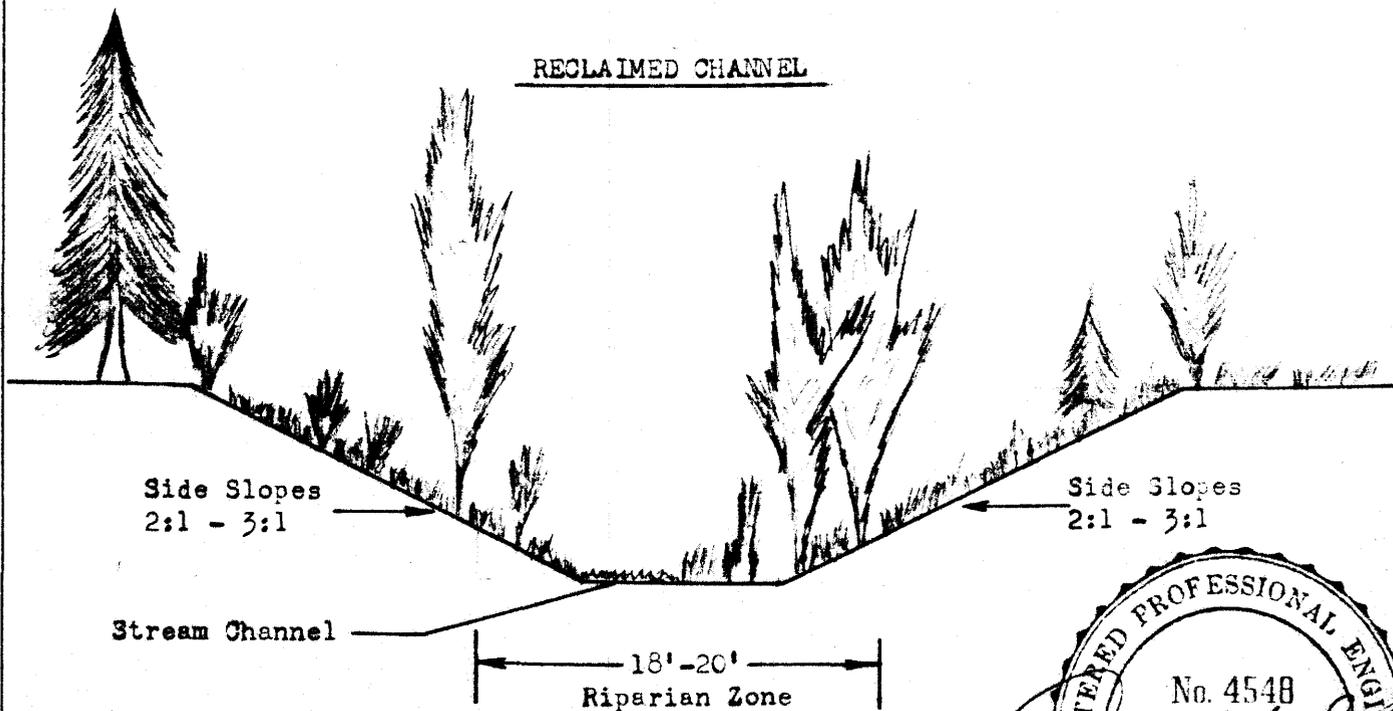
The sample was taken from that portion of Trail Canyon which Co-Op anticipates final reclamation in the near future. The specific site was at the toe of the slope where coal was historically stockpiled, approximately 800' above the Load-out facility.

The additional data is attached under appendix B

EXISTING CHANNEL



RECLAIMED CHANNEL



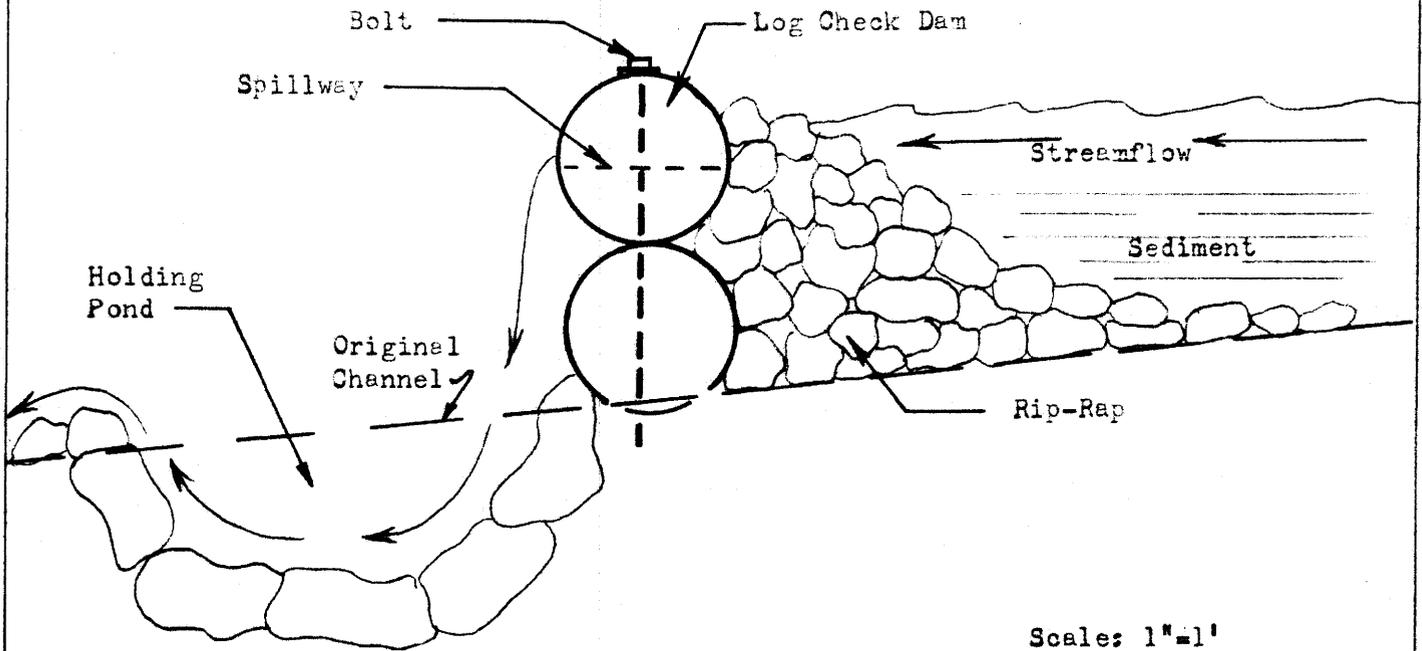
BEAR CANYON STREAM CHANNEL

SCALE 1"=10'

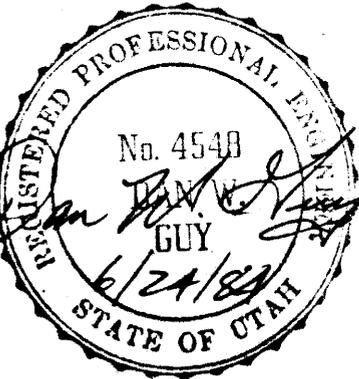
FIGURE
NO. 1

JUN 25 1984

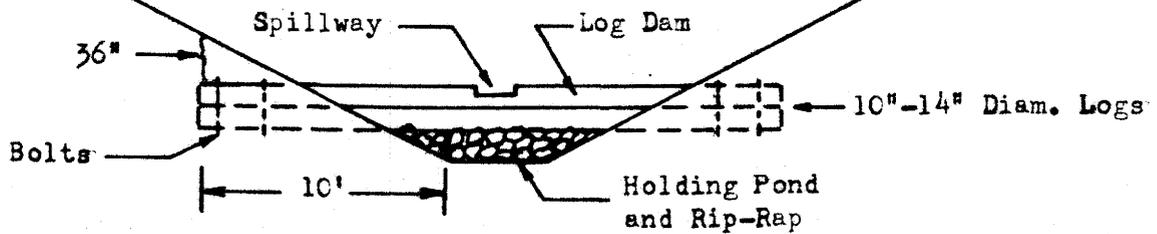
SIDE VIEW



Scale: 1"=1'



END VIEW
(Looking Upstream)



Scale: 1"=10'

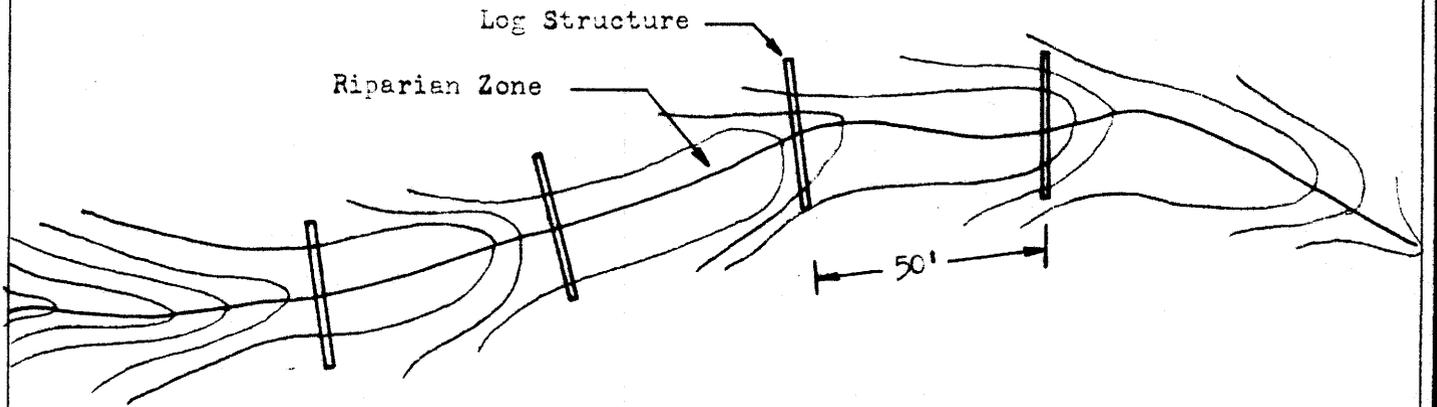
LOG CHECK DAM AND HOLDING POND

SCALE: AS SHOWN

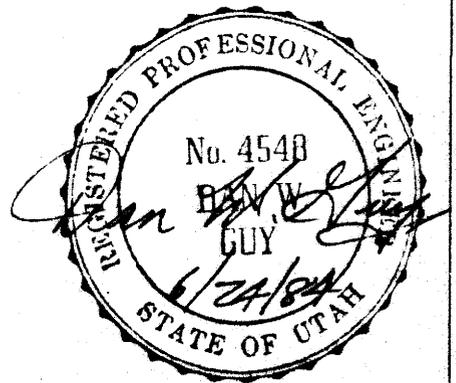
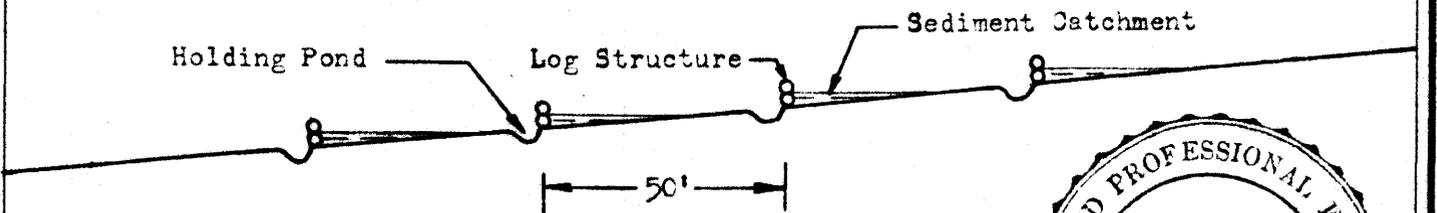
FIGURE
NO. 2

JUN 25 1984

PLAN VIEW



PROFILE



ENHANCED STREAM CHANNEL

SCALE: 1"=40'

FIGURE
NO. 2-A



STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dr. G. A. (Jim) Shirazi, Division Director

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

October 12, 1983

Mr. Wendell Owen
Co-op Mining Company
P. O. Box 1245
Huntington, Utah 84528

RE: Scalehouse Modification
Final Approval
Bear Creek Canyon Mine
ACT/015/025
Folder Nos. 3, 4 and 7
Emery County, Utah

Dear Mr. Owen:

The Division has reviewed all material submitted by Co-op Mining Company for the proposed scalehouse permit modification and have, to the best of our ability, found that it meets all requirements set forth under Title 40-10 UCA 1953 (Regulation of Coal Mining and Reclamation Operations), and UMC 700 et seq. (Surface Effects of Underground Coal Mining Activities).

Approval of the proposed scalehouse modification for the Bear Creek Canyon Mine permit is hereby granted and utilization of this facility may lawfully commence.

If you have any questions, please feel free to call.

Sincerely,

JAMES W. SMITH, JR.
COORDINATOR OF MINED
LAND DEVELOPMENT

JWS/EH:btb

cc: Carl Kingston, Co-op Mining Company
R. Daniels, DOGM
E. Hooper, DOGM
J. Helfrich, DOGM
J. Whitehead, DOGM

UMC 783.22 Land Use Information

The applicant has not completely addressed this requirement. Land productivity data obtained from the Soil Conservation Service (SCS) were not presented.

This information was provided and referenced in Chapter 4, Page 4-10 to Chapter 9 Appendix 9-B.

4.4.2.3 Land Capability and Productivity Before Any Mining

Present land capability and productivity will be only slightly reduced compared to the after mining capability. Mining activities have proceeded on the current lease areas of the Co-Op Mining Company historically with only minor effects on productive capabilities in terms of soils, topography, vegetation or hydrology. The soils indigenous to the area affected by the operations are described in Chapter 8. Vegetation is discussed in Chapter 9.

Surface water in the permit area is limited to surface run-off that flows most heavily during the spring and early summer months and then normally dry up. The quality and quantity of this water and of the ground water will be identified in Chapter 7.

4.4.2.4 Land Productivity Before Mining in Terms of Average Yield of Food, Fiber, Forage or Wood Products

Land productivity in terms of plant products

before any mining will not differ greatly from future productivity. Early settlers depended upon range land for grazing sheep, cattle and horses. Timbering was active, but on a much smaller scale than grazing. Early settlers needed fenceposts, corral poles, house logs and railroad ties.

The permit area affected by Surface operations and facilities of the underground Bear Canyon mine is capable of supporting limited grazing and recreational uses. Farming in the area is prohibited by the steep and rocky terrain.

Current and future land use will suit the physical features of the mine plan area, which is mostly steep and rocky. Such land is well suited for management as a multi-use area and coal mining fits appropriately into the overall land use scheme.

Land productivity data were obtained from the U.S. Soil Conservation Service.



United States
Department of
Agriculture

Soil
Conservation
Service

350 North 4th East
Price, Utah 84501

September 26, 1983

Mel Coonrod
Co-op Mine
P. O. Box 358
Elmo, Utah 84521

Dear Mel,

Trail Canyon Reference Area:

Pinyon-Juniper Grass Site

The production is 650 lbs herbage production for this year. The range site condition is good.

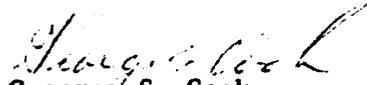
Trail Canyon Riparian Reference Area:

The production is 2,650-3,000 lbs/acre. The condition is fair.

Bear Canyon Comparative Area:

Pinyon-Juniper Grass Site

The production is 600 lbs/acre. The range site condition is fair.


George S. Cook
Range Conservationist

JUN 25 1984

UMC 783.25 Cross-Sections, Maps and Plans

The applicant has not completely addressed this requirement. The following remains incomplete:

- (a) The elevation and locations of test borings and core samplings were not supplied.
- (c) Columnar outcrop sections denoted on Figure 2 in Appendix 6-A have not been located and identified on a map.
- (d) A coal cropline map was submitted but strike and dip of the coal to be mined was not addressed.
- (f) The extent of subsurface water on Plate 3-4 was not characterized in a cross-section.

The remaining items, (e), (g), (h), (i) and (l) were completely addressed.

See Plate 3-4A end of Chapter 3.

UMC 784.17 Protection of Public Parks and Historic Places

The applicant has been given an extension to June 30, 1984 to complete the requirements of this section.

See Appendix 5-1

APPENDIX 5-1

PALEO-ARCHEOLOGICAL SURVEY



SENCO-PHENIX

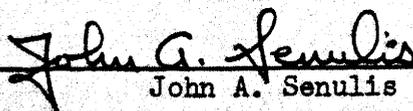
ARCHEOLOGICAL SAMPLING SURVEY OF THE
BEAR CANYON MINE LEASE EXTENSION
PERFORMED FOR THE BEAR CANYON/CO-OP MINE
THROUGH ENVIRONMENTAL INDUSTRIAL SUPPLY

In accordance with State of Utah Guidelines
in Emery County, Utah
State of Utah Antiquities Permit No. 1106

SP-UT-42

SENCO-PHENIX

June 19, 1984



John A. Senulis

Principal Investigator

JUN 25 1984

Abstract

A 10% sample survey was performed on the Bear Permit area for CO-OP Mining by John A. Senulis of SENCO-PHENIX under regulation of the Office of Surface Mining, Utah Division of Oil, Gas and Minerals, and the Utah State Historic Preservation Officer.

No cultural resources were located and the probability of undetected remains is slight. Archeological clearance is recommended, particularly since there will be no or minimal surface impact from this project.

Project Area

The 750 acre Bear Permit Area is located in the $W\frac{1}{2}/W\frac{1}{2}$ of Section 24, the $E\frac{1}{2}$ and the $E\frac{1}{2}/W\frac{1}{2}$ of Section 23, the $S\frac{1}{2}$ of Section 14, and the $N\frac{1}{2}/NE\frac{1}{4}$ of Section 26, all Township 16 South, Range 7 East, Emery County Utah. There will be no, or minimal surface impact within the new permit area. Potential impacts would be from subsidence caused by abandoned mine shafts. The project is shown on the U.S.F.S. Manti-LaSal Map and U.S.G.S. 7.5' Quad: Hiawatha, UT (1978).

Specific Environment

The specific project area is extremely rugged, mountainous terrain with a topographical form of dissected uplands. Elevations range from 6800 to 8990 feet. Most of the terrain is steep with common grades of 15-20°. The one source of permanent water near the project area is Huntington Creek, ca. 3/4 mile southwest of the project area. Bear Creek, which flows much of the year, is roughly the eastern boundary of the permit area. Soils are generally colluvium forest soils on the slopes with clay loams on the ridges and in the valleys. The valley soils have a heavy gravel content of quartzite, lignite and scoria. Sandstone and shale are the predominant bedrock outcrops.

Predominant vegetation in the drainage areas is Ponderosa Pine, Douglas Fir, Aspen, Limber Pine, and Juniper with willow, rabbitbrush, sagebrush, muhly, squirreltail, milkvetch, lupine, woods rose, scarlet

gilia, arrow-leafed balsamroot, foothills arnica and other associated grasses, forbs and shrubs. On the steep, rocky, rugged hillsides, the pine and juniper trees and other vegetation become sparse.

Archeological Potential

A files search at the Utah State Historic Preservation office indicated that no archeological surveys have been performed in the project area. Sites in Huntington Canyon are generally flake scatters, isolates, and rock shelters, with historic sites consisting primarily of evidence of mining, i.e. mine shafts, hardware, etc. Generally the prehistoric and earlier historic sites are located along the valley floor. The probability of locating significant archeological resources in the steep mountainous areas was considered remote.

Survey Strategy and Methodology

The survey strategy was based upon the belief that the most likely area for sites would be within Bear Creek Canyon. Therefore, the entire canyon was surveyed with particular emphasis on the sides for potential rock shelters, and on the canyon floor for isolates. A second portion of rugged uplands was surveyed with wandering random transects to insure adequate coverage of the diverse zones.

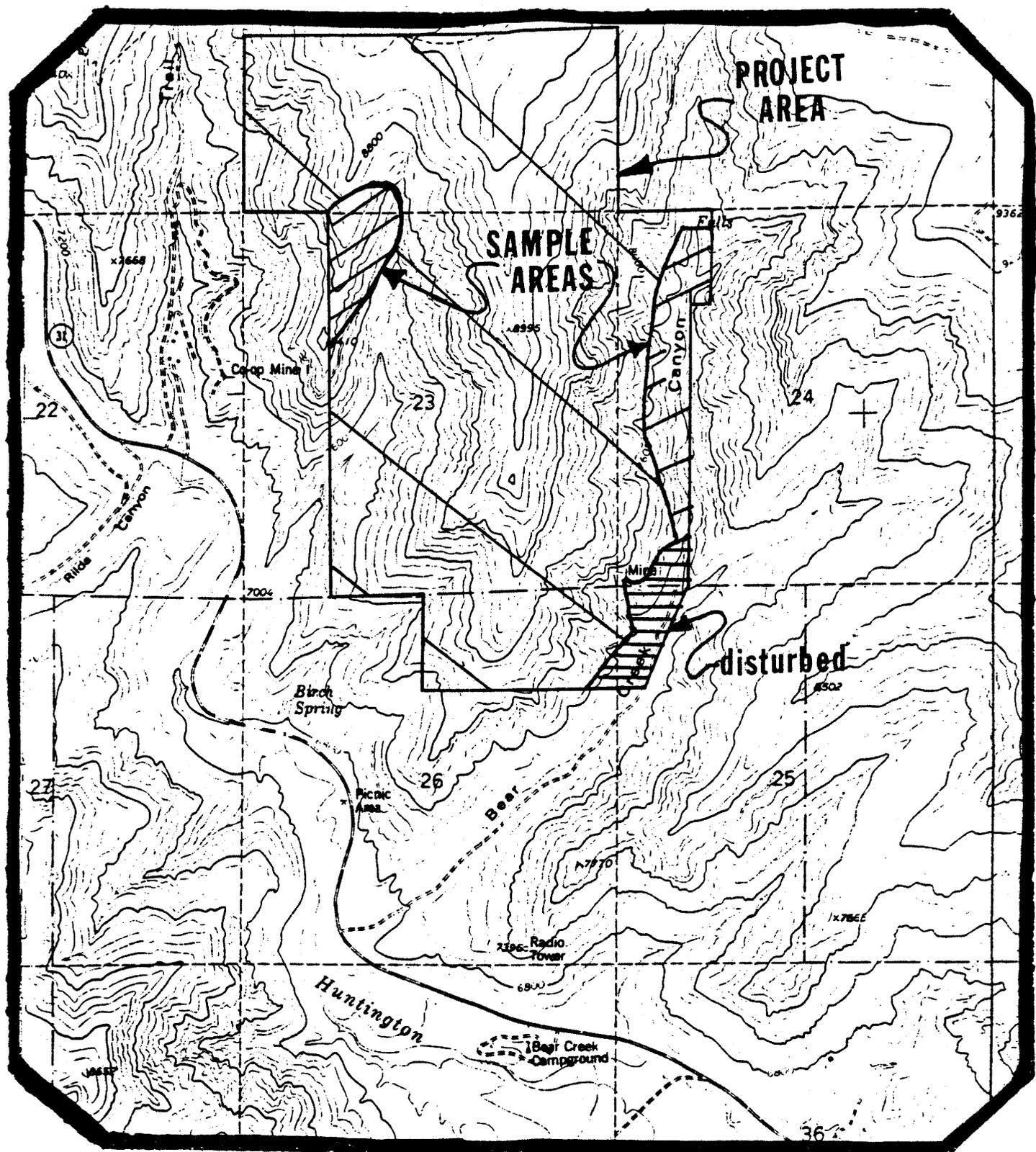
Survey Conditions

On June 18, 1984, John and Jeanne Senulis performed a walkover survey of the aforementioned areas. The sky was overcast for part of the survey with light mountain showers; however, the sky then cleared and the majority of the survey was conducted under sunny skies. The soils ranged from damp to dry, and the temperature was approximately 70° F. with calm winds except during the rain showers.

Findings and Recommendations

Outside of two modern campfires, no prehistoric or historic cultural resources were located in the steep, inhospitable terrain. No rock alcoves of sufficient size or configuration were discovered and the

entire valley floor showed evidence of occasional flash flooding.
Because of the lack of findings, and the project's non-surface disturbing
nature, archeological clearance is recommended.

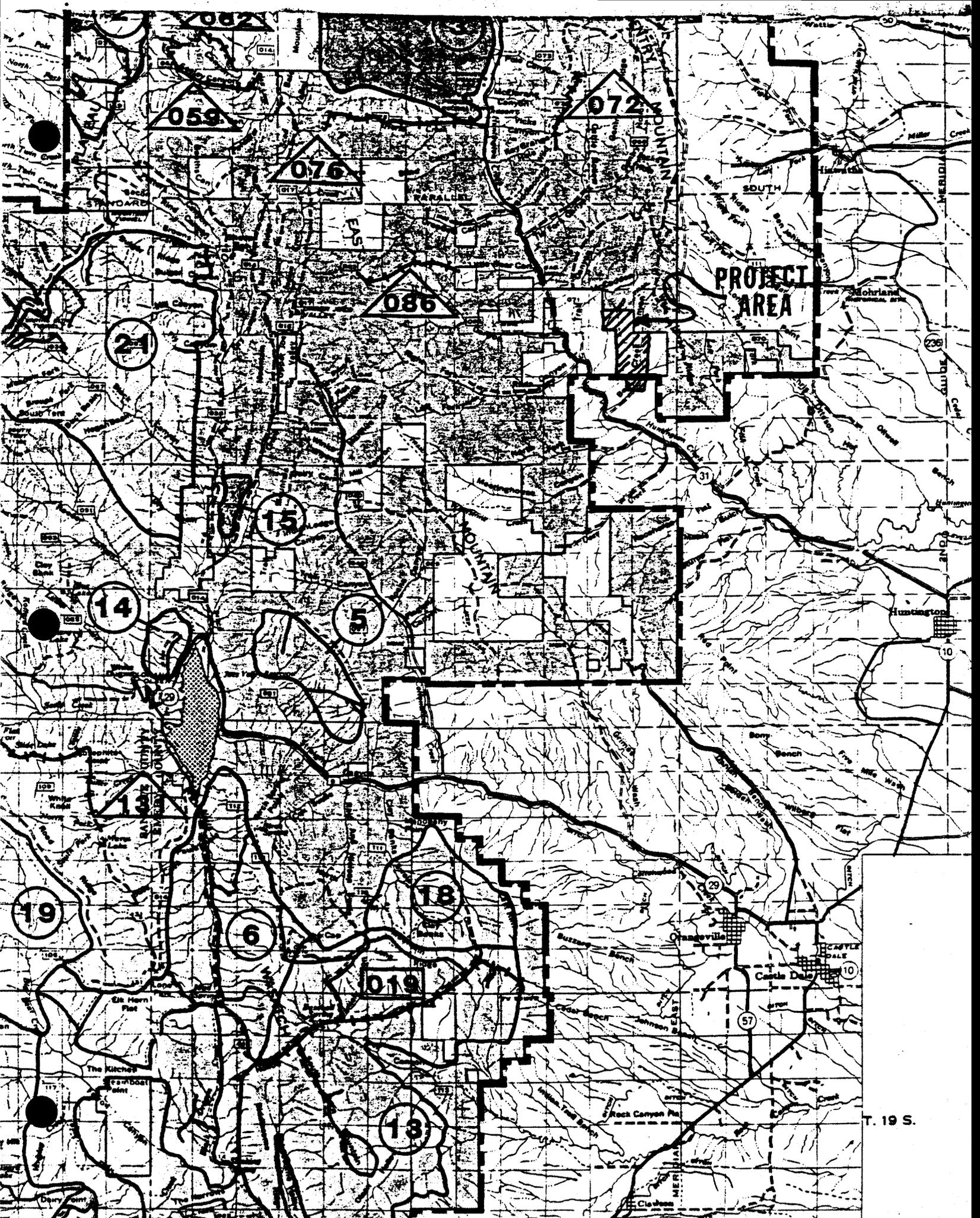


SENCO-PHENIX
ARCHAEOLOGICAL SURVEYS

BEAR CANYON MINE LEASE EXTENSION
CO-OP MINING COMPANY
SECTIONS 14, 23, 24, 26, T16S. R7E
EMERY COUNTY, UTAH
U.S.G.S. 7.5' QUAD: HIAWATHA, UTAH (1978)
SENCO-PHENIX (UT-42)
JUNE 18, 1984

P.O. BOX 9197
SALT LAKE CITY, UTAH
84109

JUN 25 1984



PROJECT AREA

T. 19 S.

JUN 25 1984

UMC 784.13 Reclamation Plan: General Requirements

Though the applicant completely addressed this requirement regarding deficiencies outlined in the March 1984 DOC/TD document, the applicant's submission of additional information April 30, 1984 changed what had been submitted and was complete prior to March 1984, thus rendering the MRP incomplete with reference to part (b)(4) of this regulation, the use of a soil substitute.

Co-Op Reply:

See Appendix 6-5

JUN 25 1984

UMC 785.19 Underground Coal Mining Activities on Areas or Adjacent
to Areas Including Alluvial Valley Floors in the Arid or
Semi-Arid Areas of Utah

The applicant has not completely addressed this requirement. A map of unconsolidated stream laid deposits on surface and groundwater into and through stream laid deposits has not been submitted.

See Chapter 3 Section 3.6.8

Letter requesting a variance under UMC/SMC 785.19(c)(3)(ii)

Submitted June 25, 1984

Co-Op Mining Company
P.O. Box 1245
Huntington, Utah 84528

June 25, 1984

Mary Boucek
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114

Ref: Alluvial Valley Floors

Dear Mary:

The pre-mining land use of the small area adjacent to Bear Creek in the Co-Op Permit Area is undeveloped range land and is not significant to farming.

This area is the only area where an alluvial valley floor could possibly exist and as stated by the SCS, no farm lands lie within the permit area and based on availability of water, steepness of the terrain, type of soil, and amount of rock, no farm land could feasibly be developed.

Based on the above which is documented in the Co-Op Bear Canyon Mine MRP Revised, Co-Op requests a waiver of UMC/SMC 785.19 paragraphs d and e and all of Section 822.

Sincerely,



Melvin A Coonrod
Permitting & Compliance
Co-Op Mining Company

MC/njc

JUN 25 1984

UMC 784.22 Diversions

(1) The applicant has not completely addressed this requirement. The map delineating drainage areas cuts off certain areas, rendering it impossible to calculate the watershed area on subareas AR-1, AU-2, AU-3, AU-4, AU-5 and AU-6. (2) The applicant has not sufficiently identified or explained the formulas used where results were taken from computer sheets or the coefficients used in calculations. (3) No ditch cross-sections have been presented and velocities have not been shown. (4) A table identifying riprap size based on velocity has not been presented. Format for and frequency of reporting regarding the groundwater monitoring plan have not been addressed.

- (1) See revised Plate 7-5
- (2) Attached as insert A
- (3) See revised Plate 7-1
- (4) Attached as Insert A

-Summary of Culvert Sizes-

	<u>Flow(cfs)</u>	<u>Vel. (fps)</u>	<u>Rip Rap</u>	<u>Slope (%)</u>	<u>Diameter</u>	<u>Required Headwater**</u>
C-1R	10.2	9.5	12"	8.0	18"	27"
C-2R	12.1	9.5	12"	8.0	18"	36"
C-3R	16.4	9.5	12"	8.0	18"	27"
C-1U	8.8	12.3	24"+	15.0	30"	18"
C-2U	1.5	8.4	9"	15.0	15"	9"
C-3U	7.9++	5.7	6"	5.0	12"	36"*
C-4U	6.1++	5.1	6"	5.1	10"	36"*
C-5U	6.1++	5.0	N/R	4.8	10"	36"*
C-6U	.9	4.4	N/R	3.7	10"	12"
C-7U	10.3	9.7	12"	8.3	12"*** (18")	27"
C-8U	8.8	13.0	24"+	15.0	18"	24"
C-9U	1.5	8.0	9"	7.3	15"	9"
C-1D	1.5	10.9	16"+	20.0	15"	9"
C-2D	4.8	9.6	12"	12.0	18"	15"
C-3D	1.2	5.2	6"	4.2	12"	9"
60" CMP	231.2	13.8	24"	3.4	60"	102"

*When capacity of culvert is exceeded flow continues down ditch to next culvert.

**From invert elevation.

***Existing 12" CMP to be replaced with 18" CMP at 8.3% slope.

+ Energy dissipating device could be used instead of rip rap.

++ A two foot high check dam of rip-rap is used to develop the headwater necessary for maximum flow through the culvert, excess flow continues down the ditch.

N/R - Not required

-Summary of Ditch Sizes-

All ditches are triangular "V ditch" with 1:1 side slopes. (See Plate 7.1 for typical.)

	<u>Flow(cfs)</u>	<u>Vel. (fps)</u>	<u>Rip Rap Size**</u>	<u>Slope(%)</u>	<u>Depth Of Ditch</u>	<u>Depth Of Water</u>
D-1R	10.2	6.8	6"	6.0	2'-0"	1'-6"
D-2R	12.1	6.8	6"	6.0	2'-0"	1'-6"
D-3R	10.4	6.8	6"	6.0	2'-0"	1'-6"
D-1U	1.5	3.5	N/R	4.0	1'-3"	0'-9"
D-2U	1.5	3.9	N/R	5.0	1'-3"	0'9"
D-3U	6.1	5.5	4"	5.0	1'-9"	1'-3"
D-4U	11.8	6.6	6"	5.0	2'-0"	1'-6"
D-5U	.9	3.5	N/R	7.0	1'-0"	0'-6"
D-6U	.9	3.5	N/R	7.0	1'-0"	0'-6"
D-7U	10.3	6.6	6"	5.0	2'-0"	1'-6"
D-8U	2.3	4.4	N/R	6.25	1'-3"	0'-9"
D-9U	1.8	5.0	4"	8.3	1'-3"	0'-9"
D-10U	1.5	5.7	6"	18.0	1'-0"	0'-6"
D-11U	7.6	7.9	9"	14.0	1'-6"	1'-0"
D-1D	.8	4.0	N/R	9.0	1'-0"	0'-6"
D-2D	1.5	5.5	4"	10.0	1'-3"	0'-9"
D-3D	1.0	5.2	4"	15.0	1'-0"	0'-6"
D-4D	4.8	5.3	4"	6.25	1'-6"	1'-0"
D-5D	7.2	6.2	6"	6.4	1'-9"	0'-9"
D-6D	1.2	4.4	N/R	6.25	1'-3"	0'-9"

*6" freeboard added to required flow depth.

** see Plate 7.1 for location of rip rap.

N/R - not required

Design Parameters Determination Procedure

Listed below are the various parameters, along with and the procedures used to obtain them, which were supplied to the computer programs used in calculating the runoff hydrographs and routings and the ditch and culvert sizings.

The equations used in the Hydro Plus III - SCS hydrograph program are listed this section, 7.2.5.2 Diversion Structures. The parameters that were used are as follows:

Basin Area - the areas where calculated, using a planimeter, from those outlined on Plate 7-5.

Basin Curve Number - this SCS runoff curve number was estimated using "A Guide to Hydrologic Analysis Using SCS Methods", Section 5. This section is included in the reference section. The soil of the mine plan area is best described by soil group "C". For the undisturbed areas the land use description is "woods or forest land" and the hydrologic condition "fair". Using these description a curve number of "73" was obtained. For disturbed areas the curve number "82" was used.

24-Hour Precipitation - the precipitation amounts for the various storm frequencies came from E. Arlo Richardson's "Estimated Return Period for Short-Duration Precipitation in Utah", the Hiawatha area.

Average Basin Slope - the slopes of the various areas outlined on Plate 7-5 were derived by dividing the total change in elevation by the hydraulic length.

Hydraulic Length - this length, also from Plate 7-5, is the length from the area outlet or mouth to the divide or point of highest elevation.

Basin Lag - this value was computed by the computer program with the computer using a minimum of 15 minutes.

The hydrograph reservoir routing program used the appropriate runoff hydrograph routed through the appropriate sedimentation pond, "A" or "B". Pond capacity per elevation and spill way capacity were determined from the cross sections and criteria shown on Plates 7-2 and 7-3.

From the parameters listed above, the computer program was able to generate runoff hydrographs. From these hydrographs the peak or maximum flow was used in the sizing of the ditches. For sizing the ditches and culverts the parameters used are as follows:

Ditch Depth - various ditch depths were tried, in 3" increments, until a depth was found that would handle the the maximum flow.

Culvert Diameter - the diameters were obtained by field measurement, unless noted otherwise. If the flow was larger than could be handled by the culvert a check dam 2' high of rip-rap is used to develop headwater for maximum flow through the culvert, excess flow continues down the ditch.

Manning Coefficient - the coefficients came from Van Te Chow's "Open-Channel Hydraulics," For corrugated metal pipes and flumes, $n=.023$; for natural channels-straight, full stage, no pools with weeds and stones, $n=.035$.

Slope - for ditches the total change in elevation was divided by the total length, both values were obtained from Plate 7-1. For culverts the slope was obtained from field measurements.

H/C
6-21-84

To determine the headwater necessary for maximum flow through the various culverts the orifice computer program was run for the different size culverts being used in the mine plan area. The equations used in the program are listed on the individual printouts. The parameters supplied the programs are as follows:

D - diameter of culvert size being considered.

C - the coefficient of contraction for orifices was obtained from King and Brater's "Handbook of Hydraulics".

UMC 783.27 Prime Farmland

The applicant has not completely addressed this requirement. A letter from the SCS was not submitted as part of the MRP.

This letter was inadvertently omitted and is attached as Appendix 8-C.

JUN 25 1984



United States
Department of
Agriculture

Soil
Conservation
Service

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

November 25, 1983

Mel Coonrod
P. O. Box 1245
Huntington, UT 84528

Dear Sir:

Keith Beardall, District Conservationist, Price, Utah, has determined that no prime farmland occurs in the Bear Canyon area; the areas were outlined in red on the map furnished with your request.

The areas in sections 14, 23, 24 and 26 are too steep to be considered for prime farmland. Sections 22 and 25 are above existing irrigation systems, more than 10 percent of the surface layer consists of rock fragments coarser than 3 inches and/or too steep to be considered for prime farmland.

We are retaining the boundary map pertaining to the area for future reference. If you have need of further information, please call on us.

Sincerely,

FERRIS P. ALLGOOD
State Soil Scientist

cc: Keith Beardall, DC, Price, UT



The Soil Conservation Service
is an agency of the
Department of Agriculture

JUN 25 1984

7/2/84

COOP RESUBMISSION ON JUN 25) 1984

UMC 784.23 Operation Plan: Maps and Plans

The applicant has not completely addressed this requirement. Cross-sections of disturbed and undisturbed ditches have not been submitted. Cross-sections of the Bear Canyon stream channel were not certified prior to the March 1984 DOC/TD document. The April 30th response omitted not only the certification but also the original cross-sections.

See Appendix 3-2

RECEIVED

JUN 25 1984

DIVISION OF OIL
GAS & MINING

JUN 25 1984

UMC 784.14 Reclamation Plan: Hydrologic Balance

The applicant has not completely addressed this requirement. The applicant has not provided maps, plans and cross-sections to depict postmining drainage patterns. Clarification of a statement in the MRP regarding "horizontal drainage patterns," a postmining drainage map, cross-sections depicting postmining topography and drainage, specific measures for stabilizing reclaimed drainage channels and details on measures proposed for reclamation of the main stream channel where it is currently culverted were not submitted as required. The previous MRP had proposed a log check dam configuration for reclaiming the Bear Canyon stream channel. This proposal was removed by the April 30, 1984 response and the only inference to reclaiming the stream channel is the depiction of eight-inch riprap shown on Plate 3-2.

See Appendix 3-2 and Plate 3-2A
 3-G (Road Reclamation Plan)
 Scale House Approved Modification Letter-
 Approvals end of MRP

Appendix 3-2

RECLAMATION PLAN - DRAINAGE CHANNELS

RECLAMATION PLAN - DRAINAGE CHANNELS

The following information is a direct excerpt from April 25, 1984 MRP Submittal and Approved Scale House Modification, October 12, 1983:

Upon final reclamation, all disturbed areas will be recontoured to near natural configuration, drainage channels will be re-established.

"PHASE # 4 DRAINAGE CHANNEL STABILIZATION AND RECONSTRUCTION

In conjunction with the recontouring, all drainage areas will re-establish to approximate original configuration. In order to minimize the loss of soil, all drainages will be lined with hygronomy blankets for approximately 10 feet above and below the areas of disturbance. In addition, where conditions warrant, rock rip rap may also be utilized to add yet another parameter of stability." (excerpt Chapter 3, pg. 3-119)

Plate 3-2A illustrates the postmining alignment of the stream channels and those areas where additional rip-rap is anticipated.

The above procedures coupled with the use of soil tac in application has proven an excellent method of stabilization of disturbed areas until vegetation is re-established. Rate of application is discussed in detail Chapter 9, pages 9-16, April 26, 1984 MRP Submittal.

That portion of Bear Creek which is presently culverted is to be reclaimed as stated in the Approved Scale House Modification October 12, 1983. For convenience a copy of that approved plan is attached herein with the addition of the Engineering Certification as requested on May 11, 1984.

PHASE # 4 DRAINAGE CHANNEL STABILIZATION AND RECONSTRUCTION

In conjunction with the recontouring, all drainage areas will re-establish to approximate original configuration. In order to minimize the loss of soil, all drainages will be lined with hygronomy blankets for approximately 10 feet above and below the areas of disturbance. In addition, where conditions warrant, rock rip rap may also be utilized to add yet another parameter of stability.

MODIFICATION DEFICIENCIES

UMC 817.44 Hydrologic Balance: Stream Channel Diversions

The methodology which the Co-Op Mining Co. contemplates implementing upon final abandonment and reclamation of that portion of Bear Creek in the vicinity of the Scale house are as follows:

1. To use a large track mounted excavator in conjunction with a small backhoe and crawler tractor to remove the 60' culvert and to regrade the opposing banks on approximately a 3 to 1 slope to facilitate revegetation and to enhance the establishment of a riparian zone. (Note fig. 1 for the present stream configuration and projected after reclamation).
2. To construct small holding ponds along the channel utilizing native materials. The actual methodology is to incorporate 2 logs approximately 10 to 14" in diameter, trench into the bank back approximately 10' on both sides of the creek channel, secure the logs together in a stacked manner with 3/4" anchor bolts, buried for approximately 10 feet with approximately 36" of fill material decreasing to 0" as the stream channel is approached. An 18" wide by 5" deep notch cut along the top of the upper log in the center of the creek channel, to create a centralized spill-way. Once the logs are secured into the channel, rock rip-rap should be laid on the up stream side to a height equal to the height of the log retainer and continued up stream for a distance of 36" decreasing in height so as to be level with the original rip-rapped channel. Then by utilizing a backhoe, a pit approximately 3' in diameter should be dug at the fall line of the spillway and lined with large rock 2' +. The log-pond configuration should be repeated at approximately 50' intervals along the course of the creek channel to create a stepped configuration along the area of disturbance.

The intent of the holding ponds created by the log-rock dam is to fill with sediment and minimize the down stream migration

of this potentially detrimental source of silt and convert it into a potentially beneficial, enriched, growth media to facilitate the enlargement and establishment of riparian vegetation. Over a course of time the water holding capability of the ponded area will decrease as the ponds fill with sediment, however, the small ponds at the base of the spillway should remain relatively free from sediment and due to the small surface areas and depth, they will hold water over an extended period during dry seasons. A diagram is attached for your review. (See fig. 2).

The methodology is one which has been successfully implemented by myself on various areas to facilitate both water holding and enhancement of riparian zones and has been proven successful.

UMC 817.44 Paragraph 2

A 93-R and a 404 permit have been applied for. See appendix "A", and a copy of the approvals will be forwarded to your office on our recieval.

JUN 25 1984

UMC 817.47 Hydrologic Balance

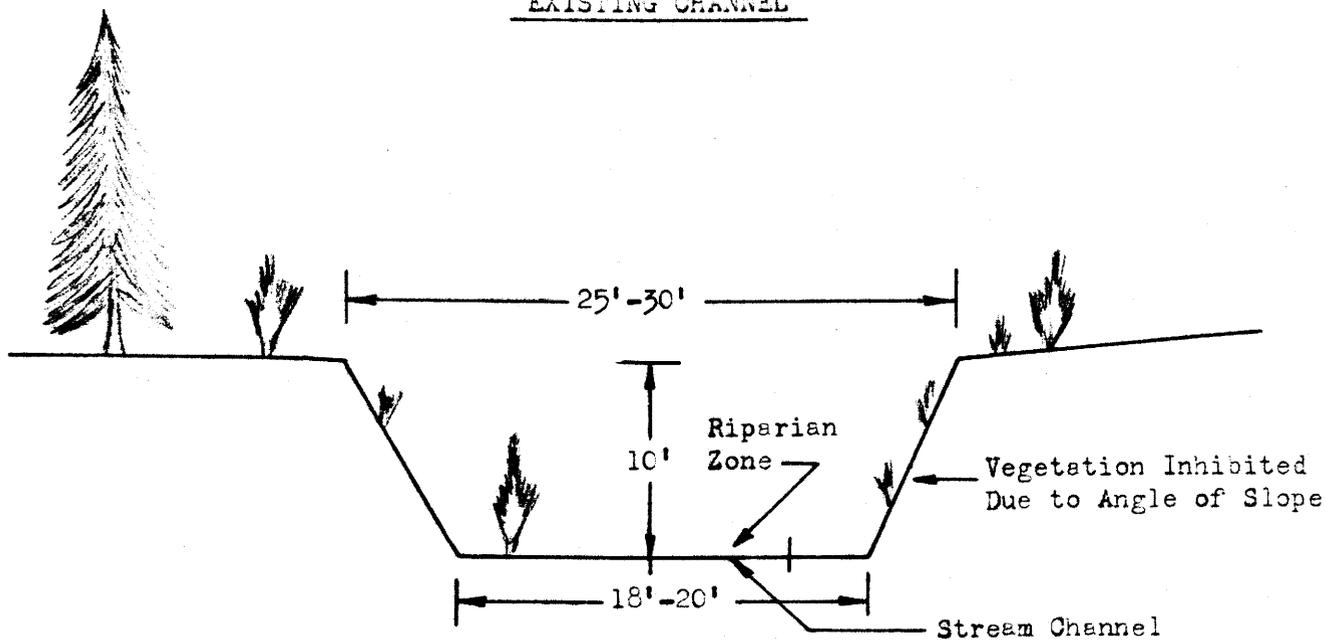
Co-Op is committed to use 12+ material in lieu of D-50 unless The Division of Oil, Gas, & Mining recommends an alternative.

UMC 817.103 Covered Coal & Acid & Toxic Forming Materials

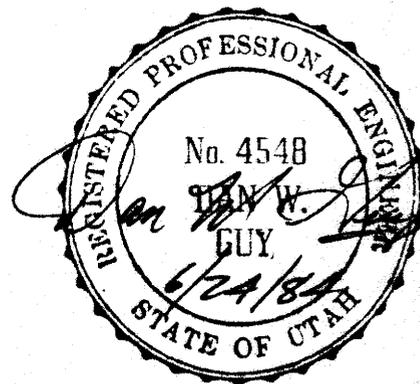
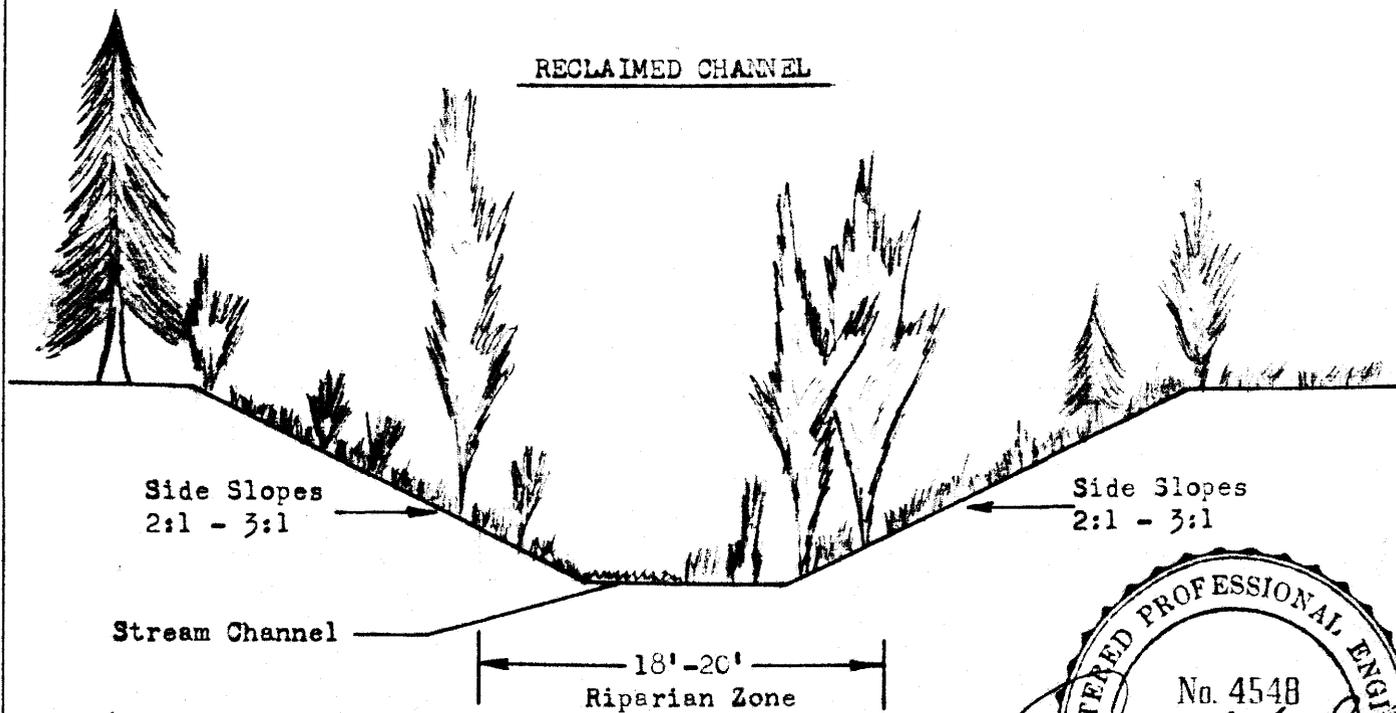
The sample was taken from that portion of Trail Canyon which Co-Op anticipates final reclamation in the near future. The specific site was at the toe of the slope where coal was historically stockpiled, approximately 800' above the Load-out facility.

The additional data is attached under appendix B

EXISTING CHANNEL



RECLAIMED CHANNEL



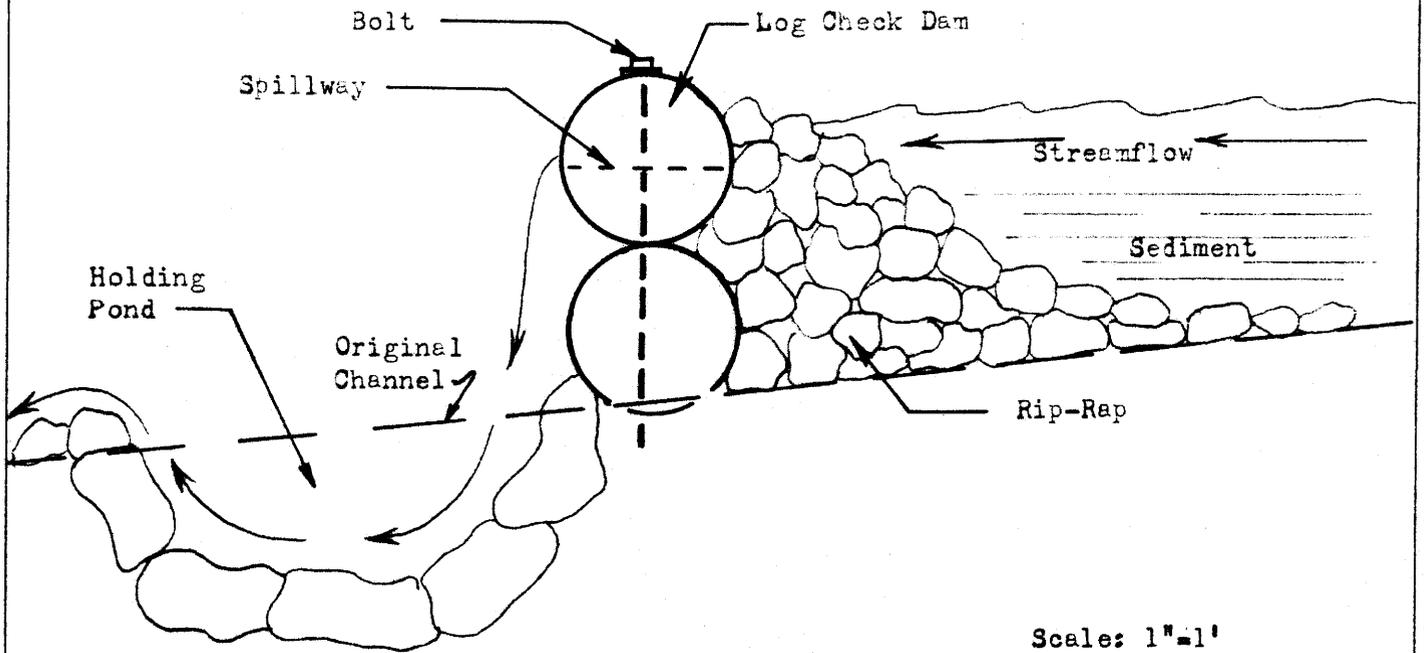
BEAR CANYON STREAM CHANNEL

SCALE 1"=10'

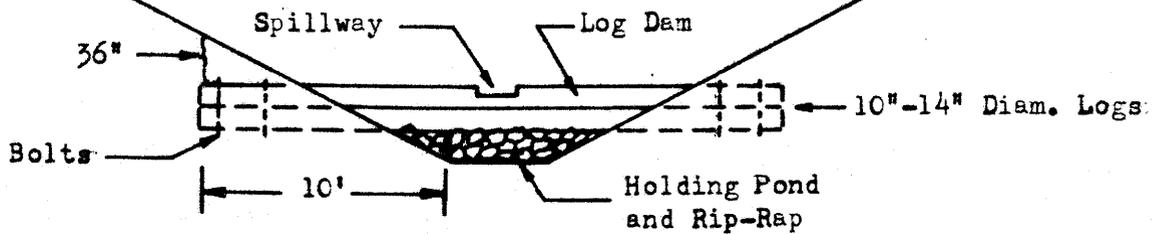
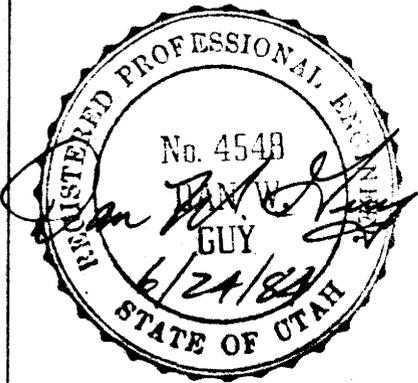
FIGURE
NO. 1

JUN 25 1984

SIDE VIEW



END VIEW
(Looking Upstream)



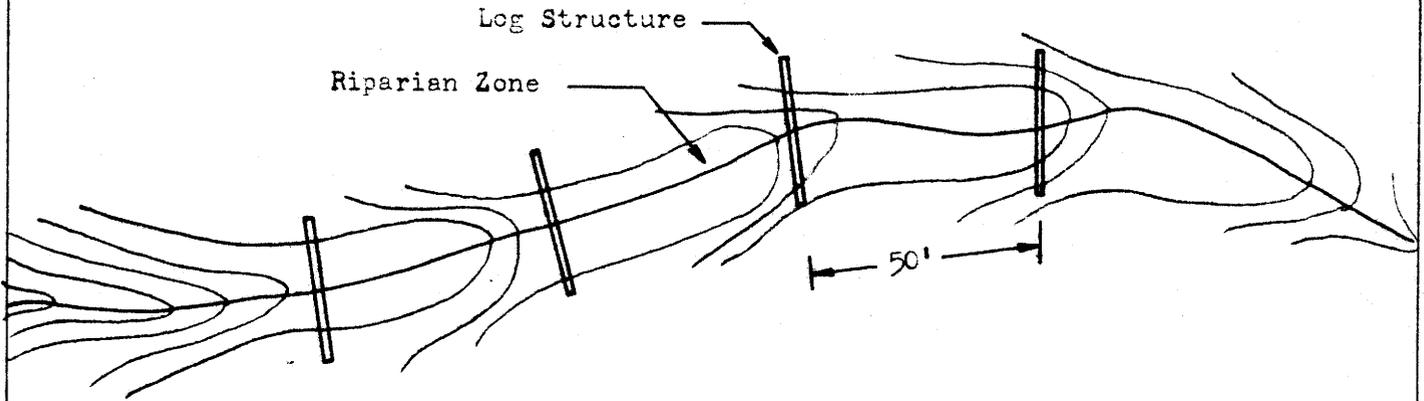
LOG CHECK DAM AND HOLDING POND

SCALE: AS SHOWN

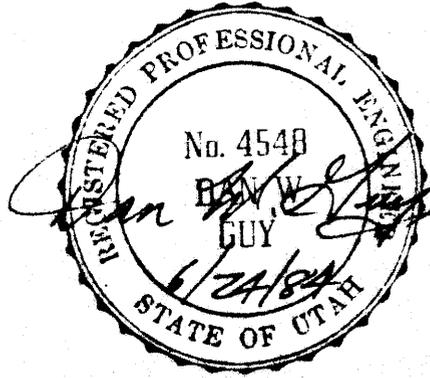
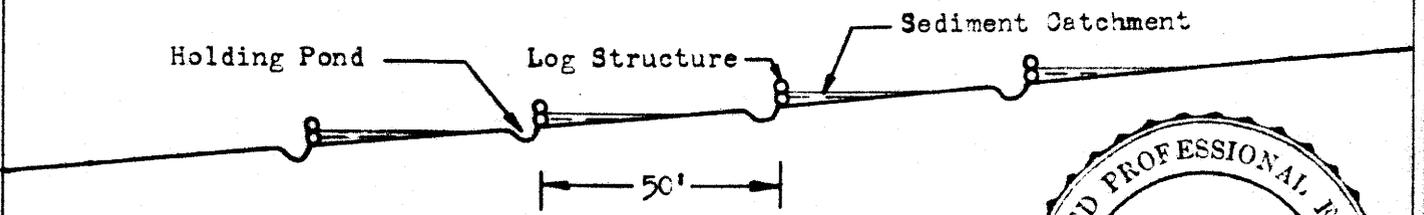
FIGURE
NO. 2

JUN 25 1984

PLAN VIEW



PROFILE



ENHANCED STREAM CHANNEL

SCALE: 1"=40'

FIGURE
NO. 2-A



STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dr. G. A. (Jim) Shirazi, Division Director

October 12, 1983

Mr. Wendell Owen
Co-op Mining Company
P. O. Box 1245
Huntington, Utah 84528

RE: Scalehouse Modification
Final Approval
Bear Creek Canyon Mine
ACT/015/025
Folder Nos. 3, 4 and 7
Emery County, Utah

Dear Mr. Owen:

The Division has reviewed all material submitted by Co-op Mining Company for the proposed scalehouse permit modification and have, to the best of our ability, found that it meets all requirements set forth under Title 40-10 UCA 1953 (Regulation of Coal Mining and Reclamation Operations), and UMC 700 et seq. (Surface Effects of Underground Coal Mining Activities).

Approval of the proposed scalehouse modification for the Bear Creek Canyon Mine permit is hereby granted and utilization of this facility may lawfully commence.

If you have any questions, please feel free to call.

Sincerely,

JAMES W. SMITH, JR.
COORDINATOR OF MINED
LAND DEVELOPMENT

JWS/EH:btb

cc: Carl Kingston, Co-op Mining Company
R. Daniels, DOGM
E. Hooper, DOGM
J. Helfrich, DOGM
J. Whitehead, DOGM

UMC 784.20 Subsidence Control Plan

The applicant has not completely addressed this section. A survey of renewable resource lands has not been presented. The applicant's assessment of the effects of potential subsidence on renewable resource lands has not been included. NOTE: the issue of renewable resource lands was raised under the heading UMC 784.20 in the February 24, 1983 and August 31, 1983 DOC/TD documents. This issue was inadvertently omitted from the March 1984 DOC/TD document by the Division.

See Appendix 3-5-8

Survey Renewable Resource Lands and Potential of Subsidence Impacts

APPENDIX 3-5-8

SURVEY RENEWABLE RESOURCE LANDS
AND POTENTIAL OF SUBSIDENCE IMPACTS

JUN 25 1984

SURVEY OF RENEWABLE RESOURCE LANDS
CO-OP BEAR CANYON PERMIT AREA AND
POTENTIAL IMPACTS OF SUBSIDENCE

On June 13, 1984, an aerial survey was conducted of the entire Bear Canyon Mine Permit Area as well as all surrounding areas which could feasibly be impacted by subsidence. The results of that survey are as follows:

- (1) Hydrologic Balance: There are no seeps and/or springs above the area of the coal beds. No surface water was observed other than Bear Creek which lies beyond the potential area of subsidence.
- (2) Timber: There is no marketable timber within the area and the terrain is so steep as to preclude the establishment and/or harvest of such.
- (3) Vegetation (Ref. grazing): The bulk of the area is high priority wildlife habitat. Potential impacts were evaluated in cooperation with UDWR Personnel. The results of that evaluation are discussed under Impacts.

The terrain is inhospitable to domestic grazing and is not utilized as such under present or future land use practices.

- (4) Fish and Wildlife: The absence of water precludes the presence of fish. The entire area of influence is utilized by a wide variety of wildlife.
- (5) Paleo-Archeo: There are no known sites within the area as documented by ground Paleo-Arch survey, Appendix 5-1.

- (6) Man-Made Structure: There are no man-made structures within the area of influence other than a small unauthorized jeep trail on the northern rim of the permit area.
- (7) Minerals, Oil & Gas: There are no oil and/or gas wells within the area and no known mineral reserves.

Potential Impacts

No negative impacts to renewable resources are anticipated other than potential impacts to wildlife.

Mr. Larry Dalton, Resource Analyst Utah Division of Wildlife Resources and the State's foremost authority on potential impacts of subsidence on wildlife, inspected the site on June 18, 1984. The results of that investigation in part are as follows:

Considering the absence of spring, water sources, the negative potential impacts of subsidence within the Bear Canyon Permit Area could easily be offset by potential positive aspects.

On the negative side: Loss of riparian area and/or water sources is of greatest concern, followed by loss of vegetation from methane gas leaking to the surface from an underground works. Considering the lack of riparian area or water sources above the coal seam, this concern is not warranted. Secondly, Co-Op has never encountered methane gas underground so there is little concern relative to potential vegetation loss, and last, the loss of nests due to escarpment failure.

On the positive side: The tension fractures resulting from subsidence along the steep side hills are frequently utilized by big game as movement corridors. The fractures and rubble provide escape cover for a variety of wildlife species as well

as additional habitat for burrowing and denning animals. While there is concern over the potential loss of nests as a result of escarpment failure, there is also a potential for additional nesting sites to be created through this gravitational shearing of escarpment surfaces.

UMC 785.19 Underground Coal Mining Activities on Areas or Adjacent
to Areas Including Alluvial Valley Floors in the Arid or
Semi-Arid Areas of Utah

The applicant has not completely addressed this requirement. A map of unconsolidated stream laid deposits or surface and groundwater into and through stream laid deposits has not been submitted.

See Chapter 3 Section 3.6.8

Letter requesting a variance under UMC/SMC 785.19(c)(3)(ii)

Submitted June 25, 1984

Co-Op Mining Company
P.O. Box 1245
Huntington, Utah 84528

June 25, 1984

Mary Boucek
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114

Ref: Alluvial Valley Floors

Dear Mary:

The pre-mining land use of the small area adjacent to Bear Creek in the Co-Op Permit Area is undeveloped range land and is not significant to farming.

This area is the only area where an alluvial valley floor could possibly exist and as stated by the SCS, no farm lands lie within the permit area and based on availability of water, steepness of the terrain, type of soil, and amount of rock, no farm land could feasibly be developed.

Based on the above which is documented in the Co-Op Bear Canyon Mine MRP Revised, Co-Op requests a waiver of UMC/SMC 785.19 paragraphs d and e and all of Section 822.

Sincerely,



Melvin A Coonrod
Permitting & Compliance
Co-Op Mining Company

MC/njc

JUN 25 1984

UMC 783.22 Land Use Information

The applicant has not completely addressed this requirement. Land productivity data obtained from the Soil Conservation Service (SCS) were not presented.

This information was provided and referenced in Chapter 4, Page 4-10 to Chapter 9 Appendix 9-B.

4.4.2.3 Land Capability and Productivity Before Any Mining

Present land capability and productivity will be only slightly reduced compared to the after mining capability. Mining activities have proceeded on the current lease areas of the Co-Op Mining Company historically with only minor effects on productive capabilities in terms of soils, topography, vegetation or hydrology. The soils indigenous to the area affected by the operations are described in Chapter 8. Vegetation is discussed in Chapter 9.

Surface water in the permit area is limited to surface run-off that flows most heavily during the spring and early summer months and then normally dry up. The quality and quantity of this water and of the ground water will be identified in Chapter 7.

4.4.2.4 Land Productivity Before Mining in Terms of Average Yield of Food, Fiber, Forage or Wood Products

Land productivity in terms of plant products

before any mining will not differ greatly from future productivity. Early settlers depended upon range land for grazing sheep, cattle and horses. Timbering was active, but on a much smaller scale than grazing. Early settlers needed fenceposts, corral poles, house logs and railroad ties.

The permit area affected by Surface operations and facilities of the underground Bear Canyon mine is capable of supporting limited grazing and recreational uses. Farming in the area is prohibited by the steep and rocky terrain.

Current and future land use will suit the physical features of the mine plan area, which is mostly steep and rocky. Such land is well suited for management as a multi-use area and coal mining fits appropriately into the overall land use scheme.

Land productivity data were obtained from the U.S. Soil Conservation Service.



United States
Department of
Agriculture

Soil
Conservation
Service

350 North 4th East
Price, Utah 84501

September 26, 1983

Mel Coonrod
Co-op Mine
P. O. Box 358
Elmo, Utah 84521

Dear Mel,

Trail Canyon Reference Area:

Pinyon-Juniper Grass Site

The production is 650 lbs herbage production for this year. The range site condition is good.

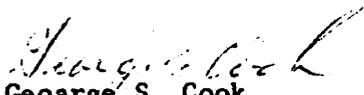
Trail Canyon Riparian Reference Area:

The production is 2,650-3,000 lbs/acre. The condition is fair.

Bear Canyon Comparative Area:

Pinyon-Juniper Grass Site

The production is 600 lbs/acre. The range site condition is fair.


George S. Cook
Range Conservationist

JUN 25 1984

UMC 783.25 Cross-Sections, Maps and Plans

The applicant has not completely addressed this requirement. The following remains incomplete:

- (a) The elevation and locations of test borings and core samplings were not supplied.
- (c) Columnar outcrop sections denoted on Figure 2 in Appendix 6-A have not been located and identified on a map.
- (d) A coal cropline map was submitted but strike and dip of the coal to be mined was not addressed.
- (f) The extent of subsurface water on Plate 3-4 was not characterized in a cross-section.

The remaining items, (e), (g), (h), (i) and (l) were completely addressed.

See Plate 3-4A end of Chapter 3.

UMC 784.17 Protection of Public Parks and Historic Places

The applicant has been given an extension to June 30, 1984 to complete the requirements of this section.

See Appendix 5-1

APPENDIX 5-1

PALEO-ARCHEOLOGICAL SURVEY



SENCO-PHENIX

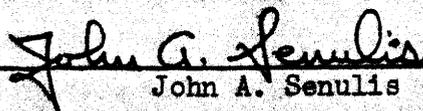
ARCHEOLOGICAL SAMPLING SURVEY OF THE
BEAR CANYON MINE LEASE EXTENSION
PERFORMED FOR THE BEAR CANYON/CO-OP MINE
THROUGH ENVIRONMENTAL INDUSTRIAL SUPPLY

In accordance with State of Utah Guidelines
in Emery County, Utah
State of Utah Antiquities Permit No. 1106

SP-UT-42

SENCO-PHENIX

June 19, 1984


John A. Senulis

Principal Investigator

JUN 25 1984

Abstract

A 10% sample survey was performed on the Bear Permit area for CO-OP Mining by John A. Senulis of SENCO-PHENIX under regulation of the Office of Surface Mining, Utah Division of Oil, Gas and Minerals, and the Utah State Historic Preservation Officer.

No cultural resources were located and the probability of undetected remains is slight. Archeological clearance is recommended, particularly since there will be no or minimal surface impact from this project.

Project Area

The 750 acre Bear Permit Area is located in the $W\frac{1}{2}/W\frac{1}{2}$ of Section 24, the $E\frac{1}{2}$ and the $E\frac{1}{2}/W\frac{1}{2}$ of Section 23, the $S\frac{1}{2}$ of Section 14, and the $N\frac{1}{2}/NE\frac{1}{4}$ of Section 26, all Township 16 South, Range 7 East, Emery County Utah. There will be no, or minimal surface impact within the new permit area. Potential impacts would be from subsidence caused by abandoned mine shafts. The project is shown on the U.S.F.S. Manti-LaSal Map and U.S.G.S. 7.5' Quad: Hiawatha, UT (1978).

Specific Environment

The specific project area is extremely rugged, mountainous terrain with a topographical form of dissected uplands. Elevations range from 6800 to 8990 feet. Most of the terrain is steep with common grades of 15-20°. The one source of permanent water near the project area is Huntington Creek, ca. 3/4 mile southwest of the project area. Bear Creek, which flows much of the year, is roughly the eastern boundary of the permit area. Soils are generally colluvium forest soils on the slopes with clay loams on the ridges and in the valleys. The valley soils have a heavy gravel content of quartzite, lignite and scoria. Sandstone and shale are the predominant bedrock outcrops.

Predominant vegetation in the drainage areas is Ponderosa Pine, Douglas Fir, Aspen, Limber Pine, and Juniper with willow, rabbitbrush, sagebrush, muhly, squirreltail, milkvetch, lupine, woods rose, scarlet

gilia, arrow-leafed balsamroot, foothills arnica and other associated grasses, forbs and shrubs. On the steep, rocky, rugged hillsides, the pine and juniper trees and other vegetation become sparse.

Archeological Potential

A files search at the Utah State Historic Preservation office indicated that no archeological surveys have been performed in the project area. Sites in Huntington Canyon are generally flake scatters, isolates, and rock shelters, with historic sites consisting primarily of evidence of mining, i.e. mine shafts, hardware, etc. Generally the prehistoric and earlier historic sites are located along the valley floor. The probability of locating significant archeological resources in the steep mountainous areas was considered remote.

Survey Strategy and Methodology

The survey strategy was based upon the belief that the most likely area for sites would be within Bear Creek Canyon. Therefore, the entire canyon was surveyed with particular emphasis on the sides for potential rock shelters, and on the canyon floor for isolates. A second portion of rugged uplands was surveyed with wandering random transects to insure adequate coverage of the diverse zones.

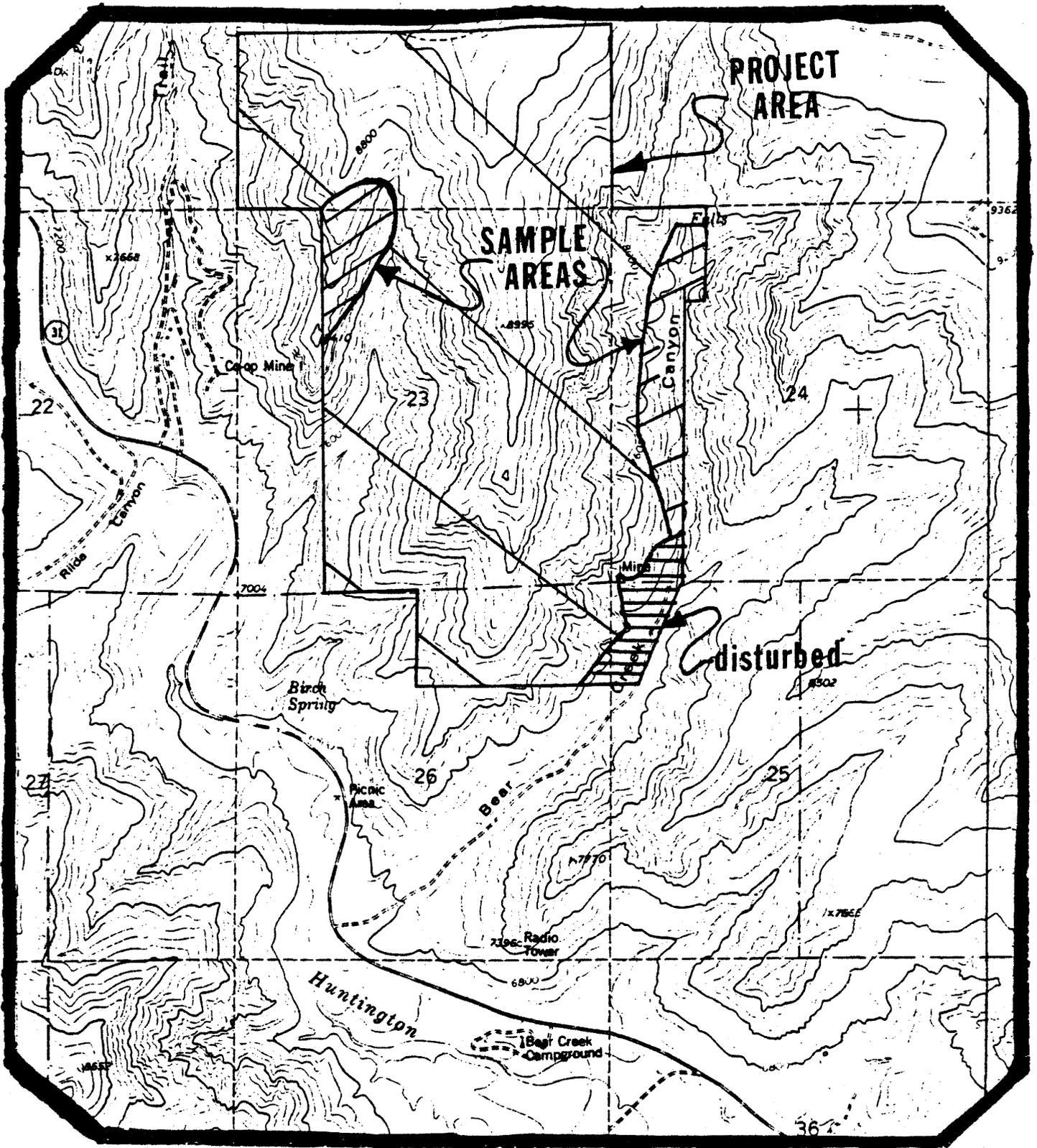
Survey Conditions

On June 18, 1984, John and Jeanne Senulis performed a walkover survey of the aforementioned areas. The sky was overcast for part of the survey with light mountain showers; however, the sky then cleared and the majority of the survey was conducted under sunny skies. The soils ranged from damp to dry, and the temperature was approximately 70° F. with calm winds except during the rain showers.

Findings and Recommendations

Outside of two modern campfires, no prehistoric or historic cultural resources were located in the steep, inhospitable terrain. No rock alcoves of sufficient size or configuration were discovered and the

entire valley floor showed evidence of occasional flash flooding.
Because of the lack of findings, and the project's non-surface disturbing
nature, archeological clearance is recommended.



SENCO-PHENIX
 ARCHAEOLOGICAL SURVEYS

BEAR CANYON MINE LEASE EXTENSION
 CO-OP MINING COMPANY
 SECTIONS 14, 23, 24, 26, T16S. R7E
 EMERY COUNTY, UTAH
 U.S.G.S. 7.5' QUAD: HIAWATHA, UTAH (1978)
 SENCO-PHENIX (UT-42)
 JUNE 18, 1984

P.O. BOX 9197
 SALT LAKE CITY, UTAH
 84109

JUN 25 1984

UMC 784.13 Reclamation Plan: General Requirements

Though the applicant completely addressed this requirement regarding deficiencies outlined in the March 1984 DOC/TD document, the applicant's submission of additional information April 30, 1984 changed what had been submitted and was complete prior to March 1984, thus rendering the MRP incomplete with reference to part (b)(4) of this regulation, the use of a soil substitute.

Co-Op Reply:

See Appendix 6-S

JUN 25 1984

SCOPE:

Co-Op Mining Company, in an attempt to implement future reclamation on a previously disturbed mining site in Bear Canyon, Bear Canyon Mine, determined that they had a deficiency of approximately 1800 cu. yds. of top soil. In order to offset this deficiency, two courses of action were investigated:

1. To utilize existing material which was down cast along the old portal access road.
2. To purchase a suitable top soil off site and haul it to the proximity of the mine.

In order to determine feasibility and suitability of both the materials and the methods, the following soil inventory and survey were conducted:

Methodology

On March 24, 1984, M. A. Coonrod, Compliance and Permitting Coordinator for the mine, sampled soil along the old portal road, top soil purchased off site and the existing top soil pile. The sample procedure for each site is as follows:

Existing Topsoil Stockpile (Sample ID-P1)

A randomly selected spot was determined by walking 10 paces up the pile from a random point selected by throwing a marker onto the pile. A 14" tile spade was utilized to excavate a hole 24" in depth and approximately 18" in diameter. A sliver of soil approximately 1" x 4" was sliced from the top to bottom of the excavation. The material was placed in a clean plastic bag and sealed (approximately 3 lbs.) Rock larger than approximately 1" diameter were avoided in containerizing the sample.

Loadout-Alternative Soil Substitute (Sample ID-P2)

Co-Op has purchased approximately 80 acres along the Price river, Carbon County, Utah. A portion of the site had the top soil stripped and stockpiled. The same sample methodology as implemented on the existing topsoil pile at the mine was utilized at this alternative soil substitute.

Road Fill (Sample ID FR-3, st 1,3 & 6)

This material was sampled at 200' intervals from the down slope of the fill in the area of the portal road intersection to the non-coal storage site along Bear Creek. Each sample was taken 3' from the toe of the downcast material. A 14" tile spade was used to excavate approximately 1' into the fill material and a grab sample (app.1 lb. of material) was taken at each site. All samples were consolidated into 3-5 gallon plastic buckets labled 1,3, and 6.

At the conclusion of the survey, all samples were consolidated and mixed. From this consolidated material, a sample of approximately 8 lbs. was placed into a clean plastic bag. All samples were hand carried to Standard Laboratories north of Huntington, Utah on March 24, 1984.

Results and Conclusions:

Attached are copies of the laboratory results. It appears that all materials on site as well as the off site substitute are compatible and capable of establishing and maintaining a diverse vegetative community consistent with the existing reference area.

Prior to implementing reclamation, all soil will be tested again to determine the need for both, type and quantity of desired fertilizers to insure rapid establishment of vegetation.

UMC 784.22 Diversions

(1) The applicant has not completely addressed this requirement. The map delineating drainage areas cuts off certain areas, rendering it impossible to calculate the watershed area on subareas AR-1, AU-2, AU-3, AU-4, AU-5 and AU-6. (2) The applicant has not sufficiently identified or explained the formulas used where results were taken from computer sheets or the coefficients used in calculations. (3) No ditch cross-sections have been presented and velocities have not been shown. (4) A table identifying riprap size based on velocity has not been presented. Format for and frequency of reporting regarding the groundwater monitoring plan have not been addressed.

- (1) See revised Plate 7-5
- (2) Attached as insert A
- (3) See revised Plate 7-1
- (4) Attached as Insert A

-Summary of Culvert Sizes-

	<u>Flow(cfs)</u>	<u>Vel.(fps)</u>	<u>Rip Rap</u>	<u>Slope (%)</u>	<u>Diameter</u>	<u>Required Headwater**</u>
C-1R	10.2	9.5	12"	8.0	18"	27"
C-2R	12.1	9.5	12"	8.0	18"	36"
C-3R	16.4	9.5	12"	8.0	18"	27"
C-1U	8.8	12.3	24"+	15.0	30"	18"
C-2U	1.5	8.4	9"	15.0	15"	9"
C-3U	7.9++	5.7	6"	5.0	12"	36"*
C-4U	6.1++	5.1	6"	5.1	10"	36"*
C-5U	6.1++	5.0	N/R	4.8	10"	36"*
C-6U	.9	4.4	N/R	3.7	10"	12"
C-7U	10.3	9.7	12"	8.3	12"*** (18")	27"
C-8U	8.8	13.0	24"+	15.0	18"	24"
C-9U	1.5	8.0	9"	7.3	15"	9"
C-1D	1.5	10.9	16"+	20.0	15"	9"
C-2D	4.8	9.6	12"	12.0	18"	15"
C-3D	1.2	5.2	6"	4.2	12"	9"
60" CMP	231.2	13.8	24"	3.4	60"	102"

*When capacity of culvert is exceeded flow continues down ditch to next culvert.

**From invert elevation.

***Existing 12" CMP to be replaced with 18" CMP at 8.3% slope.

+ Energy dissipating device could be used instead of rip rap.

++ A two foot high check dam of rip-rap is used to develop the headwater necessary for maximum flow through the culvert, excess flow continues down the ditch.

N/R - Not required

-Summary of Ditch Sizes-

All ditches are triangular "V ditch" with 1:1 side slopes. (See Plate 7.1 for typical.)

	<u>Flow(cfs)</u>	<u>Vel. (fps)</u>	<u>Rip Rap Size**</u>	<u>Slope(%)</u>	<u>Depth Of Ditch</u>	<u>Depth Of Water</u>
D-1R	10.2	6.8	6"	6.0	2'-0"	1'-6"
D-2R	12.1	6.8	6"	6.0	2'-0"	1'-6"
D-3R	10.4	6.8	6"	6.0	2'-0"	1'-6"
D-1U	1.5	3.5	N/R	4.0	1'-3"	0'-9"
D-2U	1.5	3.9	N/R	5.0	1'-3"	0'9"
D-3U	6.1	5.5	4"	5.0	1'-9"	1'-3"
D-4U	11.8	6.6	6"	5.0	2'-0"	1'-6"
D-5U	.9	3.5	N/R	7.0	1'-0"	0'-6"
D-6U	.9	3.5	N/R	7.0	1'-0"	0'-6"
D-7U	10.3	6.6	6"	5.0	2'-0"	1'-6"
D-8U	2.3	4.4	N/R	6.25	1'-3"	0'-9"
D-9U	1.8	5.0	4"	8.3	1'-3"	0'-9"
D-10U	1.5	5.7	6"	18.0	1'-0"	0'-6"
D-11U	7.6	7.9	9"	14.0	1'-6"	1'-0"
D-1D	.8	4.0	N/R	9.0	1'-0"	0'-6"
D-2D	1.5	5.5	4"	10.0	1'-3"	0'-9"
D-3D	1.0	5.2	4"	15.0	1'-0"	0'-6"
D-4D	4.8	5.3	4"	6.25	1'-6"	1'-0"
D-5D	7.2	6.2	6"	6.4	1'-9"	0'-9"
D-6D	1.2	4.4	N/R	6.25	1'-3"	0'-9"

*6" freeboard added to required flow depth.

** see Plate 7.1 for location of rip rap.

N/R - not required

Design Parameters Determination Procedure

Listed below are the various parameters, along with and the procedures used to obtain them, which were supplied to the computer programs used in calculating the runoff hydrographs and routings and the ditch and culvert sizings.

The equations used in the Hydro Plus III - SCS hydrograph program are listed this section, 7.2.5.2 Diversion Structures. The parameters that were used are as follows:

Basin Area - the areas where calculated, using a planimeter, from those outlined on Plate 7-5.

Basin Curve Number - this SCS runoff curve number was estimated using "A Guide to Hydrologic Analysis Using SCS Methods", Section 5. This section is included in the reference section. The soil of the mine plan area is best described by soil group "C". For the undisturbed areas the land use description is "woods or forest land" and the hydrologic condition "fair". Using these description a curve number of "73" was obtained. For disturbed areas the curve number "82" was used.

24-Hour Precipitation - the precipitation amounts for the various storm frequencies came from E. Arlo Richardson's "Estimated Return Period for Short-Duration Precipitation in Utah", the Hiawatha area.

Average Basin Slope - the slopes of the various areas outlined on Plate 7-5 were derived by dividing the total change in elevation by the hydraulic length.

Hydraulic Length - this length, also from Plate 7-5, is the length from the area outlet or mouth to the divide or point of highest elevation.

Basin Lag - this value was computed by the computer program with the computer using a minimum of 15 minutes.

The hydrograph reservoir routing program used the appropriate runoff hydrograph routed through the appropriate sedimentation pond, "A" or "B". Pond capacity per elevation and spill way capacity were determined from the cross sections and criteria shown on Plates 7-2 and 7-3.

From the parameters listed above, the computer program was able to generate runoff hydrographs. From these hydrographs the peak or maximum flow was used in the sizing of the ditches. For sizing the ditches and culverts the parameters used are as follows:

Ditch Depth - various ditch depths were tried, in 3" increments, until a depth was found that would handle the the maximum flow.

Culvert Diameter - the diameters were obtained by field measurement, unless noted otherwise. If the flow was larger than could be handled by the culvert a check dam 2' high of rip-rap is used to develop headwater for maximum flow through the culvert, excess flow continues down the ditch.

Manning Coefficient - the coefficients came from Van Te Chow's "Open-Channel Hydraulics," For corrugated metal pipes and flumes, $n=.023$; for natural channels-straight, full stage, no pools with weeds and stones, $n=.035$.

Slope - for ditches the total change in elevation was divided by the total length, both values were obtained from Plate 7-1. For culverts the slope was obtained from field measurements.

H/C
6-21-84

To determine the headwater necessary for maximum flow through the various culverts the orifice computer program was run for the different size culverts being used in the mine plan area. The equations used in the program are listed on the individual printouts. The parameters supplied the programs are as follows:

D - diameter of culvert size being considered.

C - the coefficient of contraction for orifices was obtained from King and Brater's "Handbook of Hydraulics".

UMC 783.27 Prime Farmland

The applicant has not completely addressed this requirement. A letter from the SCS was not submitted as part of the MRP.

This letter was inadvertently omitted and is attached as Appendix 8-C.

JUN 25 1984



United States
Department of
Agriculture

Soil
Conservation
Service

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

November 25, 1983

Mel Coonrod
P. O. Box 1245
Huntington, UT 84528

Dear Sir:

Keith Beardall, District Conservationist, Price, Utah, has determined that no prime farmland occurs in the Bear Canyon area; the areas were outlined in red on the map furnished with your request.

The areas in sections 14, 23, 24 and 26 are too steep to be considered for prime farmland. Sections 22 and 25 are above existing irrigation systems, more than 10 percent of the surface layer consists of rock fragments coarser than 3 inches and/or too steep to be considered for prime farmland.

We are retaining the boundary map pertaining to the area for future reference. If you have need of further information, please call on us.

Sincerely,

FERRIS P. ALLGOOD
State Soil Scientist

cc: Keith Beardall, DC, Price, UT



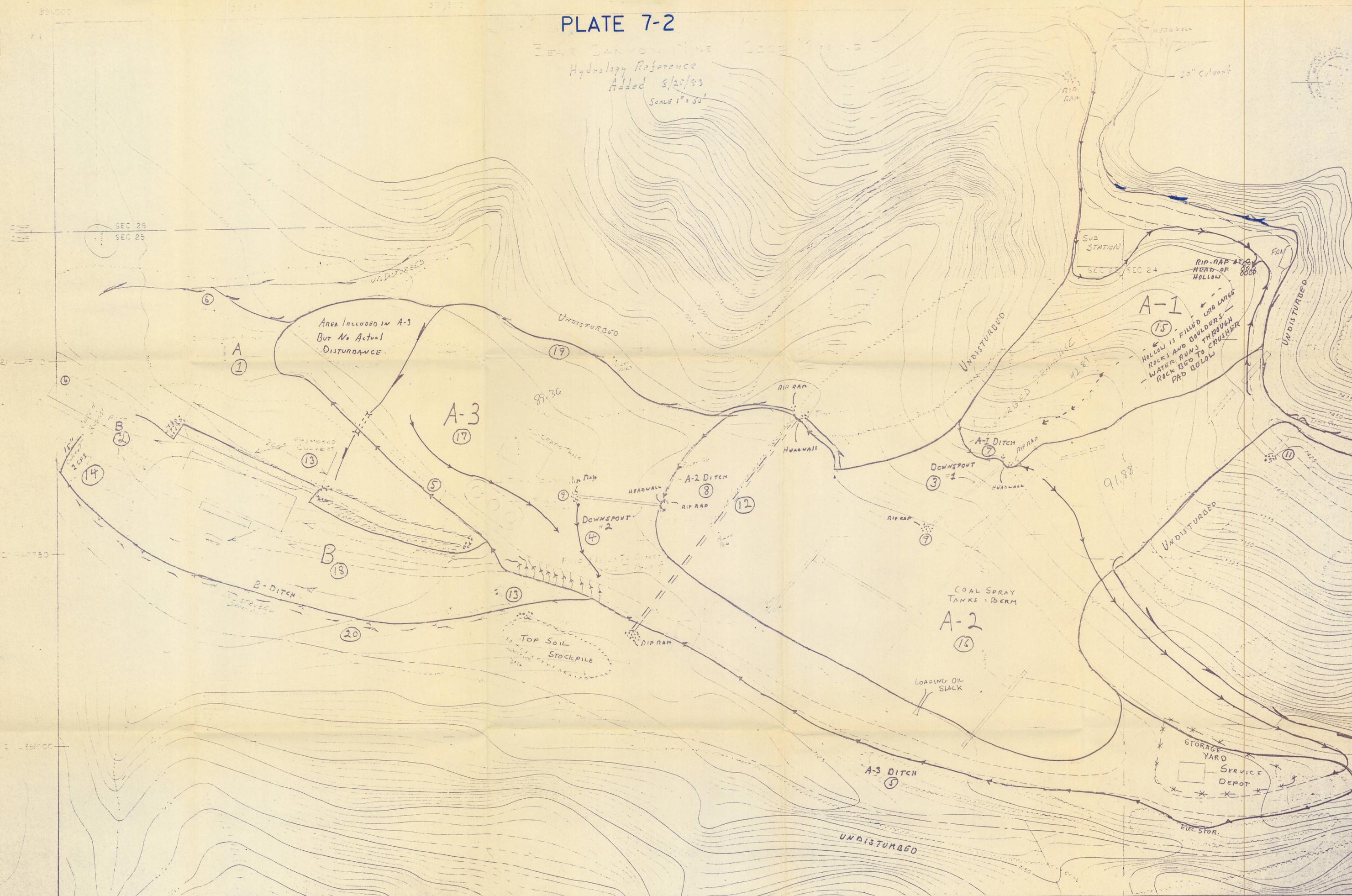
The Soil Conservation Service
is an agency of the
Department of Agriculture

JUN 25 1984

PLATE 7-2

BEAR CANYON LINE COOD LINE

Hydrology Reference
Added 8/21/83
Scale 1" = 50'



NOTES:

1. Pond to be inspected during construction under the supervision of a registered professional engineer.
2. Required angle of exterior slopes on south and east to be determined by stability analysis.
3. Interior slope of 2H:1V to be confirmed by stability analysis.
4. Pond to be constructed in accordance with the requirements of UMC 817.46.

DESIGN CRITERIA:

Drainage Area 14.35 Acres
 SCS Curve #82
 3-Year Sediment Storage 41,444 Ft³
 10-Year 24-Hour Runoff Storage 42,714 Ft³
 Use Existing Spillway 10 Foot Wide
 Broad Crested Weir
 Rainfall Data Base Hiawatha Data by E. Arlo Richardson

HYDROLOGIC REPORT FOR
 CO-OP Mine Disturbed Area
 POND DEPTH VS STORAGE PROVIDED

POND IDENTIFIER Reconstructed Sed. Pond "A" - Empty

ELEV feet	DEPTH feet	AREA sq. ft.	VOLUME cu. ft.	SUM VOL cu. ft.	OUTFLOW c. f. s.
87.0		9892.0		0.0	0.0
88.0	1.0	9676.0	9284.0	9284.0	0.0
89.0	1.0	10492.0	10084.0	19368.0	0.0
90.0	1.0	11340.0	10916.0	30284.0	0.0
91.0	1.0	12220.0	11780.0	42064.0	0.0
92.0	1.0	13132.0	12676.0	54740.0	0.0
93.0	1.0	14076.0	13604.0	68344.0	0.0
94.0	1.0	15052.0	14564.0	82908.0	0.0
94.2	0.2	15254.0	3030.6	85938.6	0.0
94.7	0.5	15798.0	7753.0	93691.6	13.4
95.2	0.5	16268.0	8006.5	101698.1	38.0

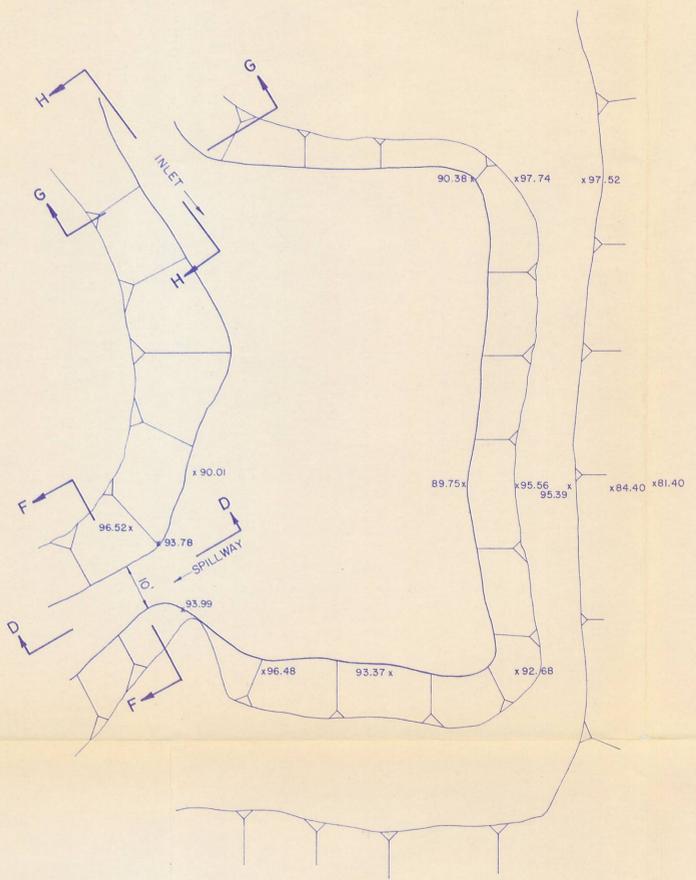
HYDROLOGIC REPORT FOR
 CO-OP Mine Disturbed Area
 POND DEPTH VS STORAGE PROVIDED

POND IDENTIFIER Reconst. Sed. Pond "A" - with 3 years accumulated sediment

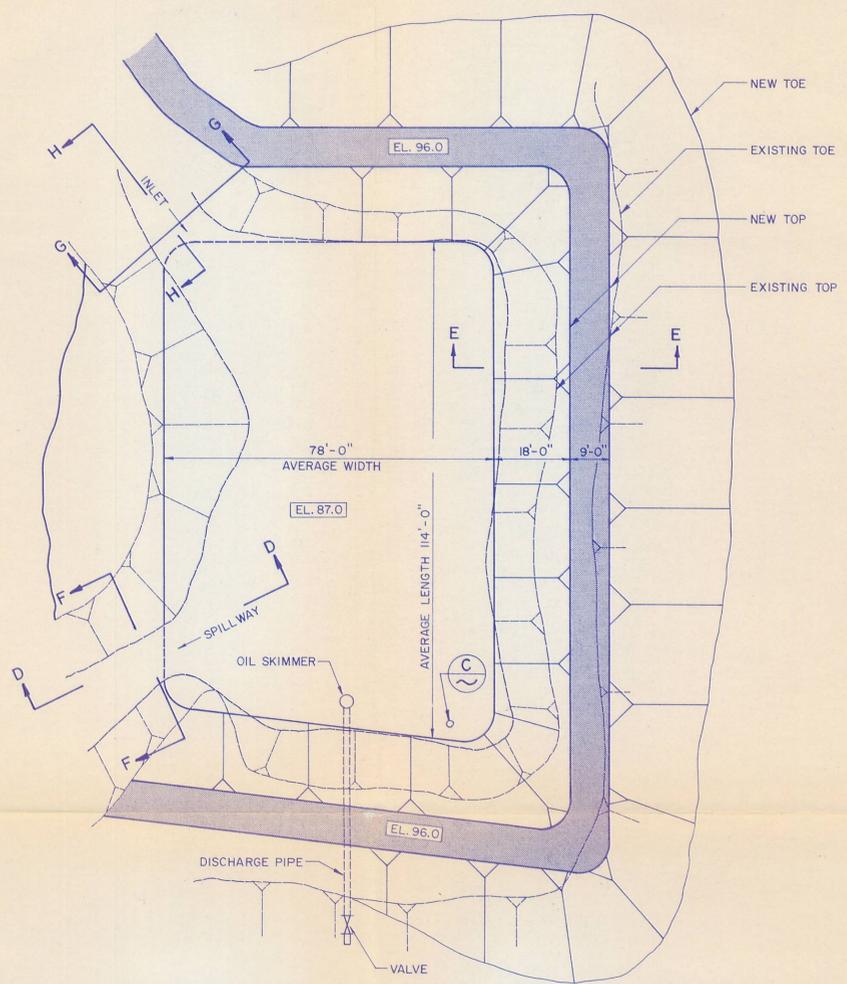
ELEV feet	DEPTH feet	AREA sq. ft.	VOLUME cu. ft.	SUM VOL cu. ft.	OUTFLOW c. f. s.
90.9		12176.0		0.0	0.00
92.0	1.1	13132.0	13286.7	13286.7	0.00
93.0	1.0	14076.0	13604.0	26890.7	0.00
94.0	1.0	15052.0	14564.0	41454.7	0.00
94.2	0.2	15254.0	3030.6	44485.3	0.00
94.7	0.5	15798.0	7753.0	52238.3	13.44
95.2	0.5	16268.0	8006.5	60244.8	35.19

ALL ELEVATIONS RELATE TO THE BENCH MARK SET AT THE SITE AT ELEVATION 100.00
 ELEVATION 100.00 BENCH MARK TO BE USED FOR CONSTRUCTION CONTROL

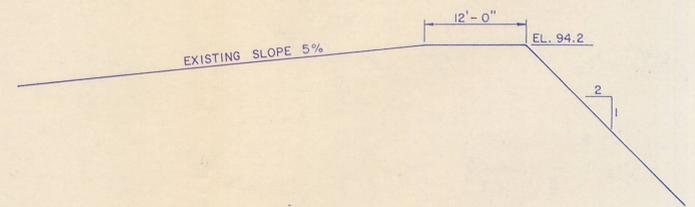
GENERAL NOTES



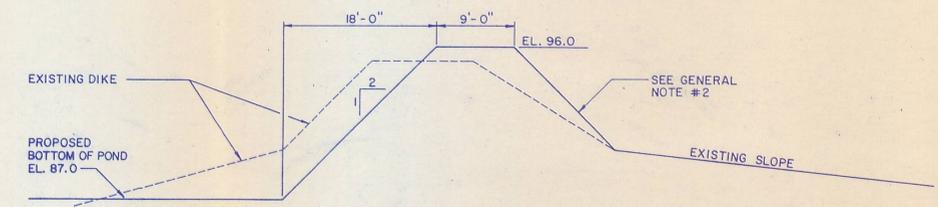
A EXISTING POND
 SCALE 1"=20'-0"



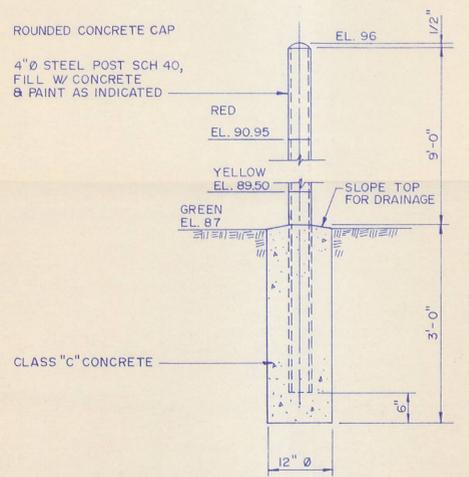
B RECONSTRUCTED POND
 SCALE 1"=20'-0"



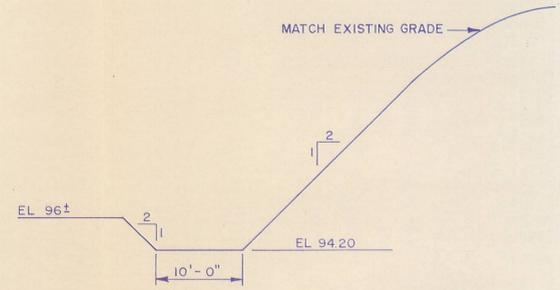
D SPILLWAY SECTION
 SCALE: V:1"=5'-0" H:1"=10'-0"



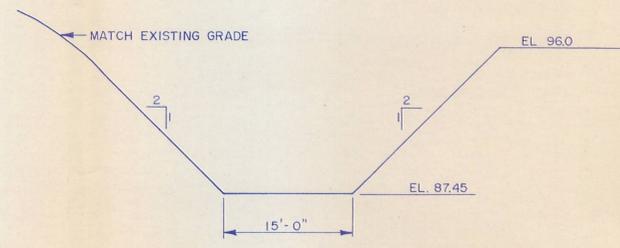
E DIKE SECTION
 SCALE: V:1"=5'-0" H:1"=10'-0"



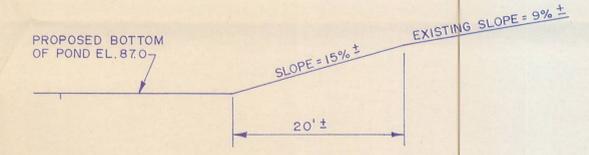
C SEDIMENT LEVEL INDICATOR
 SCALE: NTS



F SPILLWAY SECTION
 SCALE: V:1"=5'-0" H:1"=10'-0"



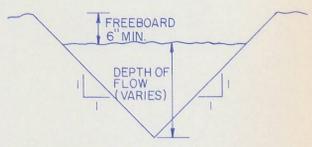
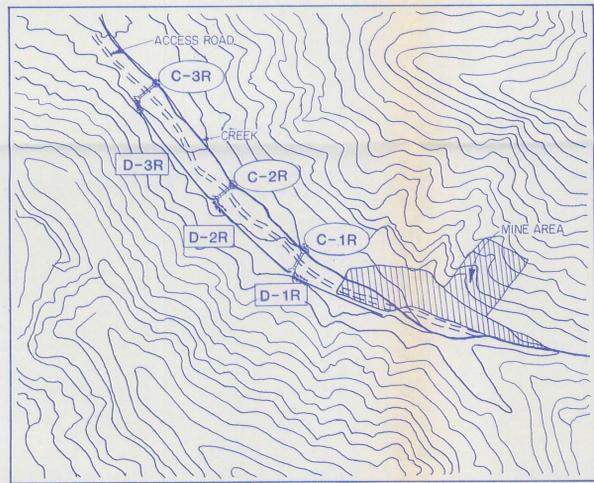
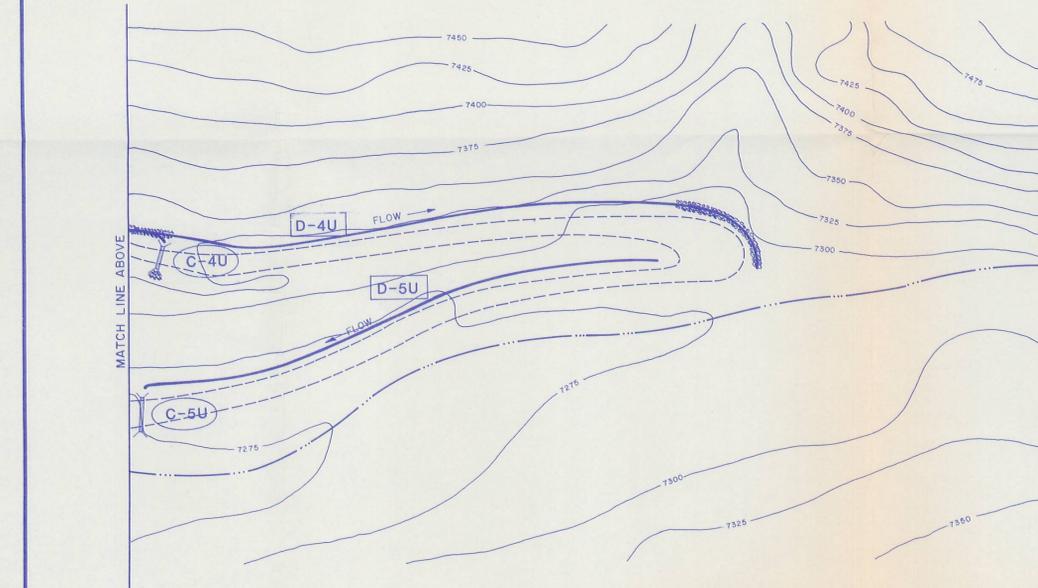
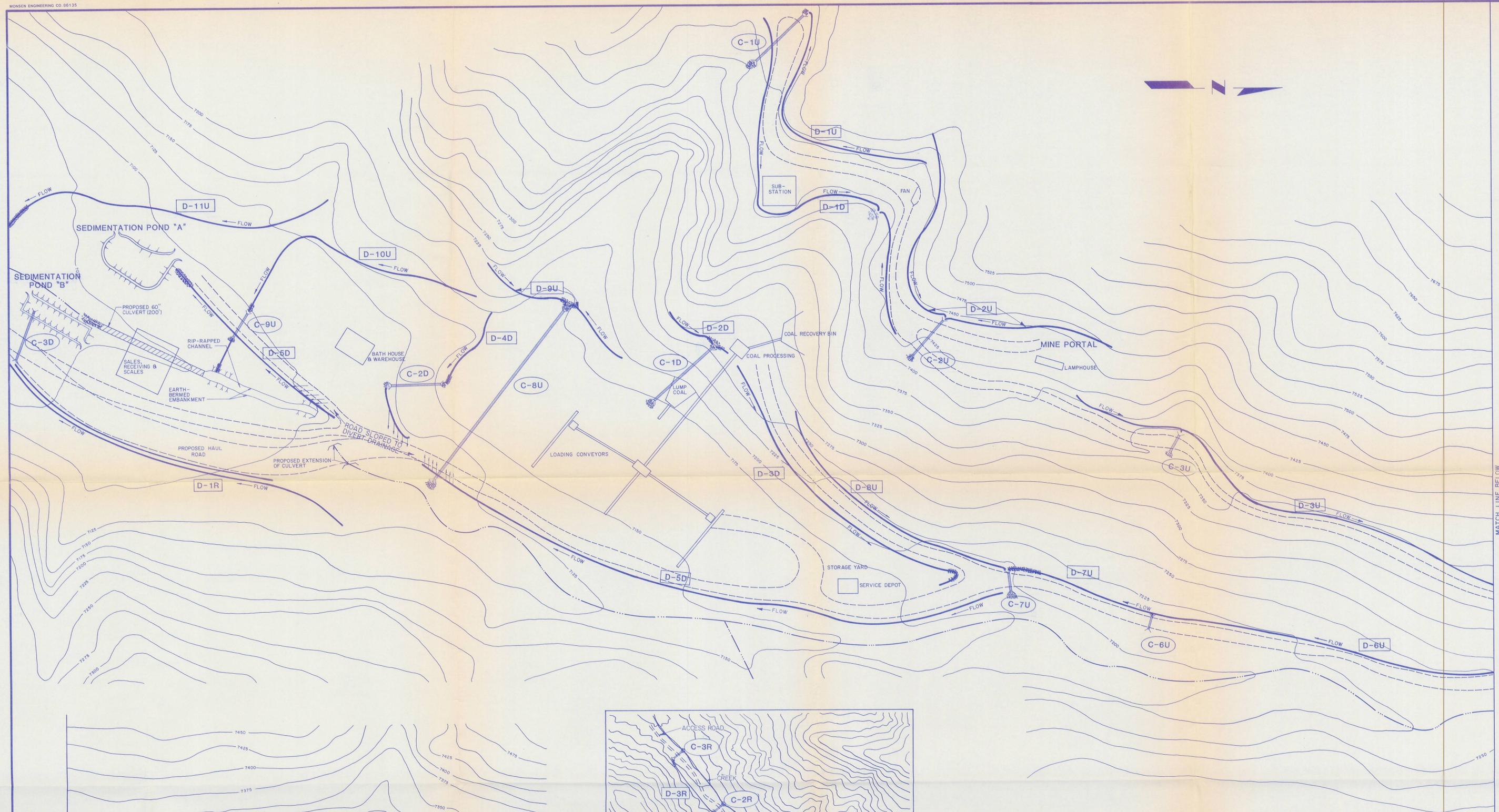
G INLET SECTION
 SCALE: V:1"=5'-0" H:1"=10'-0"



H INLET SECTION

REVISED MARCH 22, 1984

		HORROCKS / CAROLLO ENGINEERS 1 WEST MAIN STREET AMERICAN FORK, UTAH 84003			
		BEAR CREEK CANYON CO-OP MINE SEDIMENTATION POND "A"			
DESIGNED HLW	CHECKED HLW	DATE FEB. 84	SCALE NOTED	DRAWING NO.	SHEET
DRAWN DDG	TRACED	REVISED			No. OF

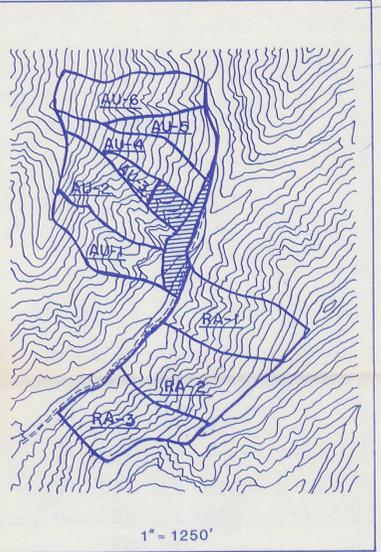
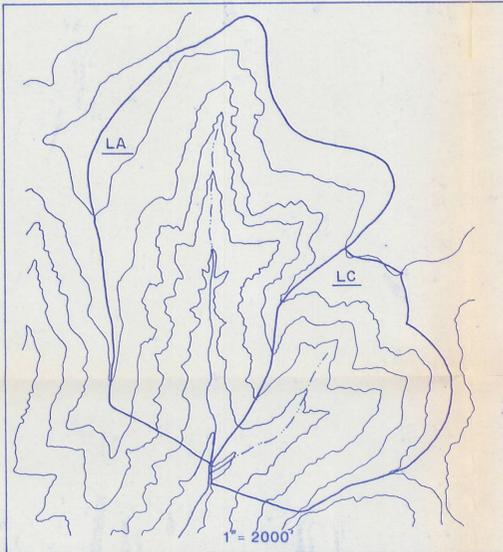
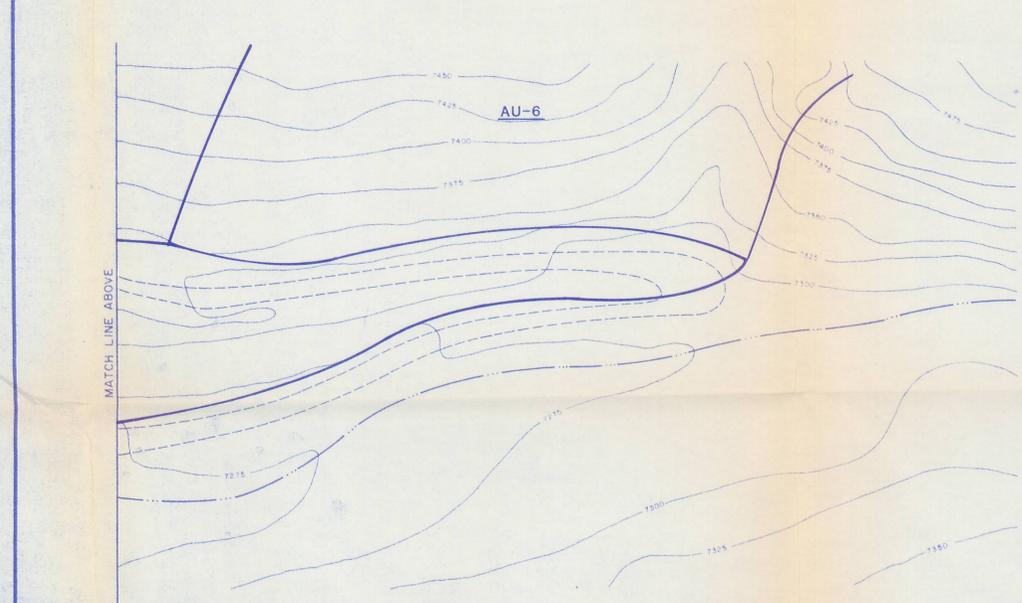
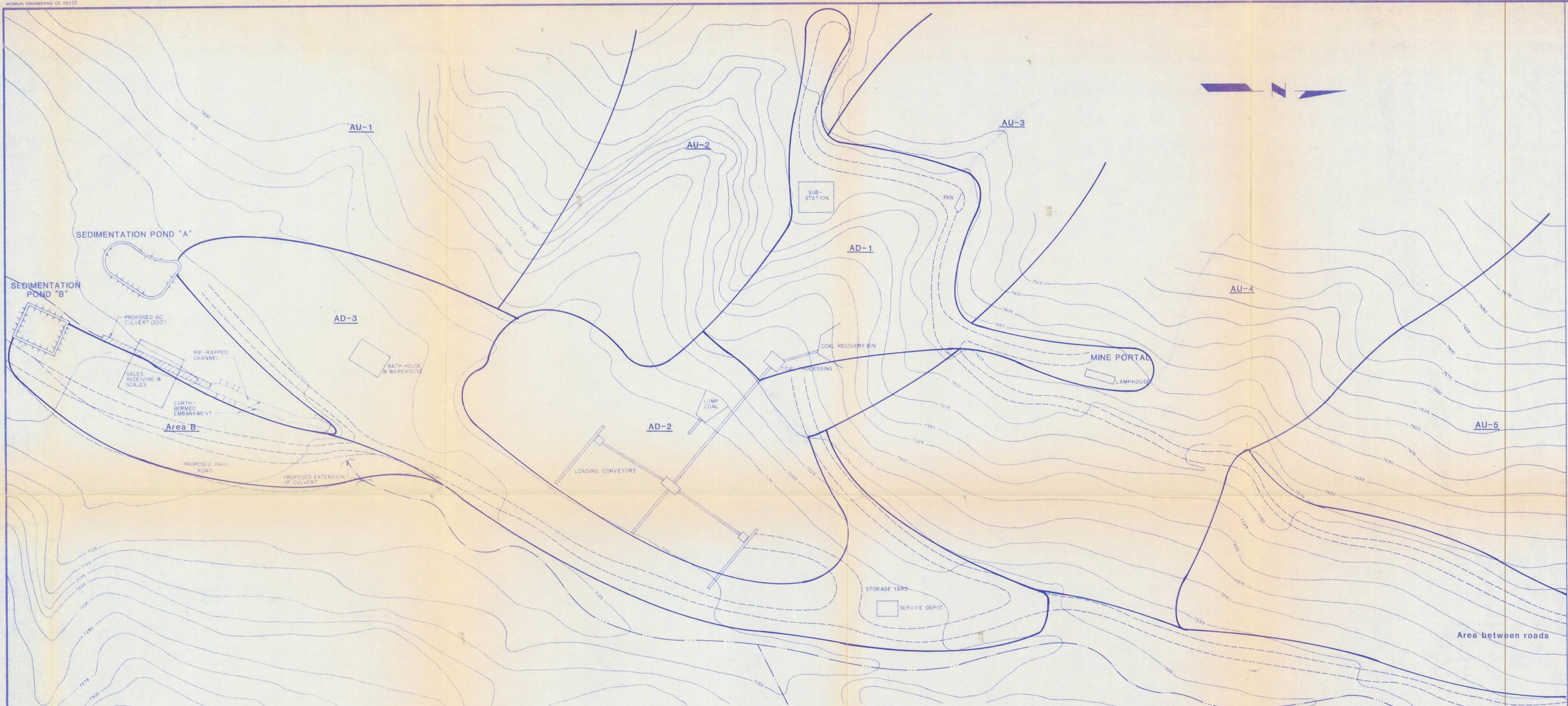


TYPICAL DITCH CROSS SECTION

- LEGEND**
- DITCH
 - CULVERT
 - RIP RAP

HORROCKS / CAROLLO ENGINEERS 1 WEST MAIN STREET AMERICAN FORK, UTAH 84003					
DESIGNED EGN	CHECKED HLW	DATE APR. '84	SCALE 1" = 80'	DRAWING NO.	SHEET
DRAWN DDG	TRACED	REVISED 5/21/84			No. OF

MATCH LINE BELOW



MATCH LINE BELOW

MATCH LINE ABOVE

HE HORROCKS / CAROLLO ENGINEERS
 1 WEST MAIN STREET
 AMERICAN FORK, UTAH 84003

BEAR CREEK CANYON CO-OP MINE

COMPUTED AREA LOCATIONS

DESIGNED	CHECKED	DATE	SCALE	DRAWING NO.	SHEET
EGN	HLW	APR '84	1" = 80'		
DRAWN	TRACED	REVISED			
DDG		6/21/84			



NOTE: SEDIMENT POND AND EXISTING DRAINAGE TO BE REMOVED AFTER REVEGETATION IS ESTABLISHED.

6" MED. DIA. RIP-RAP

6" MEDIAN DIA. RIP-RAP

LOG CHECK DAMS

6" MED. DIA. RIP-RAP

NOTE: LOWER ROAD TO BE USED AS TEMPORARY DRAINAGE TO SEDIMENT POND UNTIL REVEGETATION IS ESTABLISHED.

NOTE: ROAD ABOVE TO BE RECLAIMED IN SAME MANNER.

LEGEND

- FINAL RECLAMATION
- PERMIT BOUNDARY
- RESTORED DRAINAGE
- CONTEMPORANEOUS RECLAMATION
- CONTOUR LINE 7200
- REMOVED STRUCTURES

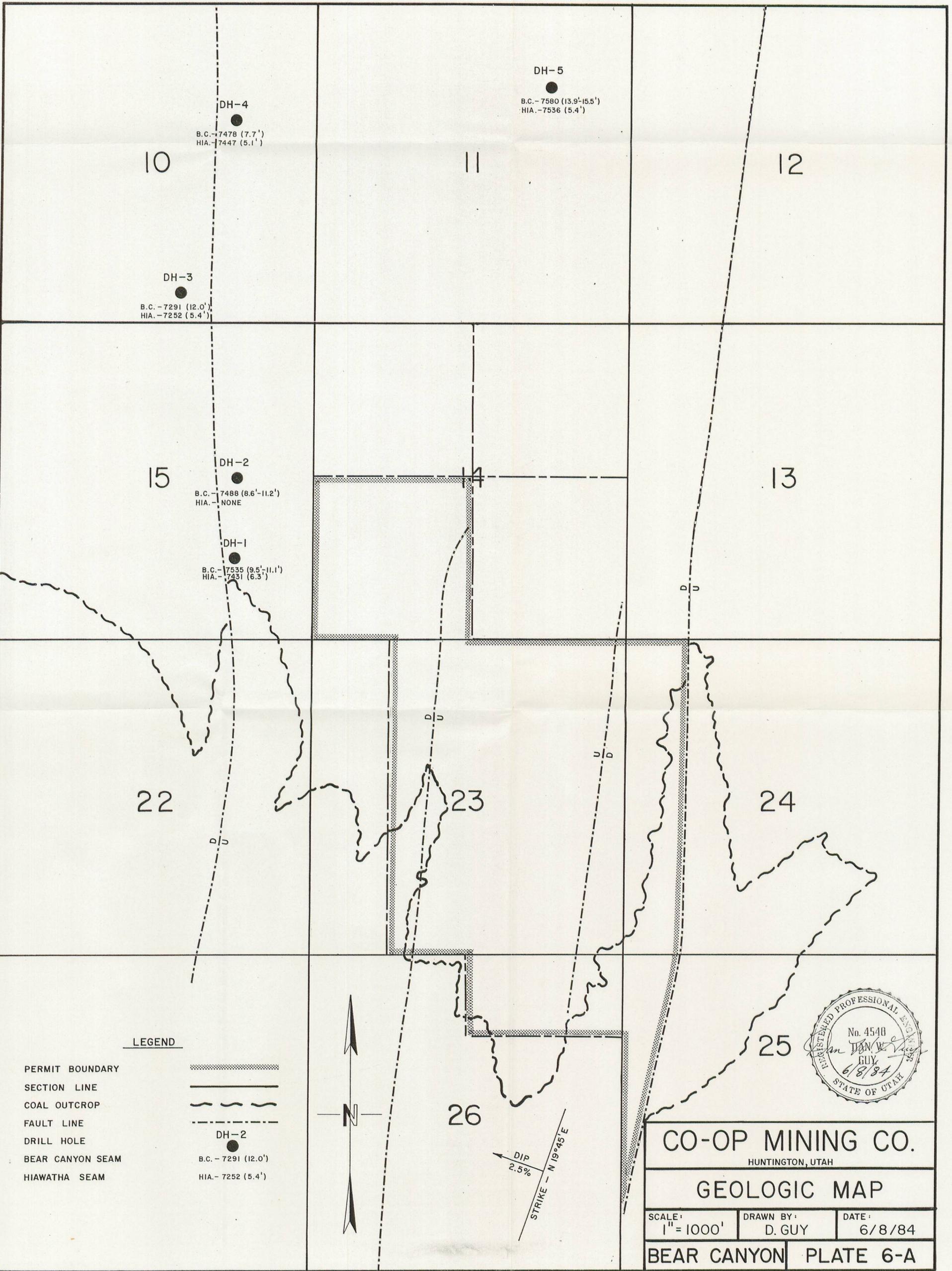


CO-OP MINING CO.
HUNTINGTON, UTAH

POST-MINING TOPOGRAPHY

SCALE: 1" = 50' DRAWN BY: D. GUY DATE: 4/27/84

BEAR CANYON **PLATE 3-2A**



DH-4
 B.C. - 7478 (7.7')
 HIA. - 7447 (5.1')

DH-5
 B.C. - 7580 (13.9'-15.5')
 HIA. - 7536 (5.4')

DH-3
 B.C. - 7291 (12.0')
 HIA. - 7252 (5.4')

DH-2
 B.C. - 7488 (8.6'-11.2')
 HIA. - NONE

DH-1
 B.C. - 7535 (9.5'-11.1')
 HIA. - 7431 (6.3')

LEGEND

PERMIT BOUNDARY

SECTION LINE

COAL OUTCROP

FAULT LINE

DRILL HOLE

BEAR CANYON SEAM
 B.C. - 7291 (12.0')
 HIA. - 7252 (5.4')

HIAWATHA SEAM



DIP
 2.5%

STRIKE - N 19° 45' E

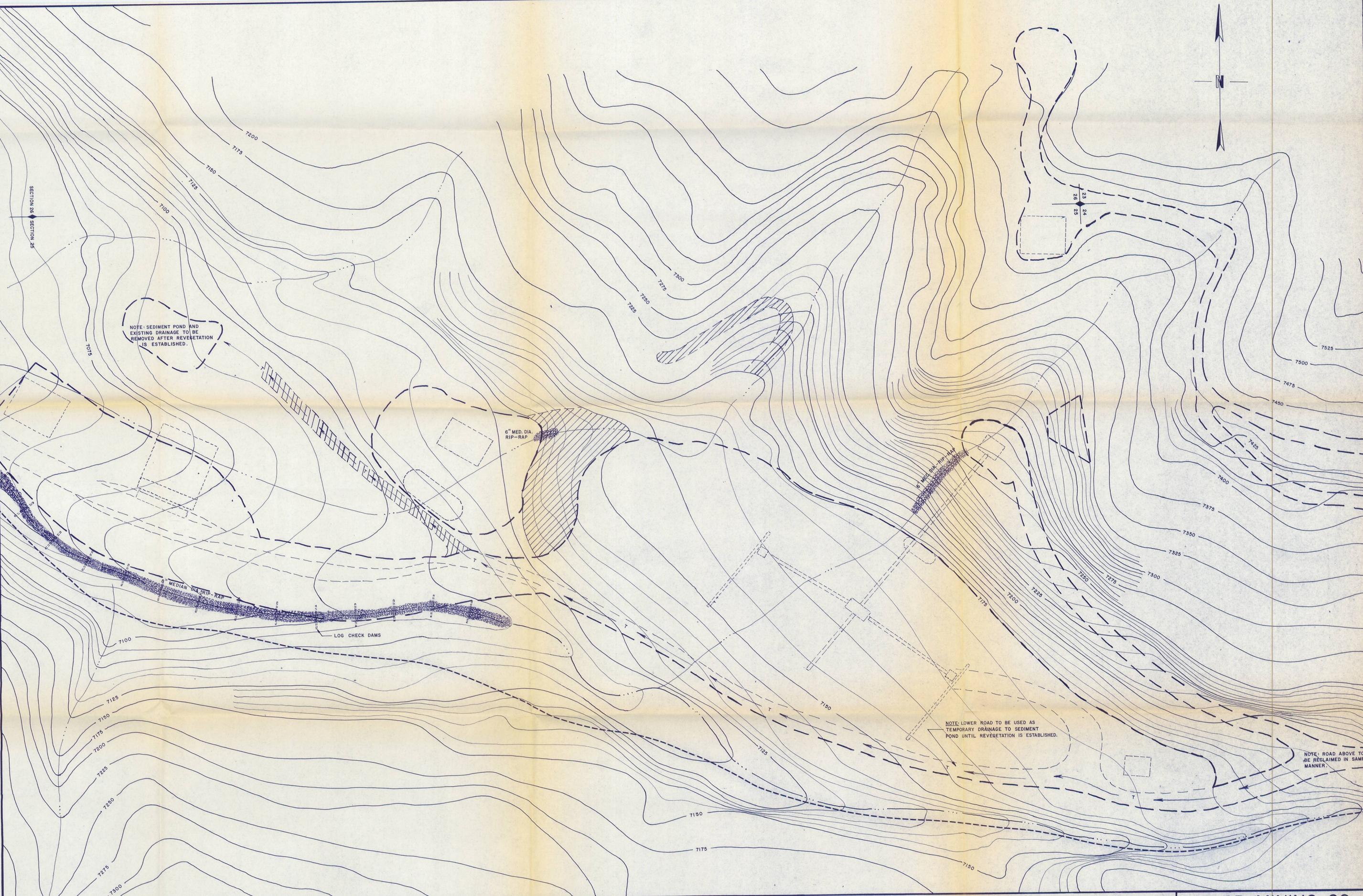
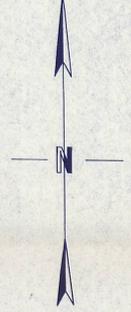


CO-OP MINING CO.
 HUNTINGTON, UTAH

GEOLOGIC MAP

SCALE: 1" = 1000'
 DRAWN BY: D. GUY
 DATE: 6/8/84

BEAR CANYON PLATE 6-A



NOTE: SEDIMENT POND AND EXISTING DRAINAGE TO BE REMOVED AFTER REVEGETATION IS ESTABLISHED.

6" MED. DIA. RIP-RAP

6" MEDIAN DIA. RIP-RAP

LOG CHECK DAMS

6" MED. DIA. RIP-RAP

NOTE: LOWER ROAD TO BE USED AS TEMPORARY DRAINAGE TO SEDIMENT POND UNTIL REVEGETATION IS ESTABLISHED.

NOTE: ROAD ABOVE TO BE RECLAIMED IN SAME MANNER.

LEGEND

- FINAL RECLAMATION
- PERMIT BOUNDARY
- RESTORED DRAINAGE
- CONTEMPORANEOUS RECLAMATION
- CONTOUR LINE
- REMOVED STRUCTURES

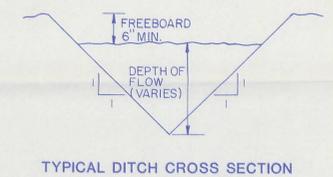
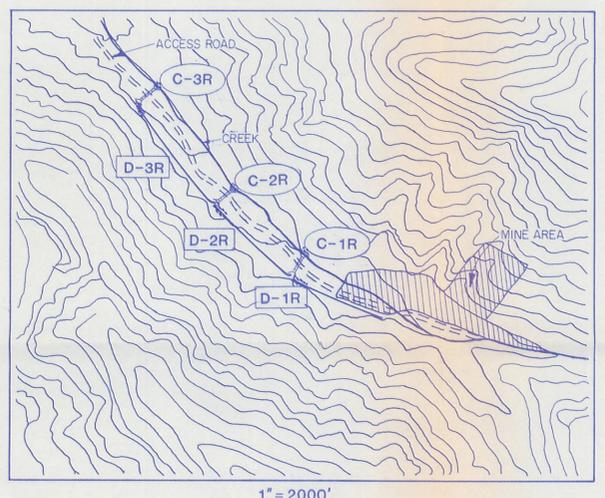
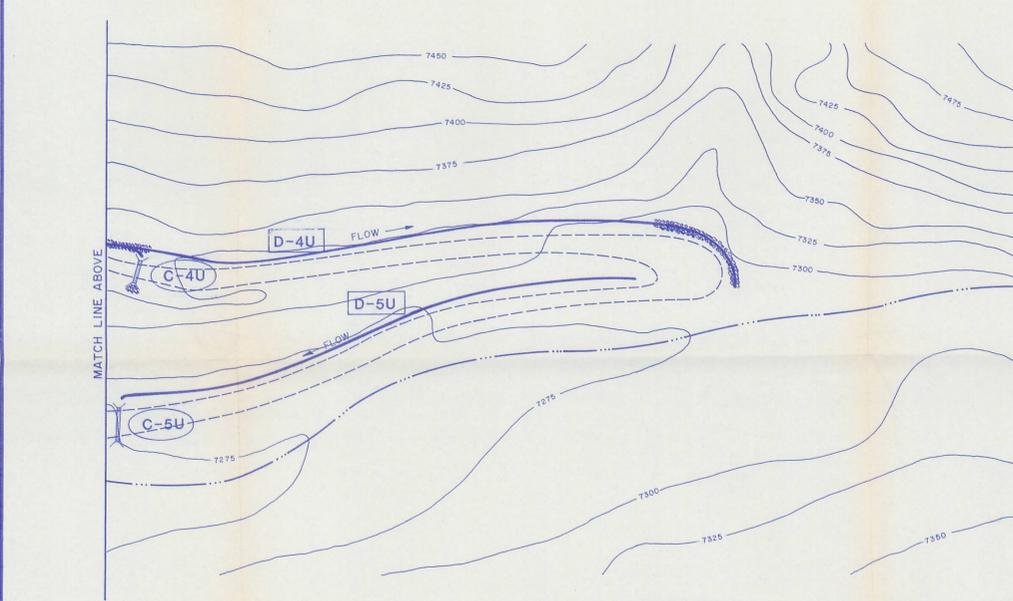


CO-OP MINING CO.
HUNTINGTON, UTAH

POST-MINING TOPOGRAPHY

SCALE: 1" = 50'	DRAWN BY: D. GUY	DATE: 4/27/84
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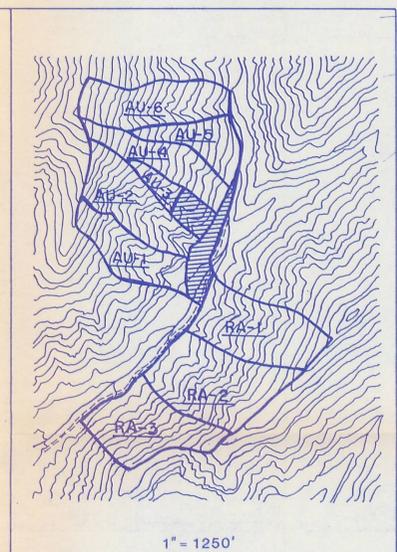
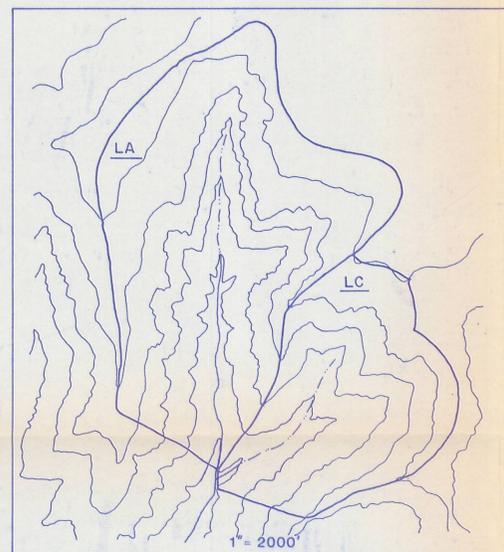
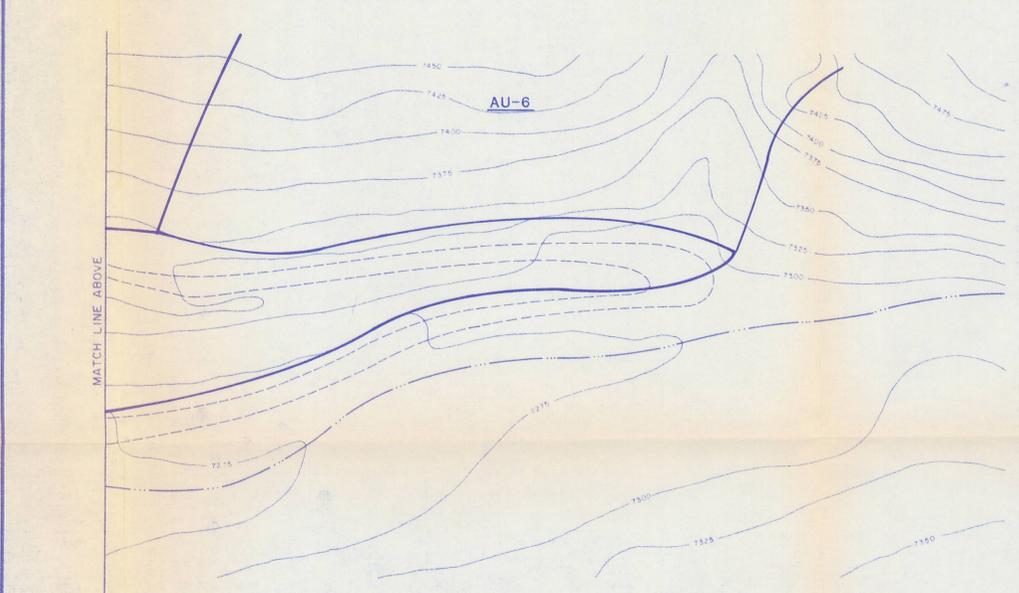
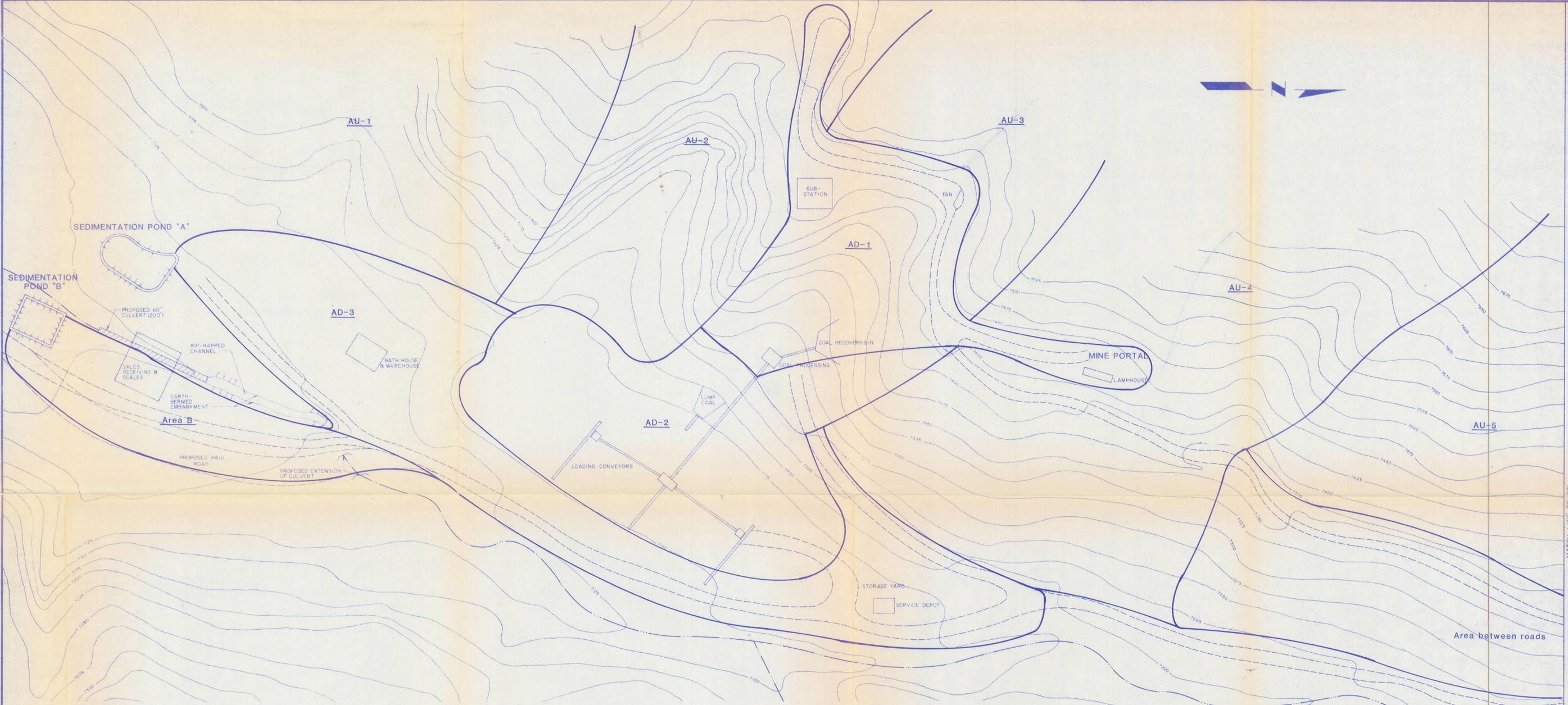
BEAR CANYON PLATE 3-2A



LEGEND
 — DITCH
 - - - - - CULVERT
 RIP RAP

 HORROCKS / CAROLLO ENGINEERS 1 WEST MAIN STREET AMERICAN FORK, UTAH 84003					
BEAR CREEK CANYON CO-OP MINE DITCHES & CULVERT LOCATIONS					
DESIGNED EGN	CHECKED HLW	DATE APR. 84	SCALE 1" = 80'	DRAWING NO.	SHEET
DRAWN DDG	TRACED	REVISED 6/21/84			No. OF

MATCH LINE BELOW



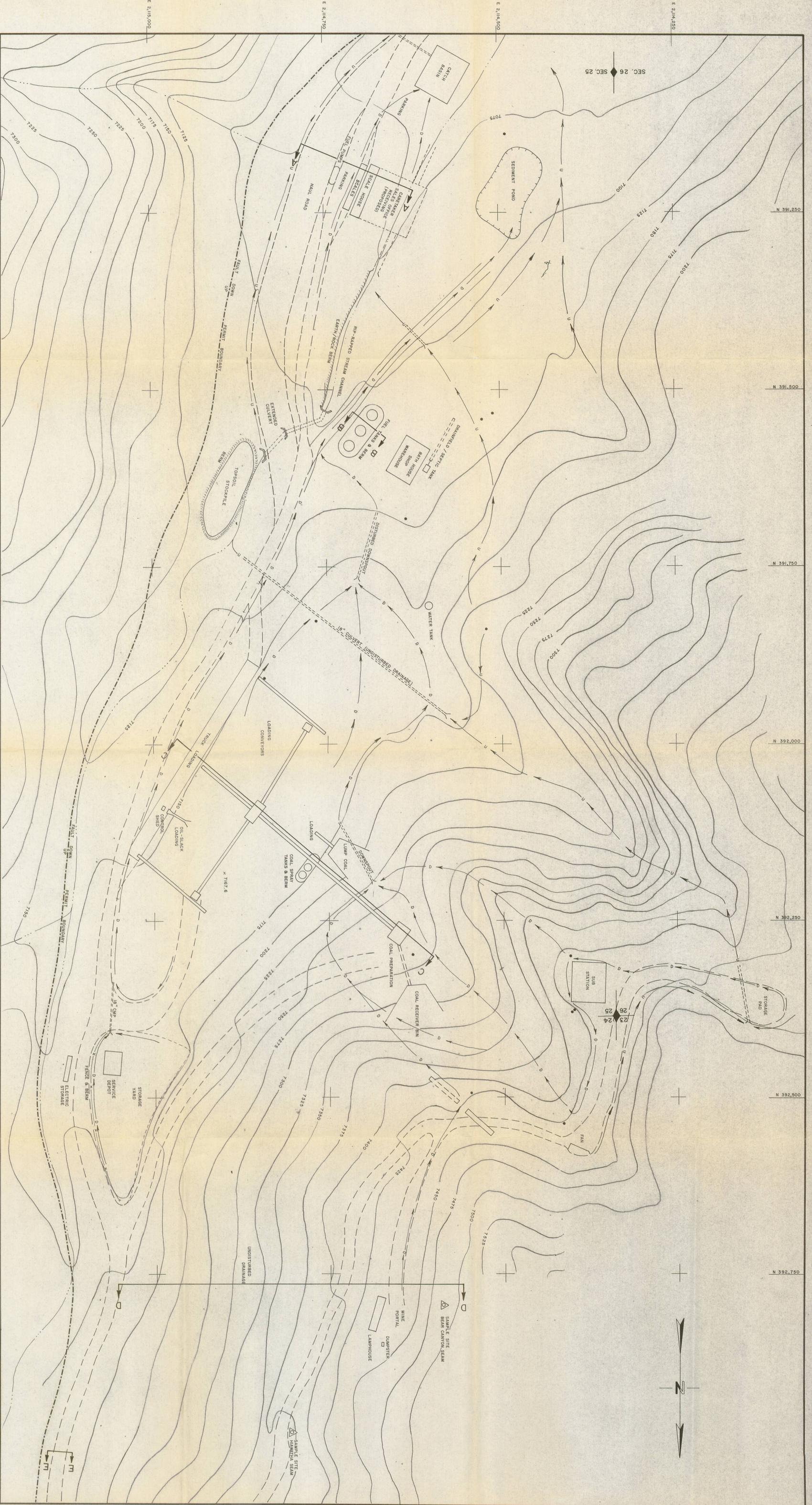
 HORROCKS / CAROLLO ENGINEERS 1 WEST MAIN STREET AMERICAN FORK, UTAH 84003		BEAR CREEK CANYON CO-OP MINE	
		COMPUTED AREA LOCATIONS	
DESIGNED EGN	CHECKED HLW	DATE APR 84	SCALE 1" = 80'
DRAWN DDG	TRACED	BY 6/21/84	DRIVING No. SHEET

MATCH LINE BELOW

MATCH LINE ABOVE



SEC. 26
SEC. 25



LEGEND

- DISTURBED DRAINAGE
- UNOBSTRUCTED DRAINAGE
- CULVERTS
- POWER POLES
- FAULT
- CONTOUR LINE

CO-OP MINING CO.
HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE: 1" = 50'
DRAWN BY: D. GUY
DATE: 4/27/84

BEAR CANYON | PLATE 2-2