

0063

C/015/025 Incoming

# 3097

OK

Hiawatha Coal Company

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James D. Smith  
Utah Division of Oil, Gas & Mining  
1954 West North Temple, Suite 1210  
P.O. Box 145801  
Salt Lake City, UT 84114-5801

December 9, 2008

Re: Deficiencies for Bath House Parking Lot Expansion, Bear Canyon Mine,  
C/015/0025, Task ID #3016

Dear Mr. Smith:

This letter is in response to our phone conversation on December 9, 2008, Hiawatha Coal Company is re-submitting our application as you requested please find two (2) complete hard copies and 1 additional digital copy of the Parking Lot Expansion. In addition I have given 1 additional hard copy and 1 additional digital copy to the Price office in care of Pete Hess. Also, each page on the C2 form was confirmed within the current MRP on file here. The only exceptions are the Chapter 8, Appendix A changes, which were requested by Mr. Western, these are currently under review as the Bear Mid-Term Review as the Division Calculation sheets.

If you have any questions, please call me at (435) 687-5777 (X-2501).

RECEIVED

DEC 15 2008

Sincerely, DIV. OF OIL, GAS & MINING



Cliff Baker  
Environmental Coordinator

C/015/0025 2008, In coming

Refer to:

- Confidential
- Shelf
- Expandable

Date \_\_\_\_\_ For additional information

## APPLICATION FOR COAL PERMIT PROCESSING

Permit Change  New Permit  Renewal  Exploration  Bond Release  Transfer

**Permittee:** HIAWATHA COAL COMPANY

**Mine:** BEAR CANYON MINE

**Permit Number:** ACT/015/025

**Title:** PARKINGLOT

**Description,** Include reason for application and timing required to implement:

TO EXPAND PARKING AREA AT BATH HOUSE

**Instructions:** If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            | 1. Change in the size of the Permit Area? Acres: <u>0.35</u> Disturbed Area: <u>0.36</u> <input checked="" type="checkbox"/> increase <input type="checkbox"/> decrease. |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 2. Is the application submitted as a result of a Division Order? DO# _____   |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 4. Does the application include operations in hydrologic basins other than as currently approved?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 6. Does the application require or include public notice publication?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 7. Does the application require or include ownership, control, right-of-entry, or compliance information?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 9. Is the application submitted as a result of a Violation? NOV # _____  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 10. Is the application submitted as a result of other laws or regulations or policies?<br><i>Explain:</i> _____  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 11. Does the application affect the surface landowner or change the post mining land use?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)   |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 13. Does the application require or include collection and reporting of any baseline information?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 15. Does the application require or include soil removal, storage or placement?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 16. Does the application require or include vegetation monitoring, removal or revegetation activities?   |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 17. Does the application require or include construction, modification, or removal of surface facilities?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 18. Does the application require or include water monitoring, sediment or drainage control measures?   |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 19. Does the application require or include certified designs, maps or calculation?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 20. Does the application require or include subsidence control or monitoring?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 21. Have reclamation costs for bonding been provided?  |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?   |
| <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No | 23. Does the application affect permits issued by other agencies or permits issued to other entities?  |

**Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you.** (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Print Name \_\_\_\_\_

M. Family V.P. 12-10-08  
Sign Name, Position, Date

Subscribed and sworn to before me this 10 day of December, 2008

Notary Public

My commission Expires:

Attest: State of Utah )  
County of Emery ) ss:



**For Office Use Only:**

**Assigned Tracking Number:**

**Received by Oil, Gas & Mining**

**RECEIVED**

**DEC 15 2008**

**DIV. OF OIL, GAS & MINING**



**Deficiency Response List**  
**Task ID #3016**  
**Bath House Parking Lot Expansion**

**R645-301-521.190,**

- D. The Permittee must update the permit area acreage in Chapter 1, Page 1-5. In addition, the permittee must also include information on the acreage of the disturbed area.**
- R. Please find Page 1-5 attached to this response.

**R645-301-120,**

- D. The Permittee must address the apparent pagination discrepancy with Page 7-135 of the submittal. Page 7-135 of the submittal appears to correspond to page 7-106 in the approved MRP.**
- R. Hiawatha Coal's MRP does not show this discrepancy, page 7-106 describes diversions (742.300). Page 7-135 describes "Area AD-8 Drainage, 1993" and "Ditch D-8D Water Bar/C-14D" specifically.

**R645-301-120,**

- D. The Permittee needs to modify the language on page 7-135 that describes culvert C-14D. The Language should make it clear to the reader as to what is currently in use at the site. Future tense is utilized in describing the 8" concrete slab associated with the removed water bar.**
- R. Please find the revised page 7-135 with the corrected language attached to this response.

**R645-301-120,**

- D. The C2 form indicates Plates 2-2B was part of the submittal, but that plate was not in either the hard copy or the electronic version on the CD's. The Permittee needs to correct the C2 form for the next submittal.**
- R. Please find the corrected C2 Form attached to this response.

**R645-301-521.151,**

- D. The permittee must provide the Division with a map that clearly indicates sufficient slope measurements or surface contours to adequately represent the existing land surface configuration of the proposed permit area for at least 100 feet beyond the limits of mining disturbance.**
- R. Please refer to the revised Plate 2-3B, which shows extended topography to the west and a cross-section E-E' located on Page 5I-78 also included in this response.

**R645-301-512.100,**

- D. The permittee must provide the Division with a certified copy of Plate 5-2B, Surface Facilities**
- R. Hiawatha Coal will provide the Division with certified copies of all plates included in this submittal upon approval.

**R645-301-526.200,**

- D. The permittee must update the MRP to show that additions that they made to the surface facilities. The information in Appendix 5-A to include the new structures, start dates and estimated completion dates.**
- R. Hiawatha Coal Company is not adding any new structures with this submittal. Rather we are just adding cut-fill volumes and some asphalt removal which have been addressed on Page 8-5 and 8-20 in this submittal.

**R645-301-231.100,**

- D. The plan must provide information on topsoil sampling in accordance with Table 2-4 and indicate volumes of topsoil salvaged from the expansion.**
- R. The soil samples are located in Appendix 2-A for the DZE soil types. Hiawatha Coal proposes that the soil samples taken along the Tank Seam access road are indicative of the TR type soils located in the area of Bear Canyon Mine and are identified as TSA-1 and TSA-2 located in Appendix 2-A.

**R645-301-231.100,**

- D. South of the existing shower house pad, in DZE soils, the plan needs to indicate a minimum of ten inches will be salvaged.**
- R. Hiawatha Coal Company fully intends to follow the topsoil recovery plan already outlined in the MRP under Sec R645-301-231, page 2-14 and R645-301-232, page 2-30.

**R645-301-232.200,**

- D. The plan must indicate that six inches of topsoil will be salvaged from the TR soil on the slopes west of the shower house pad.**
- R. Hiawatha Coal Company fully intends to follow the topsoil recovery plan already outlined in the MRP and will recover a minimum of 6" of topsoil and or subsoil where ever possible along the western slopes of the proposed expansion area.

**R645-301-231.400,**

- D. The plan must describe the construction or modification of existing topsoil storage areas for placement of the topsoil salvaged.**
- R. Hiawatha Coal Company fully intends to follow the topsoil Plan already in the approved MRP. Hiawatha Coal Company intends to place any recovered topsoil in either one or both of the Main or the Wild Horse Ridge Tank Seam Topsoil piles. Hiawatha Coal proposes that the affected topsoil pile Plates be updated after final placement of the topsoil.

**R645-301-121.200,**

**D. Page 8-20 of this application seems to indicate that Sediment Pond "A" cut and fill requirements are reduced by approximately 40,000 cu yds. The plan must explain how this expansion impacts Sediment Pond "A".**

R. The Proposed plan does not impact Sediment Pond "A". Page 8-20 was updated in the TS-4 area to simply add the "Subtotal" statement to clean the page up and the difference is a conversion from cu-ft to cu-yds. The actual changes pertaining to this submittal are in the TS-9 Subtotals for the Shower House and Sediment Pond "C".

**D. Table 2-7 (page 2-34) records acreage disturbed for each reclamation area. TS-9 acreage must be updated to include this post-law disturbance.**

R. Please find the revised Table 2-7, page 2.34 attached to this response.

**D. Table 2-8 must be updated with information from this expansion.**

R. Please find the revised Table 2-8, page 2.35 attached to this response.

**R645-301-742.220, -221.31, -221.3 and -221.33,**

**D. The permittee must update the Sediment Pond "C" calculations within Appendix 7-F of the MRP. The Permittee must demonstrate that Sediment Pond "C" has the storage capacity to handle the increase in storm water volume that will be generated from the parking lot expansion.**

R. Please find the revised Sediment Pond "C" Calculations for Storage Capacity included in this response.

**R645-301-542.300,**

**D. The permittee must provide the Division with a certified copy of Plate 2-3B, Reclamation Area.**

R. Hiawatha Coal will provide the Division with certified copies of all plates included in this submittal upon approval.

**R645-301-830.140,**

**D. The permittee must update the Bond Calculation in Appendix 8-A.**

R. Please find the appropriate Calculation sheets for the associated areas attached to this response. Please be aware these are subject to an approval on the Bear Mid-Term Review, Task # 2935.

Plate 1-1 shows the Permit Area, Plate 1-2 shows Surface Ownership, Plate 1-3 shows Sub-Surface Ownership. The initials COP on the plates stand for C.O.P. Coal Development Company. Table 1-3 lists the owners of the surface and mineral property rights within the permit area.

Federal lease U-024316, U-024318, U-020668, U-38727, U-46484, U-61048, and U-61049 are held by C.O.P. Coal Development Co. Fee Surface Area and Fee and Federal Coal Rights are leased by Co-Op Mining Company from C.O.P. Coal Development Co. (See letter from C.O.P. Coal Development Company, Appendix 2-A).

The lease guarantees Co-Op the right to mine and remove from, and for purposes incident to mining, including access roads, camp facilities, surface operations, storage of coal, and other activities; also unrestricted use of all access roads leading to and from the property.

A total of ~~10,991.83~~ 10,992.45 acres are included in the permit area. This includes 6,615.43 acres of federal coal and ~~4,376.40~~ 4,377.02 acres of private coal owned by C. O. P. Development. The total disturbed acreage within the permit area is approximately 40.64 acres.

Following is a description of the Permit Area.

FILE IN:  
 Confidential  
 Shelf  
 Expandable  
Refer to Record No. 0063 Date 12/09/08  
In C150025 2008 Incoming  
For additional information

Table 2-7 Reclamation Area Summary

MARK <sup>1</sup>	DESCRIPTION	Total ac. <sup>1,2,3</sup>	Re-contour acres <sup>1&amp;3</sup>	Pre-1977 acres <sup>2</sup>	New acres
TS-1	Ball Park Topsoil Pile	1.27	0.0	-0-	1.27
TS-2	Lower Haul Road	1.6	0.0	1.6	-0-
TS-3	Sed Pond B & Scale Office Pad	2.60	1.41	1.23	1.37
TS-4	Sed Pond A	0.75	0.75	-0-	0.75
TS-5	Main Pad Area	12.32	9.41	8.89	3.43
TS-6	Portal Access Road	3.25	3.25	0.02	3.23
TS-7	Blind Canyon Seam Portal Area	1.81	1.81	0.51	1.30
TS-8	Upper Storage Pad	0.87	0.83	-0-	0.87
TS-9	Shower House Pad	<del>1.83</del> 2.19	<del>1.83</del> 2.19	-0-	<del>1.83</del> 2.19
TS-10	Tank Seam Access Road	2.91	2.91	-0-	2.91
TS-11	Tank Seam Portal Pad	0.66	0.59	-0-	0.66
TS-12	Wild Horse Ridge Access Road	3.26	0.22	-0-	3.26
TS-13	Conveyor belt Access/Topsoil	1.50	1.14	-0-	1.50
TS-14	Upper Conveyor belt Access Road	.96	0.66	-0-	0.96
TS-15	WHR Blind Canyon Seam Portal Area	1.58	1.58	-0-	1.58
TS-16	WHR TS Lower Portal Access Road	0.89	0.0	-0-	0.89
TS-17	WHR TS Upper Access Road and Pad	2.22	1.74	-0-	2.22
TOTAL		<del>40.28</del> 40.64	<del>28.13</del> 28.49	12.25	<del>28.03</del> 28.39

Notes:

1. See [Plates 2-3](#).
2. See [Plates 5-2](#).
3. The total acres represent acreage which will be reclaimed. Some of the acres will not require re-contouring or regrading during reclamation. The "Re-contour acres" represent the total acres which will require regrading. The "Total acres" shown will be reclaimed in accordance with the reclamation plan.

operations according to [Table 5O-1](#) and will include Total Petroleum Hydrocarbons by EPA Methods 8015 and 418.1. The location of these samples will correlate with the areas generating the most substitute topsoil material as described in [Appendix 5-I](#). Following regrading, soils remaining on the surface as substitute topsoil material will be sampled for pH, EC, and Total Hydrocarbons by EPA method 8015 for diesel fuel and 418.8 for waste oil.

Table 2-8 Substitute Topsoil Summary

Location	Topsoil Amounts Required			Substitute Topsoil Generated from Cuts (cu. yd.)			
	Area (acres)	Depth (in.)	Volume (cu. yd.)	Topsoil Stockpile	Sub. Topsoil Generated	Sub. Topsoil Not Regraded	Total Topsoil
TS-3	1.41	12	<b>2,275</b>	0	2,080	2,563	<b>4,643</b>
TS-4	.75	10	<b>1,008</b>	0	1,008	0	<b>1,008</b>
TS-5	9.41	12	<b>15,181</b>	0	20,814	4,537	<b>25,351</b>
TS-6	3.25	12	<b>5,243</b>	0	7,111	0	<b>7,111</b>
TS-7	1.81	12	<b>2,920</b>	0	4,170	0	<b>4,170</b>
TS-8	.83	12	<b>1,339</b>	0	3,552	0	<b>3,552</b>
TS-9	<del>1.83</del> 2.19	12	<del>2,952</del> <b>3,533</b>	<del>1,200</del> 1,851	3,761	0	<del>4,961</del> <b>5,612</b>
Total			<del>36,452</del> <b>37,033</b>				<del>50,796</del> <b>51,447</b>

**Table 5I-1 - Cut and Fill Summary  
Areas TS-3 Through TS-9**

Area	Fill (-) Volume (cu. yd.)	Cut (+) volume (cu. yd.)	Excess Volume (cu. yd.) <sup>1</sup>
TS-3	1,454	1,468	14
TS-4	3,460	3,473	13
TS-5	25,157	39,907	14,750
TS-6	5,573	8,126	2,553
TS-7	18,037	6,445	-11,592
TS-8	7,022	3,666	-3,356
TS-9	<del>5,851</del> <u>10,954</u>	<del>5,889</del> <u>10,911</u>	<del>38</del> <u>-43</u>
Cumulative Balanced Volume (cu. yd.) =			<del>2,420</del> <u>2,377</u>

<sup>1</sup> An excess volume of 2,420 cu. Yds. will be generated based on the contours shown on Plates 5-6. This excess is generated in Reclamation Area TS-5, and demonstrates that there is adequate material for reclamation. During reclamation, actual contours in TS-5 can be varied in the areas of cut to eliminate this excess cut. This excess material may also be used to cover any soil found to be unsuitable at the time of reclamation.

**TS-9 Sediment Pond C and Bathhouse Pad**

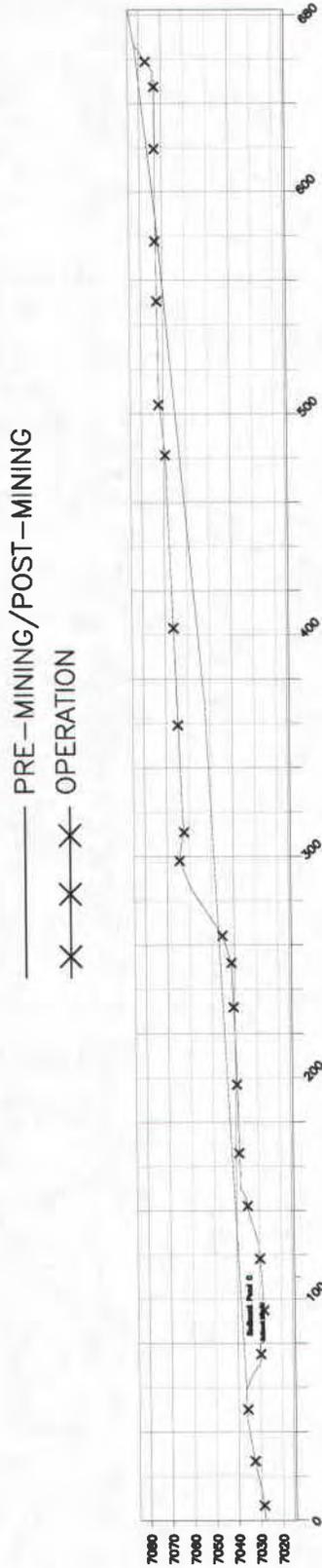
The material generated for the bathhouse parking area will be used as fill material for Sediment Pond C and the ditch leading from the Bathhouse Pad to Sediment Pond C. The 1,200 cu. yd. topsoil stockpile created during the construction of the bathhouse pad will be used in conjunction with the substitute topsoil generated from the bathhouse pad.

**Table 5I-8 - Area TS-9 Cut & Fill summary**

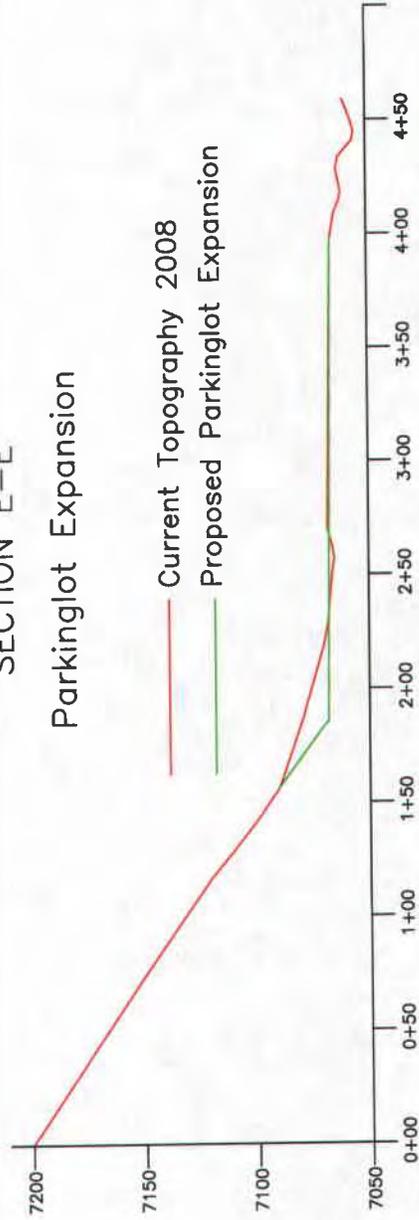
Section	Fill (-) Volumes (cu. yd.)			Cut (+) Volumes (cu. yd.)			Volume Cumulative (cu. yd.)
	Topsoil	Substitute Topsoil	Regular Soil	Topsoil	Substitute Topsoil	Regular Soil	
D-D	1,200*	1,762	<del>2,899*</del> 7,992	<del>1,200</del> 1,483	2,561	2,128 6,867	<del>28</del> -43

\* It was assumed that sediment Pond C would contain 98 cu. yd. of sediment at the start of reclamation. 1,200 cu. yd. of material will come from the Wild Horse Ridge topsoil stockpile, which was originally recovered from the Bathhouse Pad.

SECTION D-D'  
 SEDIMENT POND "C"



SECTION E-E'  
 Parkinglot Expansion



## Table of Contents (Continued)

### Chapter 7 Hydrology

<u>Regulation</u>	<u>Description</u>	<u>Page</u>
732.400	Road Drainage.....	7-63
R645-301-733	Impoundments.....	7-63
R645-301-734	Discharge Structures .....	7-64
R645-301-735	Disposal of Excess Spoil.....	7-64
R645-301-736	Coal Mine Waste .....	7-64
R645-301-737	Non Coal Mine Waste .....	7-64
R645-301-738	Temporary Casing of Wells .....	7-64
R645-301-740	Design Criteria and Plans .....	7-65
R645-301-741	General Requirements .....	7-65
R645-301-742	Sediment Control Measures .....	7-87
742.200	Siltation Structures.....	7-87
742.220	Sediment Ponds .....	7-89
742.300	Diversions.....	7-105
R645-301-744	Discharge Structures .....	7-137138
R645-301-760	Reclamation Hydrology .....	7-137138

## Table of Contents (Continued)

### Chapter 7 Hydrology

#### List of Figures

<u>Figure</u>	<u>Description</u>	<u>Page</u>
Figure 7-0	<u>Forest Service Protected Water Resources</u> .....	7-61B
Figure 7-1	Curve Number Graphs .....	7-68
Figure 7-2	Curvilinear and Triangular Unit Hydrographs.....	7-69
Figure 7-3	Head Relationship for Selected Broad-crest Weirs .....	7-75
Figure 7-4	Headwater Depths for C.M. Pipe Culverts with Inlet Control.....	7-81
Figure 7-5	Velocity Against Stone on Channel Bottom.....	7-83
Figure 7-6	Size of Stone that will Resist Displacement for Various Velocities and Slide Slopes.....	7-84
Figure 7-7	Typical Silt Fence .....	7-88
Figure 7-8	Culvert C-1U-Downslope Profile .....	7-121
Figure 7-9	Downspout Structure .....	7-123
Figure 7-10	Collection Box .....	7-124
Figure 7-11	Ditch D-10D Cross-Section .....	7-125
Figure 7-12	Buried Flexible Culvert.....	7-126
Figure 7-13	Exposed Culvert Anchor.....	7-127
Figure 7-14	Catch Basin .....	7-128
Figure 7-15	Ditch D-8D Water Bar Concrete Structure.....	7-137
Figure 7-15A	Cross Section A-A' Culvert C-14D .....	7-137

Table 7-23 Summary of Storm Runoff Calculations for 10 Year 6 Hour Storm

Watershed	Curve Number CN	Time of Concentration (Hr)	Drainage Area (Acres)	Peak Discharge (CFS)
AU-1	76	0.094	6.46	0.83
AU-1A	83	0.032	1.36	0.51
AU-1B	83	0.026	1.16	0.44
AU-1C	76	0.120	<del>16.40</del> 16.04	1.95
AU-2	76	0.075	2.23	0.30
AU-2A	76	0.077	1.64	0.22
AU-2B	76	0.081	3.80	0.51
AU-3	76	0.078	3.87	0.52
AU-3A	76	0.016	0.30	0.05
AU-4	76	0.093	7.97	1.02
AU-4A	83	0.029	0.92	0.35
AU-5	76	0.104	20.14	2.51
AU-6	76	0.059	2.73	0.39
AU-7	76	0.094	13.46	1.72
AU-8	76	0.050	4.95	0.72
AU-9	76	0.100	4.77	0.60
AU-10	76	0.137	35.52	4.05
AU-11	76	0.045	0.62	0.09
AU-12	76	0.050	2.33	0.34
AU-13	76	0.022	0.66	0.10
AU-14	76	0.050	2.43	0.35
AU-15	76	0.058	0.91	0.13
AU-16	76	0.152	44.93	4.92
AU-17	76	0.152	30.10	3.29
AU-18	76	0.152	36.55	4.00
AU-19	76	0.144	36.03	4.03

Table 7-23 Summary of Storm Runoff Calculations for 10 Year 6 Hour Storm (cont)

Watershed	Curve Number CN	Time of Concentration (Hr)	Drainage Area (Acres)	Peak Discharge (CFS)
AD-1A	76	0.090	3.70	0.48
AD-1B	76	0.037	2.12	0.32
AD-2A	76	0.040	0.97	0.15
AD-2B	83	0.025	1.08	0.41
AD-2C	83	0.012	0.25	0.10
AD-3A	76	0.034	1.49	0.23
AD-3B	76	0.034	0.78	0.12
AD-4	83	0.011	0.08	0.03
AD-5	76	0.056	2.13	0.30
AD-6	90	0.220	1.39	0.81
AD-7	90	0.145	2.95	1.83
AD-8 upper	90	0.021	0.70	0.48
AD-8 lower	90	0.247	2.79	1.59
AD-9	90	0.069	0.35	0.23
AD-10 upper	90	0.026	0.30	0.20
AD-10 lower	90	0.078	0.65	0.42
AD-11	95	0.011	0.69	0.65
AD-12 upper	90	0.020	0.22	0.15
AD-12 lower	90	0.076	0.34	0.22
AD-13	91	0.106	1.78	1.23
AD-14	90	0.009	0.08	0.05
AD-15	90	0.069	<del>1.83</del> 2.19	<del>1.20</del> 1.44
AD-16	90	0.030	0.77	1.24
AD-17	90	0.019	0.24	0.16
AD-18	90	0.170	0.9	0.55
AD-19	90	0.009	0.15	0.10
AD-20	90	0.0102	0.65	0.44
AD-21	90	0.0061	0.23	0.16

<sup>1</sup> Sized for the 100 Yr – 6 hr storm event.

Table 7-24 Summary of Division Ditch Calculations

Ditch	Bottom Width (Ft)	Top Width (Ft)	Depth (Ft)	Type Side Slope H:V	Measure d Slope %	Contributing Watershed	REQ'D Av. Rip-Rap Size (In.)
D-1D	0	1.33	0.67	1:1	2 Min 11 Max	AD-3A	Soil
D-2D	0	1.33	0.67	1:1	6 Min 20 Max	AD-3A, AD-5	Bedrock
D-3D	0	2	1	1:1	2 Min 6 Av. 18 Max	AD-3A, AD-5, AD-7	Soil Soil Grouted
D-4D	0	2	1	1:1	2 Min 6 Av. 17 Max	AD-14	Soil Soil D <sub>50</sub> 6"
D-5D	0	1.33	0.67	1:1	4 Min 10 Max	AD-9	Soil
D-6D	0	3	1.5	1:1	2 Min 4 Max	AD-3A, AD-5 AD-7, AD-9, AD-10 AD-12, AD-14	Soil
D-7D	2	3.5	0.75	1.5:1	2 Min 6 Av. 55 Max	AD-1A, AD-1B, AD-2A AD-2B, AD-2C, AD-3B AD-4, AD-6, AD-8	Soil Soil D <sub>50</sub> 6"
D-8D	0	2	1	1:1	2 Min 7 Max	AD-13	Soil
D-8D Water Bar	0	14	0.33	6:1	3 Av.	AD-13	Soil
D-9D	0	2	1	1:1	4 Min 10	AD-15	Soil
D-10D	1	3.33	0.67	1.5:1	7 Min 50	AD-6, AD-3B, (part) AD-2B, AD-2C	D <sub>50</sub> 4" Bedrock
D-11D	0	1	0.5	1:1	41 Min Near Vert.	Tipple Wash Hose	Grouted Rip-Rap
D-12D	0	1	0.5	1:1	81 Av.	Tipple Wash Hose	Soil
D-13D Water Shed	0	6	0.5	10:1 2:1	0.5 Av.	AD-6 Partial	Soil
D-14D	0	1.33	0.67	1.5:1	0.06 Av.	AU-4A	Soil
D-15D	0	2.00	1.00	1:1	0.05 Av.	AD-16	Soil
D-16D	0	1.50	1.75	1:1	0.05 Av.	AD-18	Soil
D-17D	0	.96	1	1:1	0.08 Av.	AU-23, AD-20	Soil

- Notes: 1. Dimensions given indicate minimum requirements. Actual dimensions may vary. Minimum required cross-sections will be maintained.
2. The use of line drainage ditches is required when flow velocities exceed approximately 5 feet per second. Rip-rap may be installed where not required.

Table 7-25 Culvert Characteristics (Cont)

Culvert	Diameter (in.)	Type	Contributing Watersheds	Slope (ft/ft)	Outlet Condition
C-1D	15	CMP flexible	AD-6, AD-3B	1.00	24" rip-rap
C-2D	15	CMP, RCP flexible	AD-2B, AD-2C, AD-3B, AD-4, AD-6	4.0	10" rip-rap
C-3D	20	slt pipe	AD-3A	0.03	4" rip-rap
C-4D	21	CMP	AD-3A, AD-5, AD-7, AD-14, C-10D	0.18	9" rip-rap
C-5D	18	CMP	AD-34, AD-5, AD-7, AD-9	0.07	rip-rap
C-6D	12	CMP	AD-10	0.48	9" rip-rap
C-7D	18	CMP	Abandoned In Place		
C-8D			Replaced with C-5D-		
C-9D	18	CMP	See C-8D	0.05	3" rip-rap
C-10D	18	CMP	Tipple Wash Hose	0.03	Soil
C-11D	12	CMP flexible	AD-4A	0.05 0.25	3" rip-rap
C-12D	8	CMP	AD-18	0.05	Soil
C-13D	12	CMP	AU-23, AD-20	0.07	Soil
C-14D	18	CMP	AD-13	0.06	Soil

### Area AD-8 Drainage, 1993

In 1993, the inlet to culvert C-7D failed, resulting in NOV 93-35-6-1. In order to eliminate the maintenance problems with culvert C-7D, the south end of drainage area AD-8, the coal storage pad, will be regraded to allow the drainage to flow into ditch D-7D below the fans shown on Plate 2-4C. At this point, the storage pad is level with D-7D, allowing drainage to easily flow into the ditch. The berm around the coal storage pad will prevent drainage over the edge of the pad and direct the flow toward ditch D-7D. The point at which the storage pad intersects D-7D is outside of the angle of repose of the coal pile, and the ditch will not be plugged by coal spillage. A catch basin exists just below this point which will trap any coal fines which may be washed into the drainage, protecting ditch D-7D below this point.

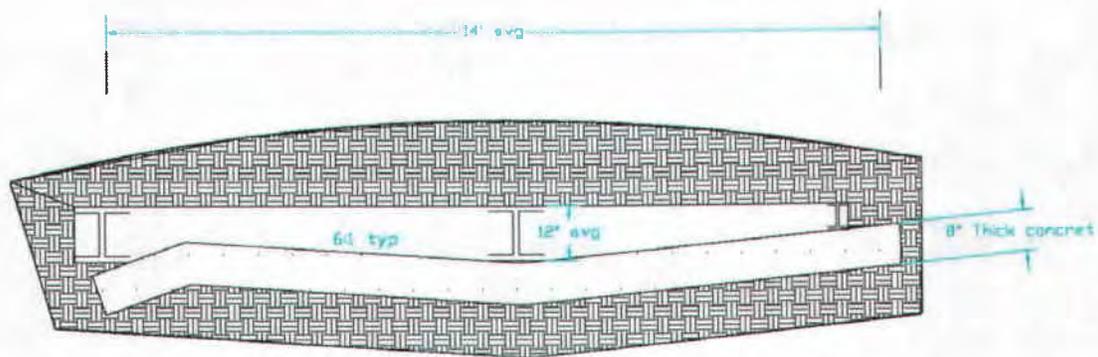
### Ditch D-8D Water Bar / C-14D

In 1996, Co-Op observed that erosion problems existed which were associated with the water bar conveying runoff from Ditch D-8D to the inlet of Sediment Pond "B" as a result of water associated with the Water Truck. In order to eliminate these problems, the water bar and associated channel will be grouted using an 8" concrete slab. This will prevent the channel from eroding. Figure 7-15 shows a typical cross-section of the concrete crossing. A steel bridge structure and swell provides vehicle crossing as shown in the figure. The bridge is designed so that the water bar design cross-section is maintained passing under it. The water bar has been removed from service to allow the main access road to be widened to accommodate safer travel through the area. It was replaced with C-14D so that drainage area AD-13 will continue to drain into Pond "B". This also eliminated or reduced the erosion problem occurring on the roadside of Pond "B" where the water bar drained into Pond "B".

**Figure 7-15 Ditch D-8D Water Bar Concrete Structure**

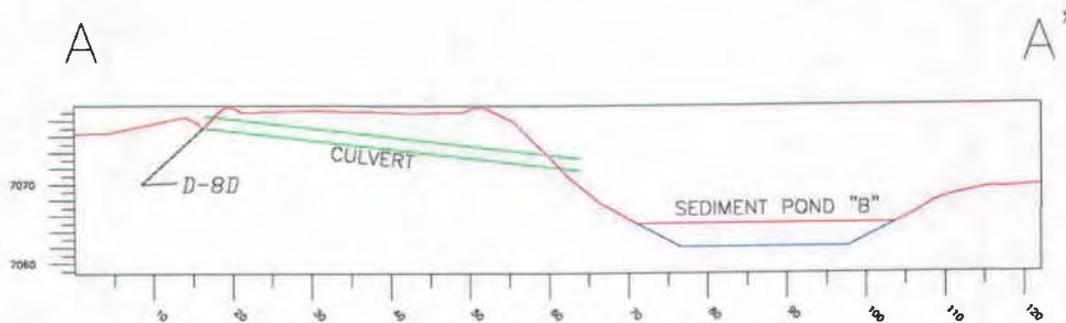
**Typical Cross-Section**

Swell present to divert all  
Runoff into sediment pond



**Minimum Channel Depth = 0.67'**  
**Minimum Required Depth = 0.33'**

**Figure 7-15A Cross-Section A-A' Culvert C-14D**



**SEDIMENT POND "C" CALCULATIONS**

**SOIL EROSION TO POND "C"**

Use the modified Universal Soil Loss Equation:

$$A = R * K * LS * VM$$

Ref: Israelson, C.E., J.E. Fletcher, F.W. Haws, E.K. Israelson, 1984. Erosion and Sedimentation in Utah: A Guide for Control. Utah Water Research Laboratories, Logan, Utah.

- A = Amount of Soil loss per unit area
- R = Rainfall Factor
- K = Soil Erodibility Factor
- LS = Topographic Factor
- VM = Erosion Control Factor:  
 = 1.2 for bare, compacted soil  
 = 0.1 for seedlings, brush

FOR POND "C" \_\_\_\_\_ >

- R = 16 FT-TONS/ACRE/HR
- K = 0.1 TONS/AC/EI

$$LS = \frac{(650 + 450s + 65s^2)}{10,000 * s^2} * \left( \frac{l}{72.5} \right)^m$$

- l = Slope Length
- s = slope steepness

- m = 0.2 for 0 < s < 1 %
- 0.3 for 1 < s < 3 %
- 0.4 for 3 < s < 5 %
- 0.5 for s > 5 %



DRAINAGE AREA	SLOPE LENGTH	SLOPE %	LS	VM	A	ACRES	A= (ft <sup>3</sup> / yr)
AD-15	530	9.4	2.85	1.2	5.47	2.19	240

Assume 100 lb / ft<sup>3</sup> unit soil wt.

**Total Sediment Volume = 240 ft<sup>3</sup> / yr**

**Design Events**

2 year - 6 Hour	P = 1.0
10 year - 6 Hour	P = 1.5
10 year - 24 Hour	P = 2.1
25 year - 6 Hour	P = 1.8
25 year - 24 Hour	P = 2.7

For 10 Year - 24 Hour storm, P = 2.1 in.

**Curve Numbers**

Disturbed Area - CN = 90

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

$$S = \frac{1000}{CN} - 10$$

<u>Watershed</u>	<u>CN</u>	<u>S</u>	<u>Q (in)</u>	<u>Area (AC)</u>	<u>Runoff Vol. (ft3)</u>
AD - 15	90	1.11	1.18	2.19	9381

**Total Runoff Volume = 9,381 ft<sup>3</sup>**

To allow a 5 year factor of safety for sediment storage:

Sediment Volume = 1200 ft<sup>3</sup>

**Total Pond Volume = 10,581 ft<sup>3</sup>**

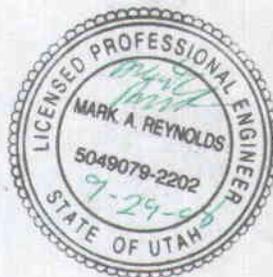


**Pond "C" as-built Structure**

**Stage - Area Data**

<u>Elev. (ft)</u>	<u>Area (ft<sup>2</sup>)</u>	<u>Vol. (ft<sup>3</sup>)</u>	<u>Cummulative Vol. (ft<sup>3</sup>)</u>
7026	22	0	0
7027	218	120	120
7028	579	399	519
7029	1051	815	1334
7030	1578	1315	2649
7031	1894	1736	4385
7032	2245	2070	6455
7033	2576	2411	8866
7034	2914	2745	11611
7035	3278	3096	14707
7035.3	3390	1000	15707

Maximum volume below the emergency spillway is 15,707 cubic feet. The required volume for the 10 year - 24 hour storm event is 10,581 cubic feet. Therefore, the structure will contain the required storm event.



## WATERSHED CHARACTERISTICS

### Disturbed Areas

P = 1.5"

Watershed	CN	Area (Ac.)	Slope y (%)	Hyd length l (ft.)	$\frac{1000}{S=-10\text{ CN}}$	$\frac{l^8(s+1)^7}{L=1900Y^5}$	T=1.67L Time of Conc (hr)
1AD-1A	76	3.70	66	1,300	3.16	0.050	0.090
AD-1B	76	2.12	95.5	520	3.16	0.022	0.037
AD-2A	76	0.97	72	440	3.16	0.020	0.040
AD-2B	83	1.08	59	320	2.05	0.015	0.025
AD-2C	83	0.25	64	140	2.05	0.007	0.012
AD-3A	76	1.49	70	400	3.16	0.021	0.034
AD-3B	76	0.78	71	400	3.16	0.020	0.034
AD-4	83	0.08	49	100	2.05	0.007	0.011
AD-5	76	2.13	73	760	3.16	0.034	0.056
AD-6	90	1.39	1.7	720	1.11	0.131	0.220
AD-7	90	2.95	8.0	1,130	1.11	0.087	0.145
AD-8 upper	90	0.70	70	400	1.11	0.013	0.021
AD-8 lower	90	2.79	1.0	600	1.11	0.148	0.247
AD-9	90	0.35	7.2	420	1.11	0.042	0.069
AD-10 upper	90	0.30	34	320	1.11	0.015	0.026
AD-10 lower	90	0.65	2.0	220	1.11	0.047	0.078
AD-11	95	0.69	20	110	0.53	0.007	0.011
AD-12 upper	90	0.22	64	340	1.11	0.012	0.020
AD-12 lower	90	0.34	8.0	500	1.11	0.045	0.076
AD-13	91	1.78	8.0	800	0.99	0.063	0.106
AD-14	90	0.08	61	120	1.11	0.005	0.009
AD-15	90	<del>1.83</del> 2.19	10.5	530	1.11	0.041	0.069
AD-16*	90	0.77	22	303	1.11	0.018	0.030
AD-17*	90	0.24	27	190	1.11	0.011	0.019
AD-18	90	0.9	3.2	771	1.11	0.102	0.170
AD-19*	90	0.15	49.24	109	1.11	0.005	0.009
AD-20*	90	0.47	30.48	204	1.11	0.0113	0.019

\*Areas AD-16, AD-17 and AD-19 are ASCA areas treated by alternate sediment controls.

**WATERSHED CHARACTERISTICS**  
 Undisturbed Areas  
 and ASCA Areas Not Reporting To Sediment Pond

P = 1.5"

Watershed	CN	Area (Ac.)	Slope y (%)	Hyd length l (ft.)	P = 1.5"		T=1.67L Time of Conc (hr)
					$\frac{1000}{S=10\text{ CN}}$	$\frac{l^8(s+1)^{-7}}{L=1900Y^5}$	
AU-1	76	6.46	57	1,240	3.16	0.056	0.094
AU-1A	83	1.36	65	460	2.05	0.019	0.032
AU-1B	83	1.16	59	330	2.05	0.015	0.026
AU-1C	76	<del>16.40</del> 16.04	72	1,950	3.16	0.072	0.120
AU-2	76	2.23	62	975	3.16	0.045	0.075
AU-2A	76	1.64	63	1,025	3.16	0.046	0.077
AU-2B	76	3.80	63	1,100	3.16	0.049	0.081
AU-3	76	3.87	65	1,060	3.16	0.047	0.078
AU-3A	76	0.30	64	140	3.16	0.009	0.016
AU-4	76	7.97	63	1,300	3.16	0.056	0.093
AU-4A	83	0.92	52	357	2.05	0.018	0.029
AU-5	76	20.14	77.3	1,700	3.16	0.062	0.104
AU-6	76	2.73	70.0	780	3.16	0.035	0.059
AU-7	76	13.46	69.4	1,400	3.16	0.056	0.094
AU-8	76	4.95	85.7	720	3.16	0.030	0.050
AU-9	76	4.77	64.8	1,440	3.16	0.060	0.100
AU-10	76	35.52	76.1	2,380	3.16	0.082	0.137
AU-11	76	0.62	73.0	570	3.16	0.027	0.045
AU-12	76	2.33	44.1	480	3.16	0.030	0.050
AU-13	76	0.66	77.5	240	3.16	0.013	0.022
AU-14	76	2.43	66.7	620	3.16	0.030	0.050
AU-15	76	0.91	15.6	300	3.16	0.035	0.058
AU-16	76	44.93	71.0	2,580	3.16	0.091	0.152
AU-17	76	30.10	71.0	2,580	3.16	0.091	0.152
AU-18	76	36.55	71.0	2,580	3.16	0.091	0.152
AU-19	76	36.03	60.5	2,190	3.16	0.086	0.144
AU-20	76	20.55	57.6	1,880	3.16	0.078	0.131
AU-21	76	9.45	48.4	1,360	3.16	0.066	0.110
AU-22	76	12.05	60.3	1,120	3.16	0.051	0.084

Summary of Peak Flows for 10-year, 6-hour storm P=1.5"  
(SCS type B distribution)

<u>Watershed</u>	<u>Peak Q (cfs.)</u>	<u>Watershed</u>	<u>Peak Q (cfs)</u>	<u>Watershed</u>	<u>Peak Q (cfs)</u>
AD-1A	0.48	AU-1B	0.44	AU-23	0.78
AD-1B	0.32	AU-1B	0.44	AU-24	1.66
AD-2A	0.15	AU-1C	1.95	AU-25	0.30
AD-2B	0.41	AU-2	0.30	AU-26	0.10
AD-2C	0.10	AU-2A	0.22	AU-27	0.03
AD-3A	0.23	AU-2B	0.50	AU-28	0.10
AD-3B	0.12	AU-3	0.52	AU-29	0.29
AD-4	0.03	AU-3A	0.05	AU-29A	0.67
AD-5	0.30	AU-4	1.02	AU-30	0.08
AD-6	0.81	AU-4A	0.35	AU-31	0.32
AD-7	1.83	AU-5	2.51	AU-32	0.28
AD-8 upper	0.48	AU-6	0.39	AU-33	0.11
AD-8 lower	1.59	AU-7	1.72	AU-34	0.27
AD-9	0.23	AU-8	0.72	AU-35	0.13
AD-10 upper	0.20	AU-9	0.60	AU-36	0.12
AD-10 lower	0.42	AU-10	4.05	AU-37	13.64
AD-11	0.65	AU-11	0.09	AU-38	1.15
AD-12 upper	0.15	AU-12	0.34	AU-39	0.18
AD-12 lower	0.22	AU-13	0.10	AU-40	15.96
AD-13	1.23	AU-14	0.35	AU-41	1.46
AD-14	0.05	AU-15	0.13	AU-42	0.67
AD-15	<del>1.20</del> 1.44	AU-16	4.92	AU-43	1.75
AD-16	1.24	AU-17	3.29	BEAR CREEK	108.18
AD-17	0.16	AU-18	4.00	BEAR CREEK <sup>1</sup>	412.70
AD-18	0.55	AU-19	4.03		
AD-19	0.10	AU-20	2.37		
AU-1	0.83	AU-21	1.15		

**PEAK**  
**HYDROGRAPH GENERATION PROGRAM**

INPUT SUMMARY FOR W.S.: AD-14

---

**STORM:**

Distribution = SCS Type 'B'  
Precip. Depth = 1.50 in  
Duration = 6.00 hr

**WATERSHED:**

Curve Number = 90  
Time of Conc. = 0.009 hrs  
Area = 0.08 ac

---

OUTPUT SUMMARY

---

Runoff depth = 0.6835 in  
Initial Abstraction = 0.2222 in  
Peak Flow = 0.05 cfs (0.6792 iph)  
At T = 2.50 hrs

---

INPUT SUMMARY FOR W.S.: AD-15

---

**STORM:**

Distribution = SCS Type 'B'  
Precip. Depth = 1.50 in  
Duration = 6.00 hr

**WATERSHED:**

Curve Number = 90  
Time of Conc. = 0.069 hr  
Area = ~~1.83~~ 2.19 ac

---

OUTPUT SUMMARY

---

Runoff depth = 0.6835 in  
Initial Abstraction = 0.2222 in  
Peak Flow = ~~1.20~~ 1.44 cfs (0.6506 0.6513 iph)  
At T = ~~2.50~~ 1 hrs

---

**PEAK**  
**HYDROGRAPH GENERATION PROGRAM**

INPUT SUMMARY FOR W.S.: AU-1B

---

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 83
Precip. Depth = 1.50 in	Time of Conc. = 0.026 hr
Duration = 6.00 hr	Area = 1.16 ac

---

OUTPUT SUMMARY

---

Runoff depth = 0.3788 in
Initial Abstraction = 0.4096 in
Peak Flow = 0.44 cfs (0.3753 iph)
At T = 2.50 hrs

---

INPUT SUMMARY FOR W.S.: AU-1C

---

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 76
Precip. Depth = 1.50 in	Time of Conc. = 0.120 hr
Duration = 6.00 hr	Area = <del>16.40</del> 16.04 ac

---

OUTPUT SUMMARY

---

Runoff depth = 0.1873 in
Initial Abstraction = 0.6316 in
Peak Flow = 1.95 cfs (0.1180 iph)
At T = 2.54 hrs

---

## Worksheet Worksheet for Circular Channel

---

Project Description	
Worksheet	C-8D
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

---

Input Data	
Mannings Coefficient	0.024
Slope	060000 ft/ft
Diameter	18 in
Discharge	1.23 cfs

---

Results	
Depth	0.30 ft
Flow Area	0.3 ft <sup>2</sup>
Wetted Perimeter	1.39 ft
Top Width	1.20 ft
Critical Depth	0.41 ft
Percent Full	20.1 %
Critical Slope	0.016734 ft/ft
Velocity	4.86 ft/s
Velocity Head	0.37 ft
Specific Energy	0.67 ft
Froude Number	1.87
Maximum Discharge	14.99 cfs
Discharge Full	13.94 cfs
Slope Full	0.0026 ft/ft
Flow Type	Supercritical

B.C.

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C. W. Mining Company

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Project Engineer: Charles Reynolds  
FlowMaster v6.0 [614b]

Page 107

### DITCH CHARACTERISTICS

DITCH	CHANNEL SLOPE %	CONTRIBUTING WATERSHED	PEAK Q(cfs)	BANK AND BOTTOM DESC.	MANNING'S $\eta^{(a)}$
D-1D	2 Min, 11 Max	AD-3A	0.23	Rocky Soil	0.03
D-2D	6 Min, 20 Max	AD-3A, AD-5	0.53	Rocky Soil, Bedrock	0.03
D-3D		Replaced with C-5D			
D-4D	2 Min, 7 Av 17 Max	AD-14	0.05	Soil	0.03
D-5D		Replaced with C-5D			
D-6D	2 Min, 4 Max	AD-3A, AD-5, AD-7 AD-9, AD-10, AD-12 AD-14	3.63	Rocky Soil	0.03
D-7D	2 Min, 6 Av 55 Max	AD-1A, AD-1B, AD-2A AD-2B, AD-2C, AD-3B AD-4, AD-6, AD-8	4.90	Soil D <sub>50</sub> 3"	0.03 0.033
D-8D	2 Min, 7 Max	AD-13	1.23	Soil	0.03
D-8D Water Bar	3 Av.	AD-13	1.23	Soil	0.013
D-9D	4 Min, 10 Max	AD-15	<del>1.20</del> 1.44	Soil	0.03
D-10D	7 Min, 50 Max	AD-6, AD-3B, AD-2C	1.03	D <sub>50</sub> 4"	0.033
D-11D	41 Min Near Vertical Max	TIPPLE WASH HOSE	0.25	Grouted rip-rap	0.035
D-12D	81 Av.	TIPPLE WASH HOSE	0.25	Grouted	0.03
D-13D Water Bar	0.5 Av.	AD-6 Partial	0.23	Soil	0.03
D-14D	0.06 Av.	AU-4A	0.35	Soil	0.03
D-15D	0.05 Av.	AD-16	1.24	Soil	0.03
D-16D	0.05 Av.	AD-18	0.55	Soil	0.03
D-17D	0.08	AU-23,AD-20	0.99		

## Worksheet Worksheet for Trapezoidal Channel

---

### Project Description

Worksheet	DITCH D-9D
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.030
Slope	0.040000 ft/ft
Left Side Slope	1.00 V : H
Right Side Slope	1.00 V : H
Bottom Width	1.00 ft
Discharge	1.44 cfs

---

### Results

Depth	0.31 ft
Flow Area	0.4 ft <sup>2</sup>
Wetted Perimeter	1.87 ft
Top Width	1.55 ft
Critical Depth	0.35 ft
Critical Slope	0.024744 ft/ft
Velocity	3.56 ft/s
Velocity Head	0.20 ft
Specific Energy	0.51 ft
Froude Number	1.26
Flow Type	Supercritical

Use Minimum Depth = 1 ft Velocity < 5 fps	Minimum Freeboard = 0.69 ft No rip-rap required
--	--

## Worksheet Worksheet for Trapezoidal Channel

---

### Project Description

Worksheet	DITCH D-9D (Max Slope)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

---

### Input Data

Mannings Coefficient	0.030
Slope	0.100000 ft/ft
Left Side Slope	1.00 V : H
Right Side Slope	1.00 V : H
Bottom Width	1.00 ft
Discharge	1.44 cfs

---

### Results

Depth	0.24 ft
Flow Area	0.3 ft <sup>2</sup>
Wetted Perimeter	1.67 ft
Top Width	1.47 ft
Critical Depth	0.35 ft
Critical Slope	0.024744 ft/ft
Velocity	4.941 ft/s
Velocity Head	0.37 ft
Specific Energy	0.61 ft
Froude Number	1.94
Flow Type	Supercritical

B.C.

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5/12/2008 5/12/2008

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Project Engineer: Charles Reynolds  
FlowMaster v6.0 [614b]  
Page 131

## Pavement

02220-875-1750 (Pavement Removal 3")

Area = ~~1,450~~ 4,182 square yards (~~1,200~~ 4,008 at Bath-House, 174 at load-out)

Cost = (\$3.85 /sq yd) (1,374 sq yd) = ~~\$5,290~~ 16,101

Time = (1,374 sq yd) / (420 sq yd/day) = ~~3.279~~ 2.96 days

Asphalt will be relayed at Trail Canyon

Volume = (~~114~~ 348 CY) (2 tons/yd) (1.3 swell factor) = ~~297~~ 905 Tons

16 ton truck; distance to haul approx. 4 miles round trip = ~~3-8~~ 57 trips/day

Time = (~~114~~ 348 cu yd)/(128 cu yd/day) = ~~0.89~~ 2.72 days

01590-200- 5300 Dump Truck Cost = ( \$823.88/day) (2.72 days) = ~~\$824~~ 2,472

Cost Subtotal      \$6,114 18,573

Time Subtotal      4.2 12.7 days

## Shower House

02220-100-0100 (Framed Portion, includes disposal)

Volume = (92 ft) (50 ft) (8 ft) = 36,800 cu ft

Cost = (\$ 0.24 /cu ft) (36,800 cu ft) = \$ 8,832

Dump Fee = ((36,800 cu ft) / 27) (0.3 rubble volume) (1.35 tons/cy) (\$7.00/ton) = \$3,864

Time = (36,800 cu ft) / (20,100 cu ft/day) = 1.83 days

02220-100-0080 (Masonry Portion, includes disposal)

Volume = (92 ft) (50 ft) (8 ft) = 36,800 cu ft

Boot wash Volume = (12 ft) (5.5 ft) (8 ft) = 528 cu ft

Cost = (\$ 0.24 /cu ft) (37,328 cu ft) = \$ 8,959

Dump Fee = ((37,328 cu ft) / 27) (0.3 rubble volume) (1.35 tons/cy) (\$7.00/ton) = \$3,919

Time = (37,328 cu ft) / (20,100 cu ft/day) = 1.86 days

## Concrete Demolition

Foundation Volume = (0.67 ft) (2 ft) (284 ft) = (380.6 cu ft) / 27 = 14.1 cu yds

Footing Volume = (0.67 ft) (2 ft) (319 ft) = (427.5 cu ft) / 27 = 15.8 cu yds

Floor Volume = (92 ft) (50 ft) (0.33 ft) = (1518 cu ft) / (27) = 56.2 cu yds

Boot wash Floor Volume = (12 ft) (5.5 ft)(0.33 ft) = (21.8) / 27 = 0.81 cu yds

Total Volume = 86.9 cu yds

Cost = (86.9 CY) ( \$12.78/CY) = \$1,111

Time = (638 s.f.) / (180 s.f./day) + (319 L.F.) / (300 L.F./day) + (4,666 s.f.) / (500 s.f./day) = 13.94 days

02220-875-5550 (Concrete Disposal on Site) 002315-400-1300 (3 CY loader) 02320-200-0320

(16 ton truck)

Volume = (86.9 CY) (1.3 swell factor) = 113.0

Cost = (113 CY) (\$10.69/CY) = \$1,208

Time = (113 cu. yds) / (232 cu. yds/day) = 0.49 days

Cost Subtotal      \$ 27,893

Time Subtotal      18.12 days

Scale House and Sediment Pond B (TS-3)

See Appendix 3L, Table 3L-2

Cut Subtotal 1,454 cu yds  
Fill Subtotal 1,454 cu yds

Sediment Pond "A" (TS-4)

See Appendix 3-L, Table 3L-3.

~~Cut (350 sq ft) x (120ft) = 42,000 cu ft =~~ Cut Subtotal = 3,460 cu yds  
~~Fill (350 sq ft) x (120ft) = 42,000 cu ft =~~ Fill Subtotal = 3,460 cu yds

Shower House and Sediment Pond C (TS-9)

See Appendix 3-L 5-1, Table 3L 5-1-8.

~~Cut (500 sq ft) x (185ft) = 92,500 cu ft =~~ Cut Subtotal = ~~5,851~~ 10,954 cu yds  
~~Fill (500 sq ft) x (185ft) = 92,500 cu ft =~~ Fill Subtotal = ~~5,851~~ 10,954 cu yds

Wild Horse Ridge (TS-12 thru TS-15)

See Appendix 3-O, Table 3O-2, 3 & 4

Cut Subtotal = 23,641 cu yds  
Fill Subtotal = 23,641 cu yds

Note: Approximately 12,500 cu yds of the Wild Horse Ridge volume will be regraded using a D9 dozer, and the remaining volume will regraded using a 330BL Excavator.

Wild Horse Ridge Tank Seam (TS-16 thru TS-17)

See Appendix 3-P.

Cut Subtotal 11,089 cu yds  
Fill Subtotal 11,089 cu yds

Cut Total = 112,025 cu yds  
Fill Total = 112,025 cu yds

## SOIL PLACEMENT

Areas	Time	Earth			Equipment			
		Cost	Moved	Cu Yds	Used	Cost/hr	(hrs)	
Tank Seam Access Road & Portal Pad (TS-10 & TS-11) Fill			Cut 20,310	20,310	330BL	\$153.13	20.2	\$ 3,093
			Hauled	10,661				
Upper Storage Pad (TS-8)	Cut	3,666	Fill	7,022	330BL	\$153.13	14.6	\$ 2,236
Portal Pad Area & Road (TS-7)	Cut	6,445	Fill	18,037	330BL	\$153.13	37.7	\$ 5,773
Portal Access Road (TS-6)	Cut	8,126	Fill	5,573	330BL	\$153.13	11.65	\$ 1,784
			Excess Cut	2,553	included in fill volumes above			
Coal Storage Pad (TS-5)	Cut	40,585	Fill	25,157	D9 Cat	\$190.80	50.3	\$ 9,597
			Excess Cut	15,428	included in fill volumes above			
Scale House/ Sed Pond B (TS-3)	Cut	1,454	Fill	1,454	D9 Cat	\$190.80	2.9	\$ 553
Sediment Pond "A" (TS-4)	Cut	3,460	Fill	3,460	D9 Cat	\$190.80	6.9	\$ 1,317
Shower House/ Sed Pond C (TS-9)	Cut	<del>5,851</del> 10,954	Fill	<del>5,851</del> 10,954	D9 Cat	\$190.80	<del>11.7</del> 21.9	<del>\$ 2,232</del> 4,178
Wild Horse Ridge Area*** (TS-12 thru TS-15)	Cut	11,141	Fill	23,641	330BL	\$153.13	23.3	\$ 3,568
				12,500	D9 Cat	\$190.80	25.0	\$ 4,770
Wild Horse Ridge Tank Seam (TS-16 thru TS-17)	Cut	1,016	Fill	11,089	D9 Cat	\$153.13	1.87	\$ 286
				10,073	330BL	\$190.80	20.1	\$ 3,835
Totals	Cut		Fill	110,462			219.82	236.42
				110,708			\$ 39,044	40,990
							(27.48 days)	

\*See Appendix 3-L and the following page.

\*\*Excess Cut will be hauled from TS-5 and TS-6 to TS-7 and TS-8, as discussed in Appendix 3-L.

\*\*\*Wild Horse Ridge material being relocated with the excavator will be hauled an average distance of 200 ft, as shown on the following pages.

**e. Revegetation**

Hydroseeding (Section 9.5)

C0150256 (Hydro Spreader)

Area = ~~38.3~~ 38.7 acres = ~~1,669~~ 1,686 MSF

Cost = (~~\$19.85~~ 20.95/MSF) (~~1,669~~ 1,686 MSF) = ~~\$33,130~~ 35,322

C0150255 (Tractor Spreader)

Area = ~~38.3~~ 38.7 acres = ~~1,669~~ 1,686 MSF

Cost = (~~\$10.28~~ 12.71/MSF) (~~1,669~~ 1,686 MSF) = ~~\$17,157~~ 21,429

C0150251 (Seed Material)

Area = ~~38.3~~ 38.7 acres

Cost = (~~\$974.10~~ 533.38/acre) (~~38.3~~ 38.7) = ~~\$37,308~~ 20,642

C0150253 (Hydromulch)

Area = ~~38.3~~ 38.7

Cost = (~~\$410.25~~ 523.95/acre) (~~38.3~~ 38.7) = ~~\$15,712~~ 20,277

C0150252 (~~3,704~~ 10,700 Seedlings)

Cost = (~~\$0.77~~ 1.71 each) (~~3834~~ 10,700) = ~~\$2,952~~ 18,297

02370-550-0120 Install Matting (Section 9.5)

Cost = (~~\$7.5~~ 7.00 sys) (~~29,040~~ 4,840) = ~~\$ 217,800~~ 203,280

02315-400-0260 (Pocking)

Cost = (~~\$1.56~~ 1.86/cu yd) (~~29,689~~ 340 cu yd) = ~~\$46,315~~ 10,435

Assume 25% reseeded = ~~\$92,594~~ 82,420

Time = (~~38.3~~ 38.7 acres) / (4 acres/day) = ~~9.58~~ 9.68 days

Cost Total ~~\$462,968~~ 412,102

Time Total ~~9.58~~ 9.68 days

**f. Monitor Well Plugging**

Assume \$5,000 per well

The above listed costs include reclamation costs added between 1985 and the latest modification.

Bonding Calculations  
 Bear Canyon Mine

Bond Summary

Direct Costs

Subtotal Demolition and Removal	\$380,418.00
Subtotal Backfilling and Grading	\$326,625.00
Subtotal Revegetation	\$492,702.00
Direct Costs	\$1,199,745.00

Indirect Costs

Mob/Demob	\$119,975.00	10.0%
Contingency	\$59,987.00	5.0%
Engineering Redesign	\$29,994.00	2.5%
Main Office Expense	\$81,583.00	6.8%
Project Mainagement Fee	\$29,994.00	2.5%
Subtotal Indirect Costs	\$321,533.00	26.8%

Total Cost \$1,521,278.00

Escalation factor 0.038  
 Number of years 5  
 Escalation \$311,861.00

Reclamation Cost \$1,833,139.00

Bond Amount (rounded to nearest \$1,000)  
 2013 dollars \$1,833,000.00

Bond Posted 2005 dollars \$1,825,000.00

Difference Between Cost Estimate and Bond  
 Percent Difference -\$8,000.00  
 -0.44%

next midterm 4/2/2013

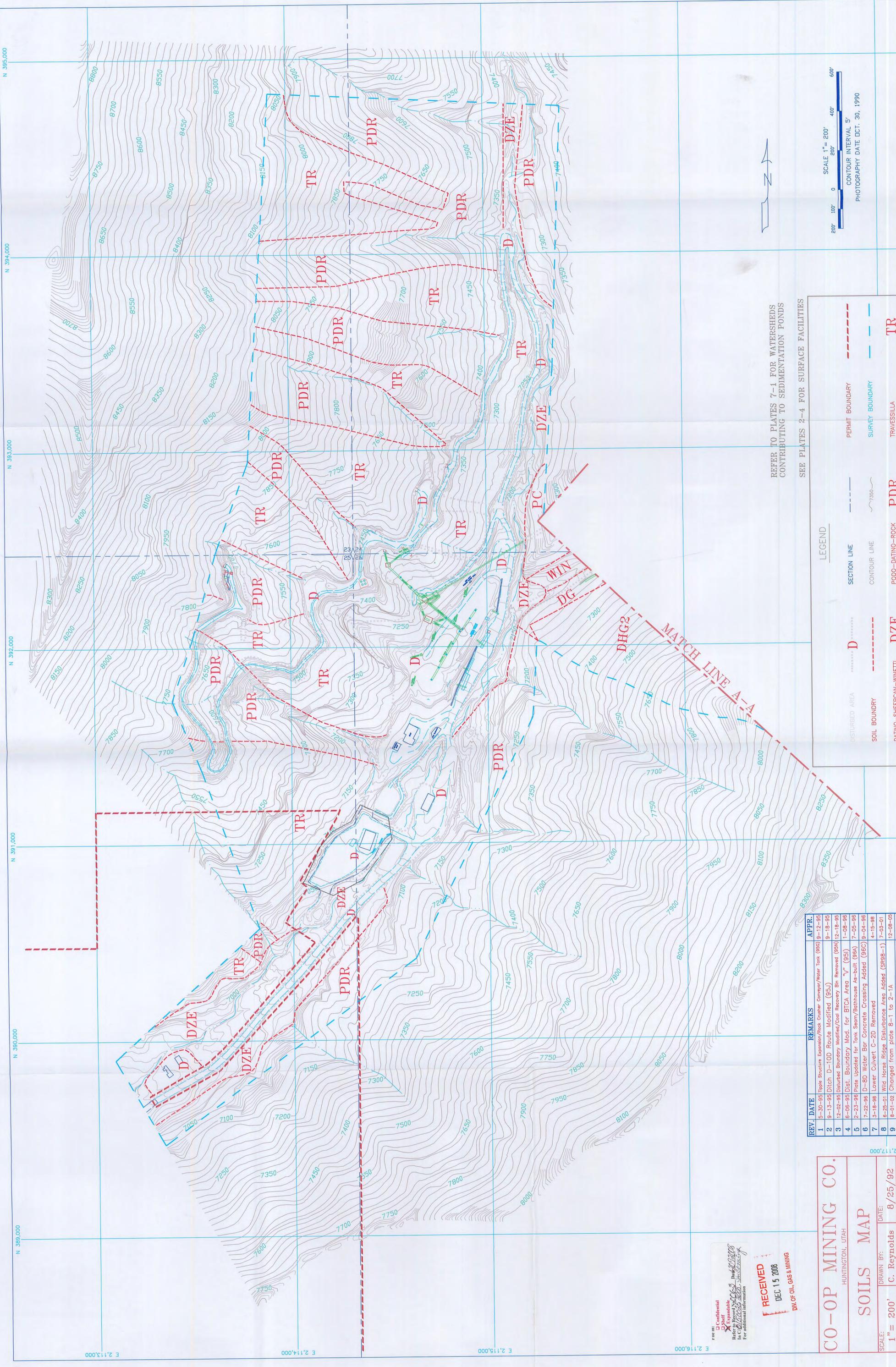
8A-1





Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost	
	Main Mine Site 01																				
	Revegetation																				
	Drill Seeding																				
	Seed Material	Tractor Spreader (equip. & labor) B-66	Reveg004	13.34 /MSF	MSF																
	Seed Material	Bear Canyon Main Mine Shrubs	Bear Canyon 001	166 \$/AC	AC																
	Seed Material	Bear Canyon Main Mine Forbs	Bear Canyon 002	149.05 \$/AC	AC																
	Seed Material	Bear Canyon Main Mine Grass	Bear Canyon 003	158.9 \$/AC	AC																
	Seed Material	Tractor Spreader (equip. & labor) B-66	Reveg004	13.34 /MSF	MSF																
	Mulch	Hay 1" material only 32 91 13 16 0350	Reveg001	56.1 /MSF	MSF																
	Stock Labor	Bare root seedlings, 11" to 16" med. soil	32 93 43 10 0140	1.79 /EA	EA																
	Stock Material	Bear Canyon Main Transplants	Bear Canyon 004	3.95 \$/AC	AC																
	Ripping	300 HP Dozer w/ Ripper	31 23 16 32 2830	0.42 /CY	CY																
	Subtotal																				105341
	Number 2 Mine Area																				
	Hydroseeding	Hydro Spreader (equip. & labor) B-81 80MS	Reveg002	18.54 /MSF	MSF																
	Seed Material	Bear Canyon Main Mine Shrubs	Bear Canyon 001	166 \$/AC	AC																
	Seed Material	Bear Canyon Main Mine Forbs	Bear Canyon 002	149.05 \$/AC	AC																
	Seed Material	Bear Canyon Main Mine Grass	Bear Canyon 003	158.9 \$/AC	AC																
	Mulch	Hay 1" material only 32 91 13 16 0350	Reveg001	56.1 /MSF	MSF																
	Stock Labor	Bare root seedlings, 11" to 16" med. soil	32 93 43 10 0140	1.79 /EA	EA																
	Stock Material	Bear Canyon Main Transplants	Bear Canyon 004	3.95 \$/AC	AC																
	Packing 340 CY/AC	Excavation Bulk Bank 2 CY (32BLL)	31 23 16 42 0260	1.54 /CY	CY																
	Subtotal																				86847
	Riparian Planting Area																				
	Plant Stock	Bear Canyon Main Mine Grass	Bear Canyon 008	889 \$/AC	AC																
	Subtotal	Bare root seedlings, 11" to 16" med. soil	32 93 43 10 0140	1.79 /EA	EA																
	Matting																				
	Subtotal	Revegetation mat, webbed	31 25 13 10 0120	7.05 /SY	SY																
	Total																				326566.5
	Reseed																				
	Subtotal	Assume 25% reseeding																			
	Total																				409200

8A-59



REFER TO PLATES 7-1 FOR WATERSHEDS CONTRIBUTING TO SEDIMENTATION PONDS  
SEE PLATES 2-4 FOR SURFACE FACILITIES

LEGEND	
-----	PERMIT BOUNDARY
-----	SECTION LINE
-----	SOIL BOUNDARY
-----	DISTURBED AREA
-----	CONTOUR LINE
-----	PC
-----	DG
-----	WIN
-----	DHG2
-----	MATCH LINE A-A
-----	TR
-----	PDR
-----	DZE
-----	D
-----	DATINO-SHEEPCAN-WINETTI
-----	TRAVESSILLA

REV.	DATE	REMARKS	APPR.
1	5-30-95	Tipple Structure Expansion/Rock Crusher Conveyor/Water Tank (95)	9-12-95
2	9-13-95	Ditch D-100 Route Modified (95)	9-18-95
3	12-02-95	Disturbed Boundary Modified/Coal Recovery Bin Removed (95)	12-18-95
4	6-06-95	Dist. Boundary Mod. for BTCA Area "V" (95)	1-08-96
5	2-23-96	Plans Updated for Tank Seam/Bathroom As-built (96)	7-05-96
6	7-22-96	D-80 Water Bar Concrete Crossing Added (96C)	9-04-96
7	3-18-98	Lower Culvert C-2D Removed	4-15-98
8	6-25-01	Wild Horse Ridge Disturbance Area Added (SR98-1)	7-03-01
9	9-01-02	Changed from plate B-1 to 2-1A	12-08-05
10	1-16-07	Loadout Expansion	8-07-07
11	5-09-08	Boundary change	

**CO-OP MINING CO.**  
HUNTINGTON, UTAH

**SOILS MAP**

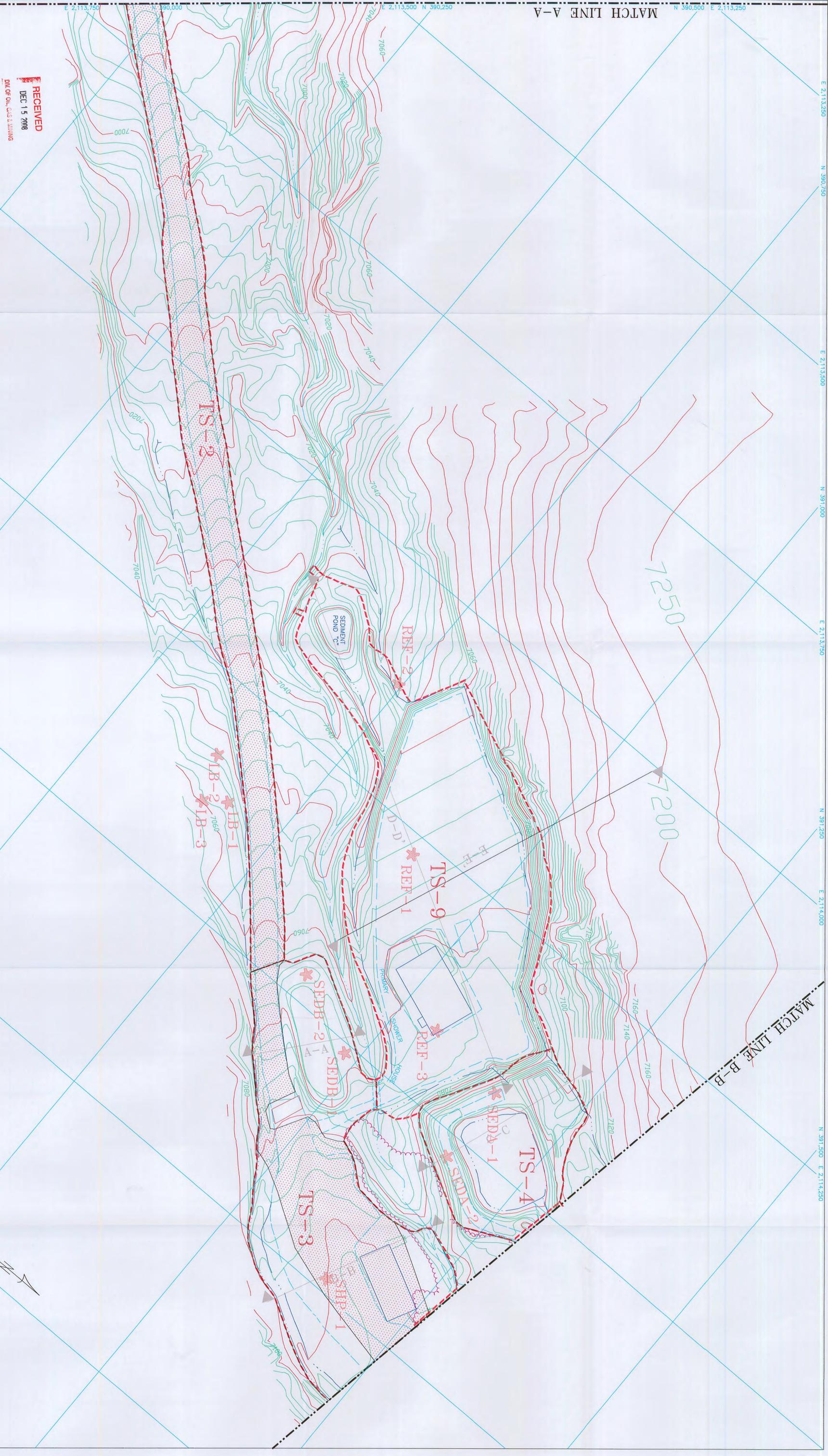
SCALE: 1" = 200'  
DRAWN BY: c. Reynolds  
DATE: 8/25/92

**BEAR CANYON PLATE 2-1A**

FILE NO: 06-000001  
 Certified  
 Expandable  
 Refer to Record No. 06-000001 for Additional Information

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MATCH LINE A-A



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HUNTINGTON, UTAH  
**RECLAMATION AREA**  
BEAR CANYON PLATE 2-3B

REV.	DATE	REMARKS	APPR.
1	10-91	Soil Sample Locations Plotted	10-91
2	4-28-92	Lump Coal Storage, Proposed Added	7-07-92
3	4-28-92	Sed. Pond "A" Dist. Bound. Corrected	9-18-92
4	11-29-92	Shower House Proposal Added (92H)	2-09-93
5	2-23-96	Updated For Shower House Pod As-Built (96A)	7-05-96
6	7-22-96	D-80 Water Bar Concrete Crossing Added (96C)	9-04-96
7	10-13-01	Added TS-5, TS-4 boundary lines and cross-sections (01A) 11-13-01	12-8-05
8	8/01/02	Changed name from 8-5B to 2-3B.	
9	9/09/08	Boundary change	
10			

Cross-sections (Appendix 3D) →  
Cross-sections B-2 (Page 31-30) →

**LEGEND**

CONTOUR LINE 6000

TOPSOIL SAMPLE LOCATIONS

RECLAMATION AREA

AREA NOT REQUIRING RECONTOURING OR TOPSOIL WITHIN THE DISTRIBUTED AREA

NOTE: WIDE DISTURBED AND RECLAMATION BOUNDARIES CONCERN. SEE PLATE 2-4 FOR SURFACE FACILITIES. PERMIT BOUNDARY AND PER-1977 DISTURBANCE.

SCALE 1" = 50'

CONTOUR INTERVAL 2'

PHOTOGRAPHY DATE NOV. 11, 1990

FILE NO: **03033**  
 Staff  
 Expedient  
 Refer to Record Book for additional information

E 2113,250 N 390,750 E 2113,500 N 391,000 E 2113,750 N 391,250 E 2114,000 N 391,500 E 2114,250

MATCH LINE B-B

MATCH LINE A-A

MATCH LINE B-B

**CO-OP MINING CO.**  
 HUNTINGTON, UTAH

**SURFACE FACILITIES**

SCALE: 1" = 50'  
 DRAWN BY: C. Reynolds  
 DATE: 8/26/91

**BEAR CANYON PLATE 5-2B**

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REV.	DATE	REMARKS	APP.
1	4-28-92	Lump Coal Storage Proposed Added	7-07-92
2	4-28-92	Sediment Pond "A" Disturbed Boundary Corrected	9-18-92
3	11-20-92	Shower House Proposed Added (9214)	3-09-93
4	8-24-94	Shower House Waterline Added (944)	10-19-94
5	2-22-96	Mop Upgraded For Shower House Rod As-Built (964)	7-05-96
6	7-24-98	D-80 Water Bar Concrete Crossing Added (980)	9-04-98
7	6-23-97	Schoolhouse Pavement Added (978)	11-03-97
8	12-20-99	Steel Bridge Structure/Contours Near Bath House (004)	2-10-00
9	6-25-01	Permit Boundary Changed for MHP Addition (998-1)	7-2-01
10	8/01/02	Changed name from 2-48 to 5-2B	12-8-03
11	9-08-08	Boundary change	

**LEGEND**

	PERMIT BOUNDARY		CONTOUR LINE		PAVEMENT
	DISTURBED AREA		UNPAVED ROADS		WATER LINES
	PRE-1977 DISTURBANCE		SECTION LINE		DRAINAGE
	CULVERTS		SEE PLATES 7-1 FOR HYDROLOGY		POWER LINES
					STREAM BUFFER ZONE MARKERS

50' 25' 0' 50' 100' 150'

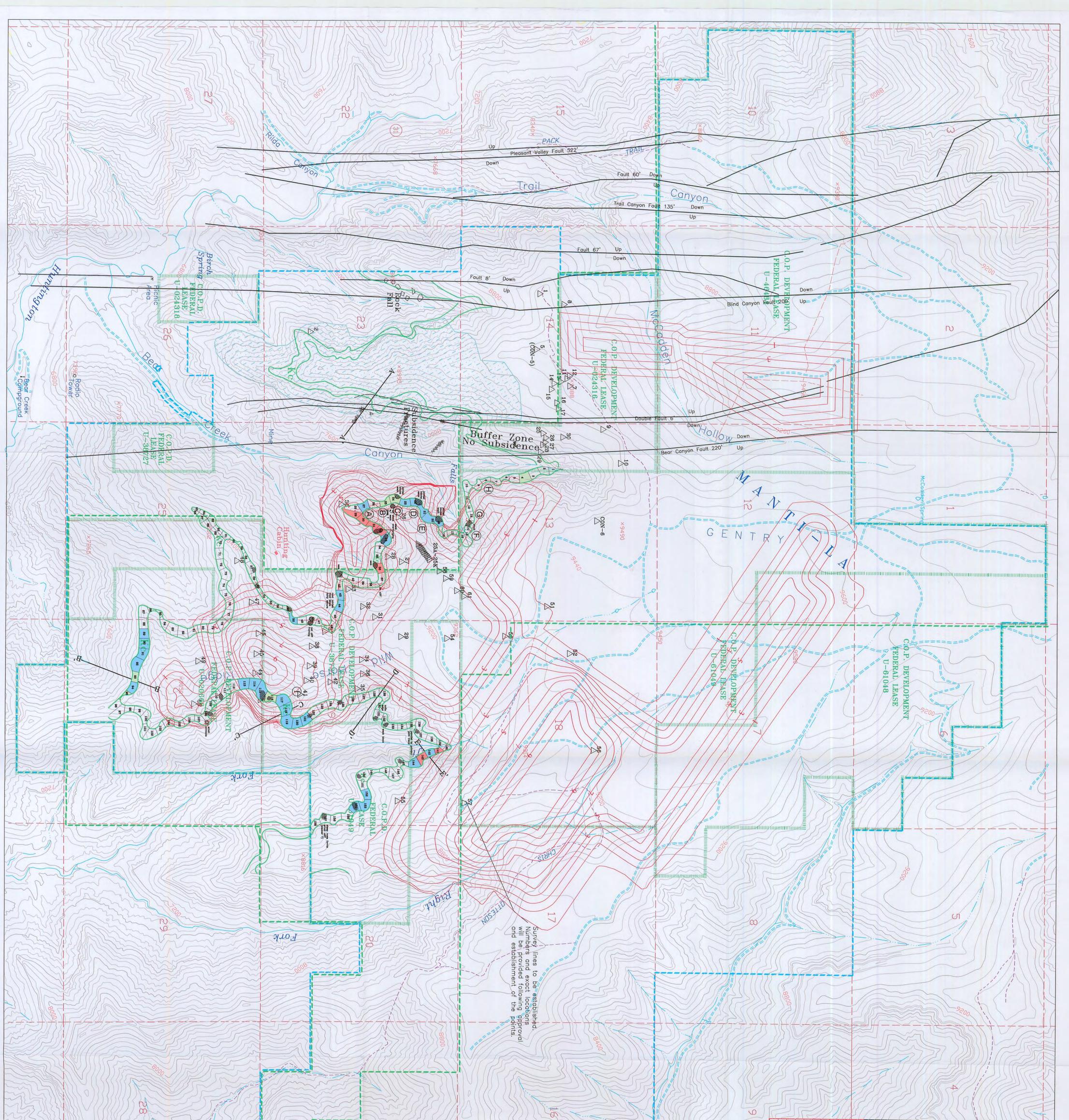
SCALE 1" = 50'

CONTOUR INTERVAL 2'

PHOTOGRAPHY DATE NOV. 11, 1990

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 For additional information





Survey lines to be established. Numbers and exact locations will be provided following approval and establishment of the points.

**LEGEND**

- BEAR CANYON PERMIT
- FEDERAL LEASE BOUNDARIES
- FOREST SERVICE BOUNDARY
- SUBSIDENCE STATION
- SECTION LINE
- SUBSIDENCE IMPACT CONTOURS
- OUTLETTAGE WORKLINE
- JOE SANDER WORKLINE
- REGULATORY LIMIT
- MINIUM
- MAXIMUM
- WORK AREA
- FAULT LINE
- 300' WELLS
- 100' WELLS

THIS PLATE SHOWS CUMULATIVE SUBSIDENCE FROM ALL BEAMS SEE PLATES 5-1 FOR INDIVIDUAL BEAM SUBSIDENCE CONTOURS SEE PLATES 5-1 FOR BEAM SPACING SEE APPENDIX 5-C FOR SUBSIDENCE MITIGATION DESCRIPTION

REV#	DATE	REMARKS	APPR.
1	12-16-04	Initial Area 1 Added, Map Area Expanded (944)	4-28-05
2	6-18-07	U-024318 Added/Subsidence Barriers Shown (97-1)	2-13-08
3	8-15-00	Initial Area 2 Added (AM008)	9-25-00
4	6-25-01	Wild Horse Ridge Area Added to Permit (SR88-1)	7-03-01
5	3-08-02	Worked Area Added to Permit (AM02E)	8-12-02
6	2-03-02	Changed names from plate 5-3 to plate 5-3	1-15-02
7	2-09-07	Added Subsidence areas 51-57	4-03-07
8	5-09-08	Boundary Change	
9			
10			

**CO-OP MINING CO**  
HUNTINGTON, UTAH

**SUBSIDENCE MAP**

SCALE: 1" = 1000'  
DRAWN BY: C. Reynolds  
DATE: 07-11-05

BEAR CANYON PLATE 5-3

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 HUNTINGTON, UTAH

**HYDROLOGY MAP**

SCALE: 1" = 50'  
 DRAWN BY: C. Reynolds  
 DATE: 7/19/91

BEAR CANYON PLATE 7-1B

REV.	DATE	REMARKS	APPR.
1	10-17-91	Ditch/Culvert Numbers Revised	11-11-91
2	4-28-92	Coal Storage Pad Proposal Added	7-07-92
3	4-28-92	Sed. Pond "A" Dist. Bound. Corrected	9-18-92
4	11-20-92	Shower House Proposal Added (92H)	2-08-93
5	8-24-94	Shower House Waterline Added (94C)	10-19-94
6	2-23-96	Map Updated for Shower House Pad As-Built (96A)	7-05-96
7	7-22-98	D-80 Water Bar Concrete Crossing Added (98C)	9-04-98
8	12-30-98	Steel Bridge Structure Contours Near Bath House	2-10-00
9	8/01/02	Digitized Map	12-8-05
10	5/09/06	Water Tank Seam As-Built/Sew Storage	8-22-07
11	5/09/06	Boundary change	

SEE PLATE 7-2 FOR SEDIMENT POND "A" SPECIFICATIONS  
 SEE PLATE 7-3 FOR SEDIMENT POND "B" SPECIFICATIONS  
 SEE PLATE 7-6 FOR SEDIMENT POND "C" SPECIFICATIONS

REFER TO PAGE 7-137 FOR CROSS-SECTION A TO A'  
 REFER TO TABLES 7.2-10 AND 7.2-11 FOR DITCH AND CULVERT SPECIFICATIONS

**LEGEND**

PERMIT BOUNDARY: - - - - -  
 DISTURBED AREA: .....

CONTOUR LINE: 5000  
 WATER LINES: W  
 SECTION LINE: - - - - -  
 CULVERTS: - - - - -

UNDISTURBED DRAINAGE: D-2U  
 DISTURBED DRAINAGE: D-2D  
 DRAINAGE BOUNDARY: - - - - -

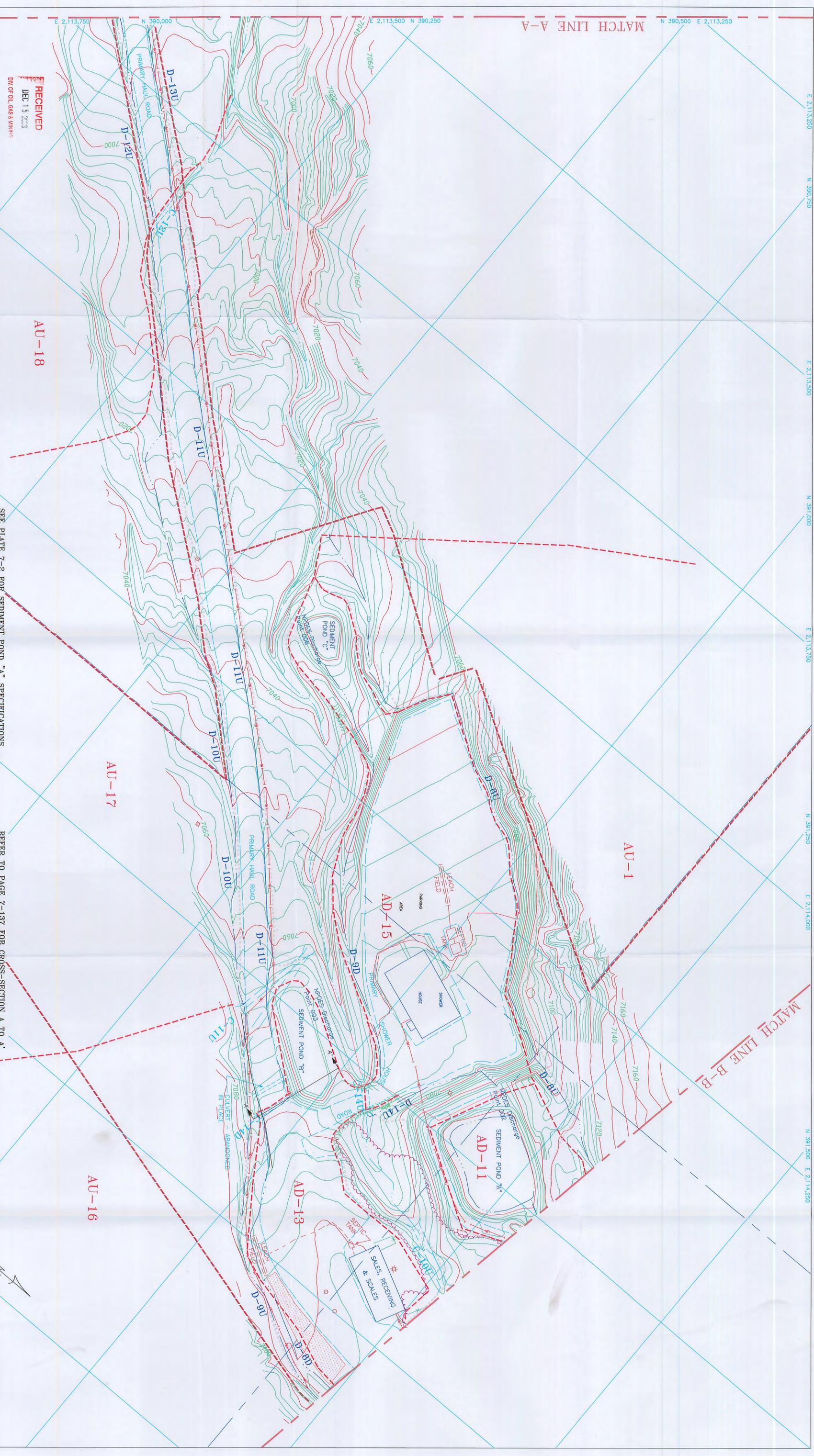
SEE PLATES 2-4 FOR SURFACE FACILITIES  
 SEE PLATE 7-6 FOR COMPLETE WATERSHED MAP

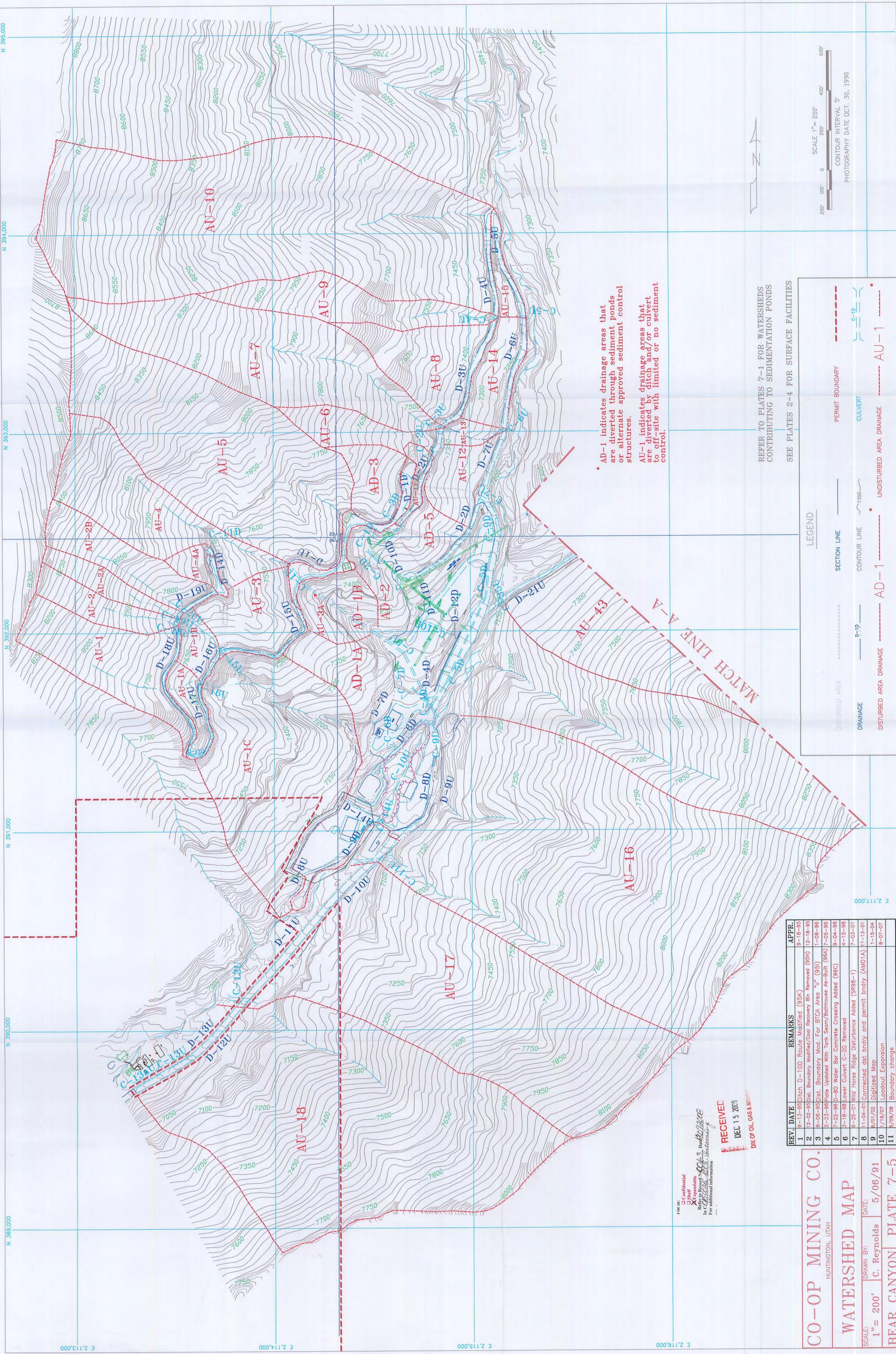
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SCALE 1" = 50'  
 CONTOUR INTERVAL: 2'  
 PHOTOGRAPHY DATE: NOV. 11, 1990

1" = 50'  
 0 50' 100' 150'

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\* AD-1 indicates drainage areas that are diverted through sediment ponds or alternate approved sediment control structures.

AU-1 indicates drainage areas that are diverted by ditch and/or culvert to off-site with limited or no sediment control.

REFER TO PLATES 7-1 FOR WATERSHEDS CONTRIBUTING TO SEDIMENTATION PONDS

SEE PLATES 2-4 FOR SURFACE FACILITIES

LEGEND

-----	DISTURBED AREA	-----	PERMIT BOUNDARY
-----	SECTION LINE	-----	CULVERT
-----	CONTOUR LINE	-----	UNDISTURBED AREA DRAINAGE
-----	DRAINAGE	-----	AU-1

REV.	DATE	REMARKS	APPR.
1	9-13-95	Ditch D-10D Route Modified (95K)	9-18-95
2	12-02-95	Dist. Boundary Modified/Coal Recovery Bin Removed (95N)	12-18-95
3	6-06-95	Dist. Boundary Mod. For BITCA Area "Y" (95)	1-08-96
4	2-23-96	Plate Updated With Tank Seam/Bathroom As-Built (96A)	7-05-96
5	7-22-96	D-8D Water Bar Concrete Crossing Added (96C)	9-04-96
6	3-18-98	Lower Culvert C-2D Removed	4-15-98
7	6-25-01	Wild Horse Ridge Disturbance Added (SR98-1)	7-03-01
8	11-04-01	Corrected dist. bndry and permit bndry (AM01A)	11-15-01
9	8/01/02	Digitized Map	1-15-04
10	1/16/07	Loadout Expansion	8-07-07
11	8/09/08	Boundary change	

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**WATERSHED MAP**

SCALE: 1" = 200'  
DRAWN BY: C. Reynolds  
DATE: 5/06/91

BEAR CANYON PLATE 7-5