PFO FORM #4 (Last Revised 1/96)

File Folder #3

TRACKING FORM

I. KEY FEATURES OF PERMITTEE'S AMENDMENT APPLICATION

Permittee	Mine Name	Amendment #	Date Received / By Who
Co-Op Mine	Bear Canyon	ACT/015/025-96A	3-28-96 SD

Proposal: Tank Seam / Bath House As Builts

Description: SHARON CAN YOU REVIEW BY 6/6/96. IF STEVE JOHNSON IS MORE FAMILIAR LET ME KNOW TX [illegible] 5/23

II. AMENDMENT CLASSIFICATION

☐ Major Amendment	Public Notice Required	☐ Yes	☒ No
☒ Minor Amendment	Outside of Permit Area	☐ Yes	☒ No
	Outside of Disturbed Area	☐ Yes	☒ No

III. SUMMARY OF DOGM PROCESSING DATES

Reviews Completed	5/6/96 PHH
Approved Effective	7/5/96
Disapproved	
Mailed	
Filed MRP SLO	

FOLLOWUP REQUIREMENTS		
MRP "After Const" Documents	☐ Yes	☐ No
TA	☐ Yes	☒ No
CHIA	☐ Yes	☐ No

Responds Within 15 days of Receipt? ☐ Yes ☐ No
If no, explain below.

IV. COORDINATED REVIEWS

EXTERNAL AGENCIES (Mine Specific) (Adverse Comments, If Any, Include in Item V)	COPY SENT		CONTACTED	
OSM	☐ Y	☐ N	☐ C	☐ N/A
BLM	☐ Y	☐ N	☐ C	☐ N/A
US Forest Service	☐ Y	☐ N	☐ C	☐ N/A
US Fish & Wildlife	☐ Y	☐ N	☐ C	☐ N/A
US National Parks	☐ Y	☐ N	☐ C	☐ N/A
UT Environmental Quality	☐ Y	☐ N	☐ C	☐ N/A
UT Wildlife Resources	☐ Y	☐ N	☐ C	☐ N/A
UT State History	☐ Y	☐ N	☐ C	☐ N/A
UT Water Rights	☐ Y	☐ N	☐ C	☐ N/A
UT SITLA	☐ Y	☐ N	☐ C	☐ N/A
Other______	☐ Y	☐ N	☐ C	☐ N/A

DOGM REVIEWS/DISCIPLINES		
Generalists PHH	☐ Yes	☐ N/A
____ INTERDISCIPLINARY APPROACH		
- Administrative ____	☐ Yes	☐ N/A
- Biology ____	☐ Yes	☐ N/A
- Engineering PHH	☒ Yes	☐ N/A
- Geology ____	☐ Yes	☐ N/A
- Hydrology SHARON	☐ Yes	☐ N/A
- Soils ____	☐ Yes	☐ N/A
- Permitting ____	☐ Yes	☐ N/A
- Other____	☐ Yes	☐ N/A

V. FOOTNOTES/ADDITIONAL EXPLANATION AS NECESSARY

Notified Charles Reynolds on 4/8/96 that language and contradictions, i.e. caretaker dwelling needs cleaned up prior to shipment to S.L.C. Mr. Reynolds was told to pick up.
Re-Submitted 4-26-96
Revised pgs. 3A-6 & 3A-7 on 5/6/96
All approved except Hydrology Portion 5/6/96 - PHH
Forwarded to SLC 5-7-96 - PHH

8.11 NUTRIENTS AND SOIL AMENDMENTS

Following final grading test samples will be taken to represent each of the reclamation areas shown on Plates 8-5. Table 8.11-1 shows the sample frequency for each reclamation area. Additional samples will be taken in the event that the initial sample indicates unsuitable material. Composite samples will be taken from 0 to 2 ft and from 2 ft to 4 ft at each sample location.

Chemical analysis for micronutrients will be conducted by testing soil extracts from the redistributed material as outlined in Table 8.9-1. All necessary fertilization and/or neutralizing compounds will be applied according to the results of the soil sampling and analysis program approved by the division.

8.11-1 Final Grading Test Sample Density

MARK	DESCRIPTION	Acreage	SAMPLE FREQUENCY
TS-1	Ball Park Topsoil Pile	1.27	1
TS-2	Lower Haul Road	1.65	1
TS-3	Sed Pond B & Scale Office Pad	2.56	1
TS-4	Sed Pond A	0.75	1
TS-5	Main Pad Area	12.30	5
TS-6	Portal Access Road	2.62	2
TS-7	Blind Canyon Seam Portal Area	1.70	1
TS-8	Upper Storage Pad	0.74	1
TS-9	Shower House Pad	1.84	1
TS-10	Tank Seam Access Road	2.25	2
TS-11	Tank Seam Portal Pad	0.46	1

for reclamation. The proposed topsoil pile location is shown on Plate 2-4B. Proposed designs and cross sections are shown on Plate 8-3.

The topsoil stockpile will be surrounded with a containment berm and protected as stated in Section 8.8.2.3. An as built survey will be made of the stockpile and submitted to the Division as Plate 8-3 upon completion.

8.9.5 Tank Seam Access Road and Portal Pad

A survey of topsoil material was performed in the area of the Tank Seam access road and portal pad area in 1992. Four sites were sampled and the soil was analyzed. These sites are designated on Plate 8-5E as TSA-1, TSA-2, TSA-3 and TSA-4 (See Appendix 8-A for test results). Results indicated highest organic matter accumulations in the top 0-6 inches. Test results also indicate that the material tested is suitable for final reclamation material at all depths. See discussion in Appendix 8-E. Soil depths were determined by the visible presence of organic matter and a distinct soil color change. The observations indicated a varying soil depth of 0 to 8 inches, the lesser depths being in the steep rocky areas. During construction, topsoil will be stripped at depths varying from 0 to 8 inches by visually observing the depth at which organic material is found in the soil. The estimated volume of topsoil which will be recovered and placed in the designated storage area is 1,100 cubic yards.

Topsoil will be recovered on the access road area during construction and relocated to the topsoil stockpile areas shown on Plate 8-5E. Plate 8-6 shows the details of the proposed topsoil stockpiles. Upon completion of the topsoil recovery and storage, the topsoil will be revegetated. A berm will be maintained around the piles to totally contain runoff from the piles. Typical dimensions of the berm are shown on Plate 8-6 and described in Appendix 7-K, BTCA area "P". An as-built survey will be made of the stockpile and submitted to the Division as Plate 8-6 upon completion.

8.9.6 Topsoil Summary

The following table summarizes the information discussed in the previous Sections:

Table 8.9-3 Summary Table

Description	cu yd
Main Topsoil Pile	1,480
Ball Park Topsoil Pile	3,400
Shower House Pad Topsoil Pile	1,700
Tank Seam Road Topsoil Storage Areas	1,100
Total	7,680
On-site Material	as required

8.9.4 Shower House Topsoil Pile

A survey of topsoil material was performed in the area of the shower house pad and Sediment Pond "C". Three sites were sampled and the soil was analyzed. These sites are designated on Plate 8-5B as REF-1, REF-2 and REF-3 (See Appendix 8-A and 8-E for test results). Results indicated organic matter accumulations in the top 4 inches of REF-1 and REF-3 and the top 8 inches of REF-2. A field survey was conducted to verify the depths. Soil depths were determined by the visible presence of organic matter and a distinct soil color change. Field observations showed soil depths of 5 inches for REF-1, 8 inches for REF-2 and 7 inches for REF-3. Other sites were excavated and observed visually throughout the area. The observations indicated a varying soil depth of 6 to 8 inches, the lesser depths being in the vicinity of REF-1. Soil depths averaged 8 inches in the vicinity of REF-2 (0.47 acres), 7 inches in the vicinity of REF-3 (0.69 acres) and 6 inches in the vicinity of REF-1 (0.68 acres).

Prior to construction on the shower house pad, topsoil material will be salvaged at these approximate depths and stockpiled. Topsoil salvage will consist of confirming and staking out depths throughout the area to facilitate excavation activities. Vegetation will be removed which could interfere with topsoil salvage operations. Shrubs and herbaceous vegetation will be salvaged along with the topsoil material to enhance the quality of the salvaged material. Salvaging the material at the depths mentioned previously will result in approx 1,700 cu yds of material

8.9 SELECTED OVERBURDEN MATERIALS OR SUBSTITUTES

There were approx 17 acres disturbed (pre-1977 disturbance) in Bear Canyon prior to time Co-Op Mining Company started its operation in 1981. See Plates 2-4. Approx 1.5 acres of this area are below the gate outside of the permit area. These acres were disturbed during mining activities that had terminated some 30 years prior. Because of this pre-law disturbance and construction of access roads, topsoil was only recovered from some areas and substitute plant growth material will have to be used over much of the reclaimed areas. Areas are summarized in Table 8.9-1.

Table 8.9-1 Disturbed Area Summary

MARK[1]	DESCRIPTION	Total ac.[1&2]	Recontour acres[1]	Pre-1977 acres[2]	New acres
TS-1	Ball Park Topsoil Pile	1.27	1.27	-0-	1.27
TS-2	Lower Haul Road	1.6	1.6	1.6	-0-
TS-3	Sed Pond B & Scale Office Pad	2.56	2.56	1.23	1.33
TS-4	Sed Pond A	0.75	0.75	-0-	0.75
TS-5	Main Pad Area	12.30	9.50	8.86	3.44
TS-6	Portal Access Road	2.62	2.62	0.01	2.61
TS-7	Blind Canyon Seam Portal Area	1.70	1.50	0.51	1.19
TS-8	Upper Storage Pad	0.74	0.70	-0-	0.74
TS-9	Shower House Pad	1.84	1.84	-0-	1.84
TS-10	Tank Seam Access Road	2.25	2.25	-0-	2.25
TS-11	Tank Seam Portal Pad	0.68	0.46	-0-	0.68
	TOTAL	28.31	25.05	12.21	16.10

Notes:
1. See Plates 8-5.
2. See Plates 2-4.

BTCA Area J - LOWER TANK SEAM ACCESS ROAD CUT SLOPE ABOVE D-16U

This area, which is approx 0.026 acres, includes the cut slope ajacent to ditch D-16U (Plate 7-1E). The total runoff volume from this area is estimated to be 0.003 acre-ft. The slope consists primarily of bedrock outcrop, minimizing the potential erosion on the slope. Areas where the slope demonstrates a high potential for erosion will be covered with erosion control matting, which will be maintained. Sediment and runoff will be controlled by the placement of a silt fence in ditch D-16U as shown on Plate 7-1E. Undisturbed drainage from area AU-2C and road drainage will also pass through the silt fence, with a maximum flow of 0.25 cfs. A typical silt fence installation is shown in Figure 7.2-15.

BTCA Area K - OUTSLOPE OF FILL AREA AROUND C-16U

This area is approx 0.23 acres, and includes the fill outslope of the lower Tank Seam Access Road around culvert C-16U (Plate 7-1E). The estimated volume of runoff from this area is 0.029 acre-ft, with a maximum slope length of 90 ft. Erosion and runoff will be controlled by the placement of erosion control matting on the slope, which will be maintained. To prevent excess water from crossing or saturating the fill slope, a berm will be maintained along the outer edge of the road, and the road will be sloped to drain water away from the slope.

BTCA Area L - LOWER TANK SEAM ACCESS ROAD CUT SLOPE ABOVE D-17U

This area, which is approx 0.019 acres, includes the cut slope ajacent to ditch D-17U (Plate 7-1E). The total runoff volume from this area is estimated to be 0.002 acre-ft. The slope consists primarily of bedrock outcrop, minimizing the potential erosion on the slope. Areas where the slope demonstrates a high potential for erosion will be covered with erosion control matting, which will be maintained. Sediment and runoff will be controlled by the placement of a silt fence in ditch D-17U as shown on Plate 7-1E. Undisturbed drainage from area AU-1B and road drainage will also pass through the silt fence, with a maximum flow of 0.43 cfs. A typical silt fence installation is shown in Figure 7.2-15.

BTCA Area M - OUTSLOPE OF FILL AREA AROUND C-17U

This area is approx 0.048 acres, and includes the fill outslope of the lower Tank Seam Access Road around culvert C-17U (Plate 7-1E). The estimated volume of runoff from this area is 0.006 acre-ft, with a maximum slope length of 50 ft. Erosion will be controlled by the placement of erosion control matting on the slope which will be maintained. To prevent excess water from crossing or saturating into the slope, a berm will be maintained along the outer edge of the road above the slope and the road will be sloped to drain water away from the fill slope.

BTCA Area N - CUT AND FILL SLOPES IN AREA AU-1C

This area, which is approx 0.12 acres, includes the cut slope ajacent to ditch D-18U and the cut and fill slopes in the three switchbacks of the Tank Seam Access Road (Plate 7-1E). The total runoff volume from this area is estimated to be 0.015 acre-ft. The cut slopes consist primarily of bedrock outcrop, minimizing the potential erosion on the slope. Areas where the cut and fill slopes demonstrate a high potential for erosion will be covered with erosion control matting, which will be maintained. Sediment and runoff will be controlled by the placement of a silt fence in ditch D-18U as shown on Plate 7-1E. Undisturbed drainage from area AU-1A, AU-1C and road drainage will also pass through the silt fence, with a maximum flow of 0.65 cfs. A typical silt fence installation is shown in Figure 7.2-15. In order to prevent water from saturating or crossing the fill slopes, berms will be placed along the outside edge of the road and the road will be sloped to drain water away from the fill slopes.

BTCA Area O - OUTSLOPE BELOW FIRST TANK SEAM ROAD SWITCHBACK

This area is approx 0.04 acres, and includes the outslope of the first Tank Seam Access Road switchback (Plate 7-1E). The estimated volume of runoff from this area is 0.005 acre-ft, with a maximum slope length of 15 ft. Erosion will be controlled by the placement of erosion control matting on the slope, which will be maintained. To prevent water from crossing or saturating the slope, berms will be placed along the road, and the road sloped to drain water away from the fill slope.

BTCA Area P - TANK SEAM ACCESS ROAD TOPSOIL STOCKPILE

This area is approx 0.06 acres (Plate 7-1E). The estimated volume of runoff from this area is 0.008 acre-ft. Erosion and sediment will be controlled by a berm placed to totally contain runoff from the pile. The berm along the base of the pile (approx. 80 ft distance) will be a minimum of 2 ft high, with the ditch between the berm and topsoil pile a minimum of 2 ft bottom width, assuming 1H:1V side slopes. This will allow the berm to contain a volume of 0.011 acre-ft at the base of the pile, providing adequate protection for the topsoil.

BTCA Area Q - UPPER TANK SEAM ACCESS ROAD CUT SLOPE ABOVE D-21U

This area is approx 0.053 acres. It includes the cut slope ajacent to ditch D-21U (Plate 7-1E). The total runoff volume from this area is estimated to be 0.007 acre-ft. The slope consists primarily of bedrock outcrop, minimizing the potential erosion on the slope. Areas where the slope demonstrates a high potential for erosion will be covered with erosion control matting, which will be maintained. Sediment and runoff will be controlled by the placement of a silt fence in ditch D-21U as shown on Plate 7-1E. Undisturbed drainage from area AU-1A and road drainage will also pass through the silt fence, with a maximum flow of 0.14 cfs. Runoff will also pass through the silt fence adjacent to culvert C-17U prior to entering the natural drainage channels. A typical silt fence installation is shown in Figure 7.2-15.

BTCA Area R - UPPER TANK SEAM ACCESS ROAD CUT SLOPE ABOVE D-22U

This area is approx 0.06 acres. It includes the cut slope ajacent to ditch D-22U (Plate 7-1E). The total runoff volume from this area is estimated to be 0.008 acre-ft. The slope consists primarily of bedrock outcrop, minimizing the potential erosion on the slope. Areas where the slope demonstrates a high potential for erosion will be covered with erosion control matting, which will be maintained. Sediment and runoff will be controlled by the placement of a silt fence in ditch D-22U as shown on Plate 7-1E. Undisturbed drainage from area AU-1 and road drainage will also pass through the silt fence, with a maximum flow of 0.72 cfs. A typical silt fence installation is shown in Figure 7.2-15.

BTCA Area S - OUTSLOPE OF FILL AREA AROUND C-23U

This area is approx 0.07 acres, and includes the fill outslope of the upper Tank Seam Access Road around culverts C-22U, C-23U AND C-24U (Plate 7-1E). The estimated volume of runoff from this area is 0.009 acre-ft, with a maximum slope length of 35 ft. Erosion and runoff will be controlled by the placement of erosion control matting on the slope, which will be maintained. To prevent excess water from crossing or saturating the fill slope, a berm will be maintained along the outside edge of the road and the road will be sloped to drain water away from the fill slope.

BTCA Area T - UPPER TANK SEAM ACCESS ROAD CUT SLOPE ABOVE D-23U

This area is approx 0.02 acres. It includes the cut slope ajacent to ditch D-23U (Plate 7-1E). The total runoff volume from this area is estimated to be 0.0025 acre-ft. The slope consists primarily of bedrock outcrop, minimizing the potential erosion on the slope. Areas where the slope demonstrates a high potential for erosion will be covered with erosion control matting, which will be maintained. Sediment and runoff will be controlled by the placement of a silt fence in ditch D-23U as shown on Plate 7-1E. Undisturbed drainage from area AU-2B and road drainage will also pass through the silt fence, with a maximum flow of 0.55 cfs. A typical silt fence installation is shown in Figure 7.2-15.

BTCA Area U - TANK SEAM PORTAL PAD

This area is approx 0.43 acres. It includes the Tank Seam portal pad and adjacent cut slope, as well as the area around the conveyor belt and borehole structure (Plate 7-1E). The total runoff volume from this area is estimated to be 0.05 acre-ft. Erosion and sediment will be controlled using silt fences placed in Ditch D-14D prior to the inlet of culvert C-12D and a silt fence placed below the belt and borehole structure prior to the outlet of C-12D (Plate 7-1E). A typical silt fence installation is shown in Figure 7.2-15.

BTCA Area "V" - Tank Seam Pad Outslope and Point Downslope

This area is approx. 0.22 acres. It includes the outslope of the Tank Seam portal pad and the slope South of the portal pad (Plate 7-1E). The total runoff volume from this area is estimated at 0.0275 acre-ft. Erosion and sediment will be controlled by the use of erosion control matting, which will be maintained. To prevent excess water in crossing or saturating the slope, a berm will be maintained along the outside edge of the pad to prevent water from flowing onto the slopes.

BTCA Area H - TANK SEAM ACCESS ROAD CUT SLOPE ABOVE D-15U

This area, which is approx 0.028 acres (Plates 7-1C and 7-1E), includes the cut slope of the Tank Seam Access Road adjacent to ditch D-15U. The total flow from this area is 0.0035 acre-ft. The slope consists primarily of bedrock outcrop, minimizing the potential erosion on the slope. Areas where the slope demonstrates a high potential for erosion will be covered with erosion control matting, which will be maintained. Sediment and runoff will be controlled by a silt fence placed in ditch D-15U as shown on Plate 7-1C. Undisturbed drainage from area AU-3 and road drainage will also pass through the silt fence, with a maximum flow of 0.33 cfs. A typical silt fence installation is shown in Figure 7.2-15.

BTCA Area I - OUTSLOPE OF LOWER TANK SEAM ACCESS ROAD NEAR D-15U

This area, approx 0.048 acres (Plates 7-1C and 7-1E), includes the minimal amount of disturbed fill on the outslope of the lower Tank Seam Access Road across from D-15U and D-16U. The estimated volume of runoff from this area is 0.006 acre-ft, with a maximum slope length of 10 ft. Erosion will be controlled by the placement of erosion control matting on the slope, which will be maintained. To prevent excess water from crossing or saturating the fill, a berm will be maintained along the outer edge of the road, and the road sloped away from the fill material.

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-17U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1000 ft/ft
Discharge.....	0.43 cfs

Computed Results:

Depth.....	0.28 ft
Velocity.....	3.72 fps
Flow Area.....	0.12 sf
Flow Top Width...	0.83 ft
Wetted Perimeter.	1.00 ft
Critical Depth...	0.35 ft
Critical Slope...	0.0300 ft/ft
Froude Number....	1.76 (flow is Supercritical)

Use Minimum Depth = 1 ft	=>	Min Freeboard = 0.72 ft
Velocity < 5 fps	=>	No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-18U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1300 ft/ft
Discharge.....	0.65 cfs

Computed Results:

Depth.....	0.31 ft
Velocity.....	4.55 fps
Flow Area.....	0.14 sf
Flow Top Width...	0.93 ft
Wetted Perimeter.	1.11 ft
Critical Depth...	0.41 ft
Critical Slope...	0.0284 ft/ft
Froude Number....	2.04 (flow is Supercritical)

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

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-19U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1200 ft/ft
Discharge.....	0.20 cfs

Computed Results:

Depth.....	0.20 ft
Velocity.....	3.29 fps
Flow Area.....	0.06 sf
Flow Top Width...	0.60 ft
Wetted Perimeter.	0.73 ft
Critical Depth...	0.26 ft
Critical Slope...	0.0333 ft/ft
Froude Number....	1.82 (flow is Supercritical)

Use Min. Depth = 0.5 ft => Min Freeboard = 0.30 ft
Velocity < 5 fps => No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-20U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1100 ft/ft
Discharge.....	0.17 cfs

Computed Results:

Depth.....	0.19 ft
Velocity.....	3.05 fps
Flow Area.....	0.06 sf
Flow Top Width...	0.58 ft
Wetted Perimeter.	0.69 ft
Critical Depth...	0.24 ft
Critical Slope...	0.0340 ft/ft
Froude Number....	1.73 (flow is Supercritical)

Use Min. Depth = 0.5 ft => Min Freeboard = 0.31 ft
Velocity < 5 fps => No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-21U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.00:1 (H:V)
Right Side Slope.	1.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1000 ft/ft
Discharge.....	0.14 cfs

Computed Results:

Depth.....	0.22 ft
Velocity.....	2.86 fps
Flow Area.....	0.05 sf
Flow Top Width...	0.44 ft
Wetted Perimeter.	0.63 ft
Critical Depth...	0.26 ft
Critical Slope...	0.0411 ft/ft
Froude Number....	1.52 (flow is Supercritical)

Use Minimum Depth = 1 ft	=>	Min Freeboard = 0.78 ft
Velocity < 5 fps	=>	No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-22U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.00:1 (H:V)
Right Side Slope.	1.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0400 ft/ft
Discharge.....	0.72 cfs

Computed Results:

Depth.....	0.49 ft
Velocity.....	3.06 fps
Flow Area.....	0.24 sf
Flow Top Width...	0.97 ft
Wetted Perimeter.	1.37 ft
Critical Depth...	0.50 ft
Critical Slope...	0.0330 ft/ft
Froude Number....	1.09 (flow is Supercritical)

Use Minimum Depth = 1 ft => Min Freeboard = 0.51 ft
Velocity < 5 fps => No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-23U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0600 ft/ft
Discharge.....	0.55 cfs

Computed Results:

Depth.....	0.34 ft
Velocity.....	3.26 fps
Flow Area.....	0.17 sf
Flow Top Width...	1.01 ft
Wetted Perimeter.	1.21 ft
Critical Depth...	0.38 ft
Critical Slope...	0.0291 ft/ft
Froude Number....	1.40 (flow is Supercritical)

Use Minimum Depth = 1 ft => Min Freeboard = 0.66 ft
Velocity < 5 fps => No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-15U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1300 ft/ft
Discharge.....	0.33 cfs

Computed Results:

Depth.....	0.24 ft
Velocity.....	3.84 fps
Flow Area.....	0.09 sf
Flow Top Width...	0.72 ft
Wetted Perimeter.	0.86 ft
Critical Depth...	0.31 ft
Critical Slope...	0.0311 ft/ft
Froude Number....	1.95 (flow is Supercritical)

Use Minimum Depth = 1 ft	=>	Min Freeboard = 0.76 ft
Velocity < 5 fps	=>	No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

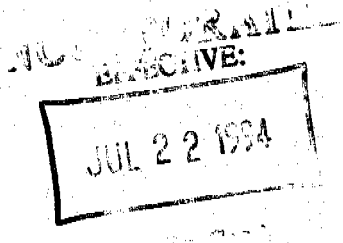
Worksheet Name: DITCH D-16U

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1200 ft/ft
Discharge.....	0.25 cfs



Computed Results:

Depth.....	0.22 ft
Velocity.....	3.47 fps
Flow Area.....	0.07 sf
Flow Top Width...	0.66 ft
Wetted Perimeter.	0.79 ft
Critical Depth...	0.28 ft
Critical Slope...	0.0323 ft/ft
Froude Number....	1.85 (flow is Supercritical)

Use Minimum Depth = 1 ft	=>	Min Freeboard = 0.78 ft
Velocity < 5 fps	=>	No rip-rap required

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-8U

Comment: AV. SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	2.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.033
Channel Slope....	0.0600 ft/ft
Discharge.....	5.04 cfs

Computed Results:

Depth.....	0.39 ft
Velocity.....	4.93 fps
Flow Area.....	1.02 sf
Flow Top Width...	3.18 ft
Wetted Perimeter.	3.42 ft
Critical Depth...	0.51 ft
Critical Slope...	0.0241 ft/ft
Froude Number....	1.53 (flow is Supercritical)

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-8U

Comment: MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	2.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.033
Channel Slope....	0.3100 ft/ft
Discharge.....	5.04 cfs

Computed Results:

Depth.....	0.25 ft
Velocity.....	8.63 fps
Flow Area.....	0.58 sf
Flow Top Width...	2.74 ft
Wetted Perimeter.	2.89 ft
Critical Depth...	0.51 ft
Critical Slope...	0.0241 ft/ft
Froude Number....	3.30 (flow is Supercritical)

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-8U

Comment: MIN SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	2.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.033
Channel Slope....	0.0200 ft/ft
Discharge.....	5.04 cfs

Computed Results:

Depth.....	0.54 ft
Velocity.....	3.35 fps
Flow Area.....	1.50 sf
Flow Top Width...	3.61 ft
Wetted Perimeter.	3.93 ft
Critical Depth...	0.51 ft
Critical Slope...	0.0241 ft/ft
Froude Number....	0.92 (flow is Subcritical)

Use Min. Depth = 0.67 ft	=>	Min Freeboard = 0.13 ft
Velocity < 5 fps	=>	No rip-rap required typ
At steep slope 31%	=>	Use D_{50}= 6"

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-14D

Comment: MIN AND MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0500 ft/ft
Discharge.....	0.54 cfs

Computed Results:

Depth.....	0.34 ft
Velocity.....	3.03 fps
Flow Area.....	0.18 sf
Flow Top Width...	1.03 ft
Wetted Perimeter.	1.24 ft
Critical Depth...	0.38 ft
Critical Slope...	0.0291 ft/ft
Froude Number....	1.29 (flow is Supercritical)

Use Min. Depth = 0.67 ft => Min Freeboard = 0.33 ft
Velocity < 5 fps => No rip-rap required

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-9D

Comment: MAX SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.00:1 (H:V)
Right Side Slope.	1.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.1000 ft/ft
Discharge.....	1.25 cfs

Computed Results:

Depth.....	0.50 ft
Velocity.....	4.95 fps
Flow Area.....	0.25 sf
Flow Top Width...	1.01 ft
Wetted Perimeter.	1.42 ft
Critical Depth...	0.63 ft
Critical Slope...	0.0307 ft/ft
Froude Number....	1.74 (flow is Supercritical)

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Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: DITCH D-9D

Comment: MIN SLOPE

Solve For Depth

Given Input Data:

Bottom Width.....	0.00 ft
Left Side Slope..	1.00:1 (H:V)
Right Side Slope.	1.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0400 ft/ft
Discharge.....	1.25 cfs

Computed Results:

Depth.....	0.60 ft
Velocity.....	3.51 fps
Flow Area.....	0.36 sf
Flow Top Width...	1.19 ft
Wetted Perimeter.	1.69 ft
Critical Depth...	0.63 ft
Critical Slope...	0.0307 ft/ft
Froude Number....	1.13 (flow is Supercritical)

Use Minimum Depth = 1 ft	=>	Min Freeboard = 0.4 ft
Velocity < 5 fps	=>	No rip-rap required

SUPERSEDED
EFFECTIVE:
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UTAH DIVISION OIL, GAS AND MINING

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B.C.

9/92

AMENDMENT TO
RECEIVED Mining & Reclamation Plan
Approved, Division of Oil, Gas & Mining

By 92H date 2/9/93

DITCH CHARACTERISTICS (cont)

DITCH	CHANNEL SLOPE %	CONTRIBUTING WATERSHED	PEAK Q(cfs)	BANK AND BOTTOM DESC.	MANNING'S η (a)
D-1U	2 Min, 8 Max	AU-3, AU-5	2.51	D_{50}≈2", D_{max}≈4"	0.03
D-2U	7 Min, 10 Max	AU-6, AU-11	0.48	Rocky Soil	0.03
D-3U	4 Min, 18 Max	AU-8	0.72	Rocky Soil	0.03
D-4U	1 Min, 10 Av, 18 Max	AU-10	4.05	Rocky Soil	0.03
D-5U	4 Min, 13 Max	AU-15	0.13	Rocky Soil	0.03
D-6U	3 Min, 6 Max	AU-14	0.35	Rocky Soil	0.03
D-7U	1 Min, 16 Max	AU-12	0.34	Rocky Soil	0.03
D-8U	2 Min, 6 Av 31 Max	AU-1	5.04	Soil D_{50}≈6"	0.033
D-9U	1 Min, 6 Max	AU-16	4.92	D_{50}≈4"	0.03
D-10U	3 Min, 10 Max	AU-17	3.29	D_{50}≈4"	0.03
D-11U	3 Min, 8 Max	misc. road drainage	1.0(b)	Soil	0.03
D-12U	3 Min 9 Max	AU-18	4.0	Soil D_{50}≈4"	0.03
D-13U	2 Min, 6 Av, 23 Max	misc. road drainage	1.0(b)	Soil	0.03
D-14U	6 Min, 66 Max	Outlet of Sed Pond A AD-3A, AD-5, AD-7, AD-8, AD-9, AD-10, AD-11,AD-12, AD-14	8.6	D_{50}≈4" D_{Max}≈10"	0.03
D-15U	11 AV	AU-3	0.33	soil	0.03
D-16U	12 AV	AU-2C	0.25	soil	0.03
D-17U	10 AV	AU-1B	0.43	soil	0.03
D-18U	13 AV	AU-1A, AU-1C	0.65	soil	0.03
D-19U	12 AV	AU-1A, AU-1C partial	0.20	soil	0.03
D-20U	11 AV	AU-1A, AU-1C partial	0.17	soil	0.03
D-21U	10 AV	AU-1A	0.14	soil	0.03
D-22U	4 AV	AU-1	0.72	soil	0.03
D-23U	6 AV	AU-2B	0.55	soil	0.03

(a) BASED ON TABLES FROM BARFIELD ET AL(1981) AND THE EQUATION $\eta = .0395(D_{50})^{1/6}$; (D in ft)

(b) PEAK Q FOR MISC ROAD DRAINAGE ASSUMED TO BE 1.0 cfs BASED ON SIMILAR DISTURBED AREAS

(c) SEE TABLE 7.2-10 FOR SUMMARY OF DIVERSION DITCH CALCULATIONS.

DITCH CHARACTERISTICS

DITCH	CHANNEL SLOPE %	CONTRIBUTING WATERSHED	PEAK Q(cfs)	BANK AND BOTTOM DESC.	MANNING'S η (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	2 Min, 6 Av 14 Max	AD-3A, AD-5, AD-7	2.36	Soil, grouted half round culvert	0.03
D-4D	2 Min, 7 Av 17 Max	AD-14	0.05	Soil	0.03
D-5D	4 Min, 10 Max	AD-9	0.23	Soil	0.03
D-6D	2 Min, 4 Max	AD-3A, AD-5, AD-7,AD-9,AD-10 AD-12, AD-14	3.61	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	4.46	Soil, D_{50}=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	0.03
D-9D	4 Min, 10 Max	AD-15	1.25	Soil	0.03
D-10D	7 Min, 50 Max	AD-6, AD-3B, AD-2C	0.93	D_{50}=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	0.05 Av.	AU-4A	0.54	Soil	0.03

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-11D

Solve For Actual Depth

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.015
Discharge.....	0.54 cfs

Computed Results:

Depth.....	0.28 ft
Velocity.....	2.95 fps
Flow Area.....	0.18 sf
Critical Depth....	0.31 ft
Critical Slope....	0.0075 ft/ft
Percent Full.....	28.30 %
Full Capacity.....	3.09 cfs
QMAX @.94D.....	3.32 cfs
Froude Number.....	1.16 (flow is Supercritical)

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-16U

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	1.0000 ft/ft
Manning's n.....	0.024
Discharge.....	1.50 cfs

Computed Results:

Depth.....	0.17 ft
Velocity.....	13.86 fps
Flow Area.....	0.11 sf
Critical Depth....	0.46 ft
Critical Slope....	0.0167 ft/ft
Percent Full.....	11.18 %
Full Capacity.....	56.90 cfs
QMAX @.94D.....	61.21 cfs
Froude Number.....	7.22 (flow is Supercritical)

Minimum required riprap conditions = 30" m.d. riprap at outlet

NOTE: At slope = 0.05 ft/ft, Flow depth = **0.35** ft.

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-17U

Solve For Actual Depth

Given Input Data:

Diameter.....	1.25 ft
Slope.....	1.0000 ft/ft
Manning's n.....	0.024
Discharge.....	1.37 cfs

Computed Results:

Depth.....	0.17 ft
Velocity.....	13.81 fps
Flow Area.....	0.10 sf
Critical Depth....	0.46 ft
Critical Slope....	0.0180 ft/ft
Percent Full.....	13.51 %
Full Capacity.....	34.99 cfs
QMAX @.94D.....	37.64 cfs
Froude Number.....	7.15 (flow is Supercritical)

Minimum required riprap conditions = 30" m.d. riprap at outlet

NOTE: At slope = 0.05 ft/ft, Flow depth = 0.35 ft.

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-18U

Solve For Actual Depth

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.2400 ft/ft
Manning's n.....	0.024
Discharge.....	0.20 cfs

Computed Results:

Depth.....	0.10 ft
Velocity.....	4.85 fps
Flow Area.....	0.04 sf
Critical Depth....	0.18 ft
Critical Slope....	0.0199 ft/ft
Percent Full.....	10.06 %
Full Capacity.....	9.45 cfs
QMAX @.94D.....	10.17 cfs
Froude Number.....	3.26 (flow is Supercritical)

Minimum required riprap conditions = 3" m.d. riprap at outlet

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-19U

Solve For Actual Depth

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.2400 ft/ft
Manning's n.....	0.024
Discharge.....	0.17 cfs

Computed Results:

Depth.....	0.09 ft
Velocity.....	4.62 fps
Flow Area.....	0.04 sf
Critical Depth....	0.17 ft
Critical Slope....	0.0202 ft/ft
Percent Full.....	9.31 %
Full Capacity.....	9.45 cfs
QMAX @.94D.....	10.17 cfs
Froude Number.....	3.23 (flow is Supercritical)

Minimum required riprap conditions = 3" m.d. riprap at outlet

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-20U

Solve For Actual Depth

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.2400 ft/ft
Manning's n.....	0.024
Discharge.....	0.14 cfs

Computed Results:

Depth.....	0.08 ft
Velocity.....	4.35 fps
Flow Area.....	0.03 sf
Critical Depth....	0.15 ft
Critical Slope....	0.0206 ft/ft
Percent Full.....	8.50 %
Full Capacity.....	9.45 cfs
QMAX @.94D.....	10.17 cfs
Froude Number.....	3.19 (flow is Supercritical)

Minimum required riprap conditions = 3" m.d. riprap at outlet

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-15U

Solve For Actual Depth

Given Input Data:

Diameter.....	1.00 ft
Slope.....	0.2000 ft/ft
Manning's n.....	0.024
Discharge.....	0.25 cfs

Computed Results:

Depth.....	0.12 ft
Velocity.....	4.86 fps
Flow Area.....	0.05 sf
Critical Depth....	0.21 ft
Critical Slope....	0.0196 ft/ft
Percent Full.....	11.69 %
Full Capacity.....	8.63 cfs
QMAX @.94D.....	9.28 cfs
Froude Number.....	3.03 (flow is Supercritical)

Minimum Required riprap conditions = 3" m.d. riprap at outlet

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-8U

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.1300 ft/ft
Manning's n.....	0.015
Discharge.....	0.35 cfs

Computed Results:

Depth.....	~~0.11 ft~~
Velocity.....	6.08 fps
Flow Area.....	~~0.06 sf~~
Critical Depth....	0.22 ft
Critical Slope....	0.0071 ft/ft
Percent Full.....	7.27 %
Full Capacity.....	32.82 cfs
QMAX @.94D.....	35.31 cfs
Froude Number.....	3.94 (flow is Supercritical)

Existing Riprap OK

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: CULVERT ADEQUACY

Comment: CULVERT C-1U

Solve For Actual Depth

Given Input Data:

Diameter.....	2.50 ft
Slope.....	0.7300 ft/ft
Manning's n.....	0.024
Discharge.....	3.81 cfs

Computed Results:

Depth.....	0.25 ft
Velocity.....	15.33 fps
Flow Area.....	0.25 sf
Critical Depth....	0.64 ft
Critical Slope....	0.0142 ft/ft
Percent Full.....	9.81 %
Full Capacity.....	189.83 cfs
QMAX @.94D.....	204.20 cfs
Froude Number.....	6.61 (flow is Supercritical)

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CULVERT CHARACTERISTICS

Culvert	Dia (in.)	Type	Contributing Watersheds	Peak Q(cfs)	Slope (ft/ft)	Outlet Condition
C-1U	30	CMP	AU-3, AU-4, AU-4A, AU-5	3.81	0.12 0.73	Bedrock
C-2U	12	CMP	AU-11	0.09	0.08	Soil
C-3U	12	CMP	AU-6, AU-7, AU-11	2.20	0.05	4" rip-rap
C-4U	12	CMP	AU-8, AU-9	1.32	0.05	4" rip-rap
C-5U	12	CMP	AU-8, AU-9, AU-15	1.45	0.05	4" rip-rap
C-6U	12	CMP	AU-6, AU-7, AU-11, AU-13, AU-14	2.65	0.05	4" rip-rap
C-7U	12	CMP	AU-12	0.34	0.05	6" rip-rap
C-8U	18	Flexible CMP, RCP	AU-2, AU-3 AU-4, AU-5	4.00	0.13	12" rip-rap
C-9U	60	stl pipe	Bear Creek[b]	108.53	0.06	48" rip-rap
C-10U	60	RCP	Bear Creek[b]	108.53	0.06	48" rip-rap
C-11U	18	CMP	AU-16	4.92	0.10	6" rip-rap
C-12U	24	CMP	AU-17	3.29	0.04	6" rip-rap
C-13U C-13aU	15	CMP	misc. road drainage	1.00	0.06	3" rip-rap
C-14U	60	CMP	Bear Creek	108.53	0.06	48" rip-rap
C-15U	12	CMP	AU-2C	0.25	0.20	Bedrock
C-16U	18	CMP flexible	AU-1B, AU-2 AU-2A, AU-2B	1.50	0.05 1.00	36" m.d. Rock in Channel
C-17U	15	CMP flexible	AU-1, AU-1A AU-1C	1.37	0.05 1.00	Bedrock
C-18U	12	CMP	AU-1A, AU-1C partial	0.20	0.24	3" rip-rap
C-19U	12	CMP	AU-1A, AU-1C partial	0.17	0.24	3" rip-rap
C-20U	12	CMP	AU-1A	0.14	0.24	3" rip-rap
C-21U	12	CMP	AU-1	0.72	0.06	42" m.d. Rock
C-22U	15	CMP flexible	AU-2	0.30	0.05 1.00	96" m.d. Rock in Channel
C-23U	15	CMP flexible	AU-2A	0.22	0.05 1.00	18" m.d. Rock in Channel
C-24U	15	CMP flexible	AU-2B	0.55	0.05 1.00	18" m.d. Rock in Channel

PEAK
HYDROGRAPH GENERATION PROGRAM

INPUT SUMMARY FOR W.S.: AU-4

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 76
Precip. Depth = 1.50 in	Time of Conc. = 0.0930 hr
Duration = 6.00 hr	Area = 7.52 ac

OUTPUT SUMMARY

Runoff depth = 0.1873 in
Initial Abstraction = 0.6316 in
Peak Flow = 0.97 cfs (0.1273 iph)
At T = 2.53 hrs

INPUT SUMMARY FOR W.S.: AU-4A

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 83
Precip. Depth = 1.50 in	Time of Conc. = 0.0440 hr
Duration = 6.00 hr	Area = 1.46 ac

OUTPUT SUMMARY

Runoff depth = 0.3788 in
Initial Abstraction = 0.4096 in
Peak Flow = 0.54 cfs (0.3662 iph)
At T = 2.51 hrs

PEAK
HYDROGRAPH GENERATION PROGRAM

INPUT SUMMARY FOR W.S.: AU-3

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 76
Precip. Depth = 1.50 in	Time of Conc. = 0.0350 hr
Duration = 6.00 hr	Area = 2.17 ac

OUTPUT SUMMARY

Runoff depth = 0.1873 in
Initial Abstraction = 0.6316 in
Peak Flow = 0.33 cfs (0.1509 iph)
At T = 2.51 hrs

INPUT SUMMARY FOR W.S.: AU-3A

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 76
Precip. Depth = 1.50 in	Time of Conc. = 0.0150 hr
Duration = 6.00 hr	Area = 0.27 ac

OUTPUT SUMMARY

Runoff depth = 0.1873 in
Initial Abstraction = 0.6316 in
Peak Flow = 0.04 cfs (0.1605 iph)
At T = 2.50 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. = 0.0270 hr
Duration = 6.00 hr	Area = 1.14 ac

OUTPUT SUMMARY

Runoff depth = 0.3788 in
Initial Abstraction = 0.4096 in
Peak Flow = 0.43 cfs (0.3741 iph)
At T = 2.50 hrs

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

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 83
Precip. Depth = 1.50 in	Time of Conc. = 0.0350 hr
Duration = 6.00 hr	Area = 1.37 ac

OUTPUT SUMMARY

Runoff depth = 0.3788 in
Initial Abstraction = 0.4096 in
Peak Flow = 0.51 cfs (0.3696 iph)
At T = 2.51 hrs

PEAK

HYDROGRAPH GENERATION PROGRAM

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

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 90
Precip. Depth = 1.50 in	Time of Conc. = 0.0170 hr
Duration = 6.00 hr	Area = 0.07 ac

OUTPUT SUMMARY

Runoff depth = 0.6835 in
Initial Abstraction = 0.2222 in
Peak Flow = 0.05 cfs (0.6755 iph)
At T = 2.50 hrs

INPUT SUMMARY FOR W.S.: AU-2

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 76
Precip. Depth = 1.50 in	Time of Conc. = 0.0750 hr
Duration = 6.00 hr	Area = 2.23 ac

OUTPUT SUMMARY

Runoff depth = 0.1873 in
Initial Abstraction = 0.6316 in
Peak Flow =0.30 cfs (0.1345 iph)
At T = 2.52 hrs

PEAK
HYDROGRAPH GENERATION PROGRAM

INPUT SUMMARY FOR W.S.: AU-1

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 76
Precip. Depth = 1.50 in	Time of Conc. = 0.0840 hr
Duration = 6.00 hr	Area = 5.49 ac

OUTPUT SUMMARY

Runoff depth = 0.1873 in
Initial Abstraction = 0.6316 in
Peak Flow = 0.72 cfs (0.1305 iph)
At T = 2.53 hrs

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

STORM:	WATERSHED:
Distribution = SCS Type 'B'	Curve Number = 76
Precip. Depth = 1.50 in	Time of Conc. = 0.0600 hr
Duration = 6.00 hr	Area = 1.02 ac

OUTPUT SUMMARY

Runoff depth = 0.1873 in
Initial Abstraction = 0.6316 in
Peak Flow = 0.14 cfs (0.1398 iph)
At T = 2.51 hrs

```
**********************************
* EARTHFAX ENGINEERING, INC.     *
*                                *
* HYDROGRAPH GENERATION MODEL    *
*   USING SCS CURVE NUMBER       *
*         METHODOLOGY            *
**********************************
```

IDENTIFICATION: AD-15

INPUT SUMMARY:

STORM:	WATERSHED:
DIST. = SCS TYPE B	AREA = 0.003 SQ. MI.
DEPTH = 1.50 IN.	CN = 90.0
DURATION = 6.0 HR.	TIME OF CONC. = 0.09 HR.

OUTPUT SUMMARY:

TOTAL RUNOFF DEPTH =	0.6835 INCHES
INITIAL ABSTRACTION =	0.2222 INCHES
PEAK FLOW =	1.25 CFS (0.6458 IN/HR)
TIME TO PEAK =	2.50 HOURS
RUNOFF VOLUME CHECK =	0.6848 INCHES

AMENDMENT TO
APPROVED Mining & Reclamation Plan
Approved, Division of Oil, Gas & Mining
By 92H date 7/9/93
SUPERSEDED

AUG 19 1996
7/92

UTAH DIVISION OIL, GAS AND MINING

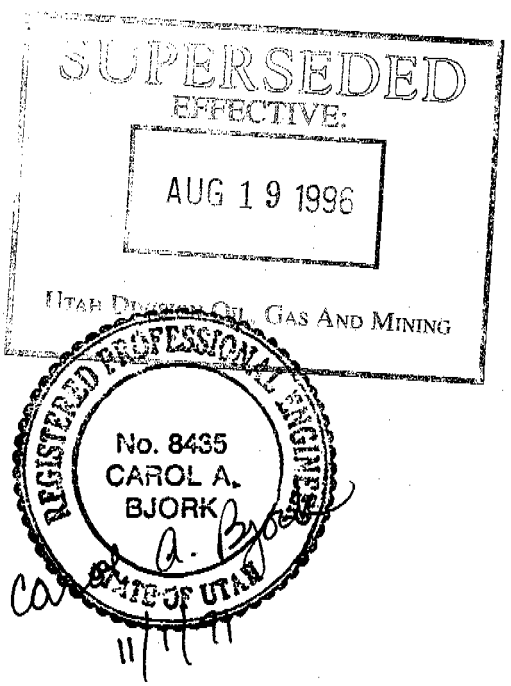
B.C.

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

Watershed	Peak Q (cfs)
AD-1A	0.48
AD-1B	0.29
AD-2A	0.15
AD-2B	0.41
AD-2C	0.10
AD-3A	0.23
AD-3B	0.12
AD-4	0.03
AD-5	0.30
AD-6	0.81
AD-7	1.83
AD-8	2.07
AD-9	0.23
AD-10	0.62
AD-11	0.65
AD-12	0.35
AD-13	1.23
AD-14	0.05
AU-1	0.72
AU-1A	0.14
AU-1B	0.43
AU-1C	0.51
AU-1D	0.05
AU-2	0.30
AU-2A	0.22
AU-2B	0.55
AU-2C	0.25
AU-2D	1.92
AU-3	0.33
AU-3A	0.04
AU-4	0.97
AU-4A	0.54
AU-5	2.51
AU-6	0.39
AU-7	1.72
AU-8	0.72
AU-9	0.60
AU-10	4.05
AU-11	0.09
AU-12	0.34
AU-13	0.10
AU-14	0.35
AU-15	0.13
AU-16	4.92
AU-17	3.29
AU-18	4.00
BEAR CREEK	108.53

Appendix 7-G

DIVERSION ADEQUACY CALCULATIONS



culverts C-18U, C-19U and C-20U. Riprap will be placed at these three outlets as shown in Table 7.2-11. The other culverts along the road will not require any disturbance at the outlets, but will use the premining conditions which exist.

The reclaimed channel designs for the Tank Seam Access Road are described in Appendix 7-H, and reflect the premining channel conditions. Premining channels consisted of eroded channels passing over large boulders embedded into the soil and/or bedrock. Reclamation activities for the channels will involve excavating the channel back to the premining configuration. The majority of the boulders in the premining channels will remain as markers which can be excavated back to. Photographs of the premining channels are contained in Appendix 7-H, and the profiles on Plate 7-8C reflect the premining profiles and descriptions.

Tank Seam Portal Pad & Access Road

Due to the remote location of the Tank Seam Portal Pad with respect to the sedimentation ponds, drainage from the portal area will be controlled using silt fences as shown on Plate 7-1E (BTCA Area "U"). The area, approx. 0.43 acres, will be used only for mine access and portal structures, and will not be used for storage. Ditch D-14D will convey the drainage from AU-4A, which includes the portal pad, to culvert C-12D. Two silt fences will be located prior to the inlet of C-12D. A third silt fence will be located at the base of the disturbed borehole area on each side of culvert C-12D above the outlet and will treat the area containing the enclosed belt and borehole structure.

Runoff will be conveyed past the Tank Seam Access Road via ditches and culverts (See Plates 7-1C and 7-1E). Runoff from the disturbed slopes and cut faces along the access road, designated as BTCA areas "H" through "T", will be treated with silt fences and/or erosion control matting as described in Appendix 7-K.

Culvert outlets will be located in places where the outlet conditions meet or exceed the minimum requirements, which are shown in Appendix 7-G. Table 7.2-11 shows the actual outlet conditions which will exist for each culvert. These conditions reflect existing conditions within the premining channels at the points where the culvert outlets will be located, with the exception of

Table 7.2-11 CULVERT CHARACTERISTICS (con't)

Culvert	Dia (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	0.40	10" rip-rap
C-3D	20	stl pipe	AD-3A	0.03	4" rip-rap
C-4D	21	CMP	AD-3A, AD-5 AD-7	0.18	9" rip-rap
C-5D	18	CMP	AD-9	0.08	soil
C-6D	12	CMP	AD-10	0.48	9" rip-rap
C-7D	18	CMP	Abandoned In Place		
C-8D	18	CMP	AD-3A, AD-5 AD-7	0.05	3" rip-rap
C-9D	18	CMP	See C-8D	0.05	3" rip-rap
C-10D	18	CMP	TIPPLE WASH HOSE	0.03	3" rip-rap
C-11D	12	stl pipe	AU-4A part	0.01	Soil
C-12D	12	CMP flexible	AU-4A	0.05 0.72	Grouted

Table 7.2-11 Culvert Charateristics

Culvert	Dia (in.)	Type	Contributing Watersheds	Slope (ft/ft)	Outlet Condition
C-1U	30	CMP flexible	AU-3, AU-4, AU-4A, AU-5	0.12 0.73	Bedrock
C-2U	12	stl pipe	AU-11	0.08	Soil
C-3U	12	CMP	AU-6, AU-7, AU-11	0.05	4" rip-rap
C-4U	12	CMP	AU-8, AU-9	0.05	4" rip-rap
C-5U	12	CMP	AU-8, AU-9, AU-15	0.05	4" rip-rap
C-6U	12	CMP	AU-6, AU-7, AU-11, AU-13, AU-14	0.05	4" rip-rap
C-7U	12	CMP	AU-12	0.05	6" rip-rap
C-8U	18	Flexible CMP, RCP	AU-2, AU-3 AU-4, AU-5	0.13	12" rip-rap
C-9U	60	stl pipe	Bear Creek[b]	0.06	48" rip-rap
C-10U	60	RCP	Bear Creek[b]	0.06	48" rip-rap
C-11U	18	CMP	AU-16	0.10	6" rip-rap
C-12U	24	CMP	AU-17	0.04	6" rip-rap
C-13U C-13aU	15	CMP	misc. road drainage	0.06	3" rip-rap
C-14U	60	CMP	Bear Creek	0.06	48" rip-rap
C-15U	12	CMP	AU-2C	0.20	Bedrock
C-16U	18	CMP flexible	AU-1B, AU-2 AU-2A, AU-2B	0.05 1.00	36" m.d. Rocks in Channel
C-17U	15	CMP flexible	AU-1, AU-1A AU-1C	0.05 1.00	Bedrock
C-18U	12	CMP	AU-1A, AU-1C partial	0.24	3" rip-rap
C-19U	12	CMP	AU-1A, AU-1C partial	0.24	3" rip-rap
C-20U	12	CMP	AU-1A	0.24	3" rip-rap
C-21U	12	CMP	AU-1	0.06	42" m.d. Boulders
C-22U	15	CMP flexible	AU-2	0.05 1.00	36" m.d. Boulder in Channel
C-23U	15	CMP flexible	AU-2A	0.05 1.00	18" m.d. Rocks in Channel
C-24U	15	CMP flexible	AU-2B	0.05 1.00	18" m.d. Rocks in Channel

Table 7.2-10 Summary of Diversion Ditch Calculations (cont)

DITCH	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	DEPTH (FT)	TYP SIDE SLOPE H:V	AV. MEASURED SLOPE %	CONTRIBUTING WATERSHED	REQ'D AV. RIP-RAP SIZE (IN.)
D-1U	2	3.33	0.67	1:1	2 Min 8 Max	AU-3, AU-5	Soil
D-2U	0	1.33	0.67	1:1	7 Min 10 Max	AU-6, AU-11	Soil
D-3U	1	2	0.5	1:1	4 Min 18 Max	AU-8	Soil
D-4U	1	4	1	1.5:1	1 Min 10 Av. 18 Max	AU-10	Soil Soil D_{50} 6"
D-5U	0	1	0.5	1:1	4 Min 13 Max	AU-15	Soil
D-6U	0	1.33	0.67	1:1	3 Min 6 Max	AU-14	Soil
D-7U	0	1.33	0.67	1:1	1 Min 16 Max	AU-12	Soil
D-8U	2	4	0.67	1:1	6 Av.	AU-1	Soil
D-9U	3	5	1	1:1	1 Min 6 Max	AU-16	Soil D_{50} 4"
D-10U	3	4	0.5	1:1	3 Min 10 Max	AU-17	Soil
D-11U	0	2	1	1:1	3 Min 8 Max	misc. road drainage	Soil
D-12U	0	3	1	1.5:1	3 Min 9 Max	AU-18	Soil D_{50} 4"
D-13U	0	2	1	1:1	2 Min 23 Max	misc. road drainage	Soil
D-14U	4	5.5	0.5	1.5:1	6 Min 66 Max	Sed Pond A Outlet	D_{50} 4" D_{50} 10"
D-15U	0	3	1	1.5:1	13 Av	AU-3	Soil
D-16U	0	3	1	1.5:1	12 Av	AU-2C	Soil
D-17U	0	3	1	1.5:1	10 Av	AU-1B	Soil
D-18U	0	3	1	1.5:1	13 Av	AU-1A, AU-1C	Soil
D-19U	0	3	0.5	1.5:1	12 Av	AU-1A, AU-1C part	Soil
D-20U	0	3	0.5	1.5:1	11 Av	AU-1A, AU-1C part	Soil
D-21U	0	3	1	1.5:1	10 Av	AU-1A	Soil
D-22U	0	3	1	1.5:1	4 Av	AU-1	Soil
D-23U	0	3	1	1.5:1	6 Av	AU-2B	Soil

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

Table 7.2-10 Summary of Diversion Ditch Calculations

DITCH	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	DEPTH (FT)	TYP SIDE SLOPE H:V	MEASURED 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_{50} 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_{50} 6"
D-8D	0	2	1	1:1	2 Min 7 Max	AD-13	Soil
D-8D Water Bar	0	2.67	0.67	2:1	3 Av.	AD-13	Soil
D-9D	0	2	1	1:1	4 Min 10 Max	AD-15	Soil
D-10D	1	3.33	0.67	1.5:1	7 Min 50 Max	AD-6,AD-3B,(part) AD-2B, AD-2C	D_{50} 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 Bar	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	0.05 Av	AU-4A	Soil

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

Table 7.2-9 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	0.09	3.70	0.48
AD-1B	76	0.037	2.12	0.29
AD-2a	76	0.04	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	
AD-8 lower	90	0.247	2.79	2.07
AD-9	90	0.069	0.35	0.23
AD-10 upper	90	0.026	0.30	
AD-10 lower	90	0.078	0.65	0.62
AD-11	95	0.011	0.69	0.65
AD-12 upper	90	0.020	0.22	
AD-12 lower	90	0.076	0.34	0.35
AD-13	91	0.106	1.78	1.23
AD-14	90	0.009	0.08	0.05
AD-15	90	0.09	2.1	1.25

Table 7.2-9 Summary of Storm Runoff Calculations for 10 Year 6 Hour Storm

WATERSHED	CURVE NUMBER CN	TIME OF CONCENTRA-TION (Hr)	DRAINAGE AREA (Acres)	PEAK DISCHARGE (CFS)
AU-1	76	0.167	34.92	3.68
AU-2	76	0.011	0.22	0.03
AU-3	76	0.053	1.43	0.21
AU-4	76	0.085	8.86	1.16
AU-5	76	0.104	20.14	2.51
AU-6	76	0.058	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
BEAR CREEK	76	0.60	1,728	108.53

SUPERSEDED
EFFECTIVE:
AUG 19 1996
UTAH DIVISION OIL, GAS AND MINING

AMENDMENT TO/92
APPROVED Mining & Reclamation Plan
Approved, Division of Oil, Gas & Mining
by pgl HS 92A date 8/7/92

DISCUSSION OF REPRESENTATIVE CROSS SECTIONS

Sediment Ponds "A" and "B"

Sediment pond sections show adequate volume of material available for recovery. See Section A-A for sediment pond "B" and Section B-B for sediment pond "A".

Upper Storage Pad

Sections C-C, D-D, and J-J (upper storage pad area) indicate enough material to recover approx. twenty ft. of highwall. The cut and fill areas of sections C-C and D-D are basically balanced. As seen in section J-J some additional material will need to be hauled from below for complete highwall recovery.

Additional material required from below:
(388 sq ft - 250 sq ft) x (320 ft) = 44,160 cu ft = 1636 cu yd

Construction of the Tank Seam Access Road will result in placement of additional material on the storage pad (section 0+00, 1+00, 2+00 and 3+00, Appendix 3-H). This material will be used for reclamation of the Tank Seam Access Road, and will not influence the upper storage pad reclamation.

Portal Pad Area and Road

Sections E-E and F-F (portal pad area & road) show enough material for approx. twenty five ft. of recovery. Section F-F is basically balanced. As seen in section E-E some additional material will need to be hauled from below for complete highwall recovery.

Additional material required from below:
(350 sq ft - 250 sq ft) x (340 ft) = 34,000 cu ft = 1260 cu yd

Portal Access and Tipple Access Roads

Sections G-G and H-H (typical road profiles) show enough material to recover approximately ten ft. of highwall. Section G-G is basically balanced. In the area of section H-H the highwall varies from 0 to 35 ft with an average of 16 ft as shown on page 3L-23. Section H-H shows typical recovery of a 16 ft (average) highwall.

Additional material required from below:
(165 sq ft - 140 sq ft) x (1500 ft) = 37,500 cu ft = 1389 cu yd

Total volume required from below:

1636 + 1260 + 1389 = 4285 cu yd

Mass balance calculations of sections 1-1 through 7-7 show excess material available from below equal to 4,120 cu yd (see table 3L-2 page 3L-5) which is approx. equal to that required above. The cut and fill angles can be varied slightly to provide the required material for highwall recovery above.

Tank Seam Access Road and Portal Pad

Appendix 3-H presents cross sections 0+00 through 30+00 for the construction of the Tank Seam Access Road and portal pad. Reclamation will involve restoring the road and pad area approximately to the premining cross section (designated as "existing" in Appendix 3-H). The total volume of fill material to be replaced in the road and pad area si 20,551 cu yd. This volume was determined using Quicksurf v. 4.0, a 3-D modeling software program. 13,288 cu yd will be hauled from the fill area at section 8+00 and 9+00 and the upper storage pad to reclaim the upper section of the road and the portal area.

meet the design specifications of the permanent ditches will be maintained along the pilot road, with silt fences placed just above the culvert inlets treating any runoff. Approximate silt fence locations are shown on Plates 7-1C and 7-1E. Upon completion of construction, final as-built contours will be submitted to the Division.

Final crowning of the road and installation of permanent ditches will be completed following initial road and pad contouring. The approximate proposed road and pad contours are shown on Plates 2-4C and 2-4E.

A slope stability analysis of the cut slopes and fill areas, as well as some discussion on the construction methodology, is on page 3H-44 following the cross sections.

Upon completion of regrading activities, interim stabilization of the cut slopes will be accomplished through hydroseeding as described in Appendix 3-G. Cut slopes will be seeded using the seed mix and mulch described in Tables 3G-1 and 3G-2. Downslopes will be seeded by hand prior to the placement of erosion control matting using the permanent seed mix shown in Table 9.5-3. This seed mix will be used in order to establish shrubs as well as grasses to aid in interim stability.

Tipple Access Road

This road is 600 ft long, and was constructed to provide access to the Coal Preparation Facility. The road has an overall slope of approx 12 pct, and does not exceed 25 pct at any point.

Shop Road

This road is 160 ft long, and provides access to the Shop Pad. The road has an overall slope of approx 1 pct, and does not exceed 5 pct at any point.

Tank Seam Access Road

This road is approx 3,000 ft long, and provides access to the Bear Canyon #2 Mine, located in the Tank Seam. The road has an overall slope of approx 9 pct, and does not exceed 16 pct at any point. Construction of this road is discussed in Appendix 3-H.

The Tank Seam Access Road will be maintained in accordance with the requirements of this Appendix. During snow storms, snow will be plowed to and stored against the cut slope of the road along the ditches, in order to prevent saturation of fill outslopes along the road due to snow melt.

ANCILLARY ROADS

The only Ancillary Road on the permit area is a jeep trail that was constructed pre-law, probably as a cattle trail. This road is shown on Plate 2-4C. The road is blocked off, is not within the disturbed area, and is not used; therefore, no maintenance or reclamation plan is proposed for this trail.

UNDER CONSTRUCTION

Photo #19 Tank Seam Fan

UNDER CONSTRUCTION

Photo #20 Tank Seam Borehole Structure

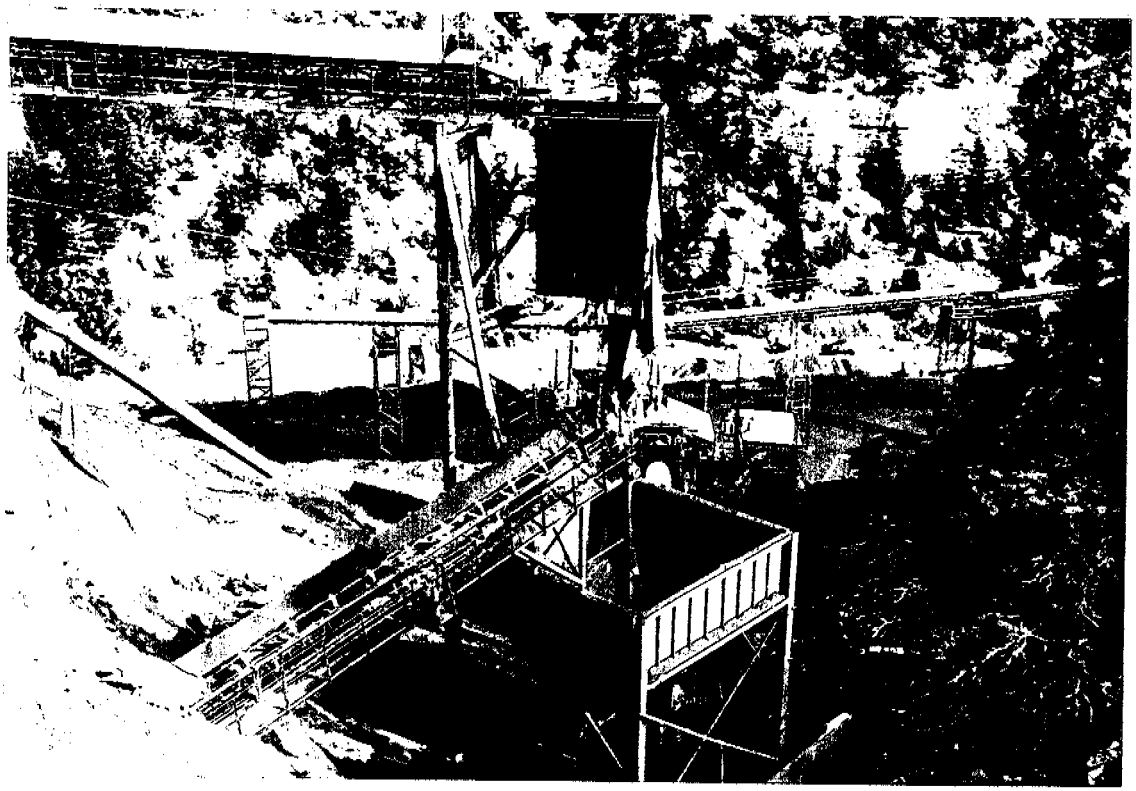


Photo #9 Cross Conveyor

REMOVED

Photo #10

EXISTING STRUCTURES

Table 3A-1 lists each structure and construction dates. Reclamation is expected in 2014.

Table 3A-1 Existing Structures

Existing Structure	Construction Dates Starting	Completion	Photo #
Fuel Tanks	10/83	6/84	2
Truck Loading Facility	9/82	4/83	3
Shop - Bathhouse - Warehouse	10/83	9/84	4
Added Machine Shop	11/89	12/89	5
Oil Slack Loading Facility	4/83	7/83	3
Storage & Stacking Facility	6/80	4/84	3
Coal Processing Facility	4/80	12/85	6
Non-Coal Storage Yard	3/80	9/84	7
Transformer Sub-Station	4/80	6/80	8
Conveyor Structures	3/80	6/80	3
Cross Conveyor	7/89	9/89	9
Sales Receiving-Scale Office	6/84	10/87 (Phase I) 10/92 (Phase II)	Fig 3A-1 1
Coal Storage Bin	4/87	10/87	11
Powder Magazine	9/82	containerized	7
Lump Coal Facility	10/83	12/85	6
Water Tanks & System	8/82	11/82	13
Mine Fan	9/82	11/82	14
Lump Coal Storage Pad	8/92	10/92	15
Equipment Wash Pad	8/92	10/92	16
Shower House	5/93	7/94	17
Antifreeze Storage Tank	12/93	1/94	18
Tank Seam Fan	7/95	8/95	19
Tank Seam Borehole Structure	7/95	8/95	20

The location of each of the listed structures is shown on Plates 2-4, Surface Facilities. Co-Op has sought interim approval for each structure in the course of construction, the hydrologic safeguards have been implemented, topsoil removed and stored, interim revegetation completed where earthwork is at final grade, and health and safety standards implemented as per MSHA standards.

All of the structures are to be reclaimed during reclamation (year 2012) and are detailed in Section 3.6.6 and 3.6.7. In order to consolidate all previous plan submittals, current photographs were taken 5/90 and are attached herein. A brief description of each facility follows under "Facility Description".

FACILITY DESCRIPTIONS

1. Sales - Receiving - Scales Office. Containing parts warehouse, parts receiving, scale office, mine offices, and security guard quarters. See Figure 3A-1, and Photo #1.

2. Fuel Tanks. There are three - 10,000 gal. fuel storage tanks installed at the downslope of the shop area. These tanks are contained within a natural berm of the slope with the only access by way of the disturbed drainage ditch leading directly to the sediment pond. The pond is designed to contain any spillage which could foreseeably occur. The area will be posted " No Smoking " and fire extinguishers are in place, all MSHA safety standards will be adhered to. See Photo #2.

3. Truck Loading Facility. The truck loadout is a conveyor system designed to load tractor-trailer trucks from any of the storage areas. It is electrically manipulated so as to minimize spillage. As each unit is loaded, the area is cleaned of spilled coal on a daily basis, and all runoff is contained. See Photo #3.

4. Shop - Bathhouse - Warehouse. The shop building with attached bathhouse is for servicing of both underground and surface equipment. Major and minor repairs are implemented and it is used to inventory parts to be utilized on a continual roll over basis. The buildings are heated with a coal furnace and are equipped with standard heavy equipment handling implements such as wenches, welders, etc. See Photo #4. A new machine shop (30 ft by 40 ft) was added in 1989 to better facilitate mine related repairs. See Photo #5.

5. Oil Slack Loading Facility. The oil slack loadout is designed to handle oiled stoker coal, primarily for non-commercial clients, it maintains a 20,000 ton storage bin with an electrical controlled auger to load small tonnages. The bin is fed via of a hopper and conveyor which is loaded by way of an end loader. See photo #3.

6. Coal Storage Area and Stacking Facility. The coal storage yard (Phase 1) is equipped with a system of conveyors wherein coal can be segregation according to size and is of a short

term nature where the piles are constantly being consumed and replenished. The area also contains two 6,000 gal oil storage tanks which are used to store oil for stoker coal. All run-off is controlled, and passes through the primary sediment pond. See Photo #3. A seasonal coal storage area (approx .5 acres) is located east of the Sales Office. See Photo #15. Run-off flows to sediment pond "B".

7. Coal Processing Facility. This facility is primarily a coal segregation site where the various sizes of coal can be separated and then stacked in the designed locations. This area is controlled run-off and is passed through the sediment pond. See Photo #6.

8. Non-Coal Storage Yard. This area is utilized for all material which is in storage on the property with projected use and or salvage value. Historically, the site has been utilized for this purpose and is designed with hydrologic safeguards to protect for this purpose and is designed with hydrologic safeguards to protect the watershed. See Photo #7.

9. Transformer Substation. This facility is the concern of the mine's power supplier, Utah Power & Light. However, Co-Op does maintain the fence, and enforces health and environmental safeguards. The structure is pictured on Photo #8.

10. Conveyor Structures. These conveyors are the route by which the coal exits the mine to the storage piles and loadouts. Photo #3 pictures the conveyors and load out facilities from below.

Cross Conveyor. In order to reduce problems encountered with the use of the Coal Recovery bin (i.e. fires and coal fine movement) a cross-over belt from the Blind Canyon Seam conveyor to the Hiawatha Seam conveyor was installed in 1989, bypassing the bin. See Photo #9.

11. REMOVED

12. Caretakers Residence. There is not a caretakers Residence in the Permit area at the Present time.

13. Coal Storage Bin. Consists of 20 ft X 20 ft surge bin to receive coal from the underground conveyors prior to traveling to the crusher. See Photo #11.

14. Powder Magazine. Consists of a storage shed. See Photo #7.

15. Lump Coal Facility. Consists of storage bin & loading conveyor. See Photo #6.

16. Removed

17. Water Tanks. Surge tanks - part of bathhouse water supply system. See Photo #13.

18. Mine Fan. Mine Ventilation fan - MSHA approved has safety guards in place. See Photo #14.

19. Lump Coal Storage Pad. Consists of a concrete pad and misc. concrete retaining walls. See Photo #15

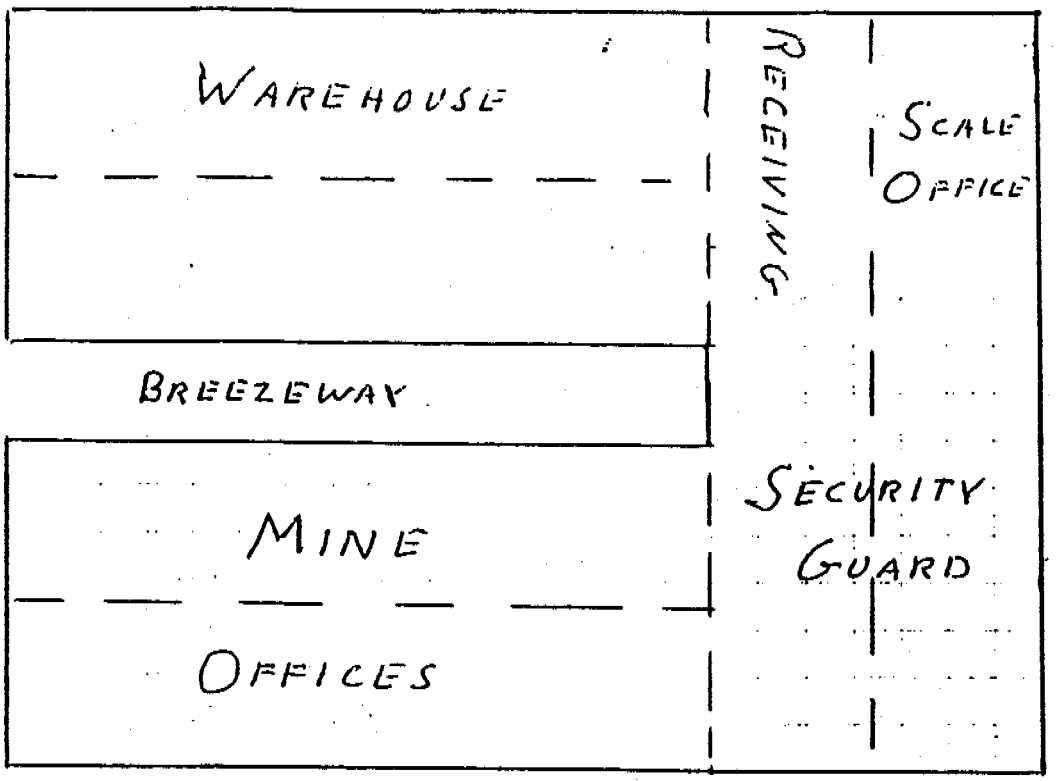
20. Equipment Wash Pad. Consists of a concrete pad with a grease and oil trap.

21. Shower House. Consists of a two story masonry block structure that houses employee showers, training classrooms and offices. See Photo #16. The waste disposal system is discussed in Appendix 3-J.

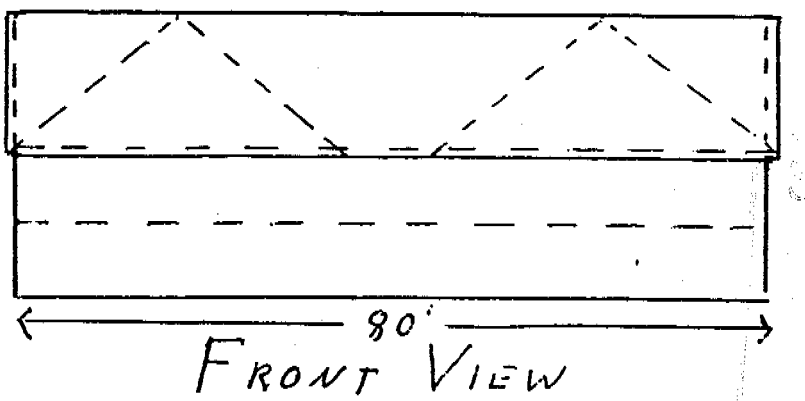
22. Antifreeze Storage Tank. Consists of 2,000 gal storage tank. Antifreeze solution is used to spray truck hoppers during periods of cold weather to prevent coal from freezing in transit. Tank is enclosed by a metal structure to hold entire capacity of tank in the event of a spillage.

23. Tank Seam Fan. Tank Seam Ventilation Fan - MSHA approved, has safety guards in place. See photo #18.

24. Tank Seam Borehole Structure. Metal structure fully enclosing borehole and conveyor - conveys coal from Tank Seam mine to the Blind Canyon Seam Mine. See photo #19.



PLAN VIEW - UPPER LEVEL



FRONT VIEW

Fig 3A-1 Sales Receiving-Scale Office

Using the bucket of the backhoe, the surface will then be ripped and scarified, creating horizontal pockets approx. 8 to 12 inches deep to aid in water retention for revegetation. The bucket will also spread the topsoil at the top of the cut in a manner to blend the reclaimed slope with the natural slope above.

As backfilling progresses down the road, seed and mulch will be placed on the completed slopes behind backfilling in accordance with Section 3.6.5.1. following mulching, erosion control matting similar to Excelsior S-2 or equivalent will be placed on the slopes by hand, and stapled to the reclaimed surfaces.

Reclamation will progress in this manner to the bottom of the Tank Seam Access Road.

e. Revegetation

Drill Seeding (Section 9.5) 16 acres x $891.00/acre		$14,256.00
Hydroseeding (Section 9.5) 9.7 acres x $1,667.00/acre		$16,169.90
Riparian Area Planting (Section 9.5) 1 acre x $2,210.00/acre		$ 2,210.00
Install Matting (Section 9.5) 3.7 acres x $3,103.75/acre		$11,483.88
	Cost Total	$44,119.78

f. Monitor Well Plugging

Approx. 4 in diam x 40 ft deep		
1 yds cement @ $51.00/yd		$ 51.00
4 hrs labor @ $15.83/hr		$ 63.32
	Cost Total	$ 114.32

g. Maintenance and/or Monitoring for Vegetation, Erosion, and Subsidence

(Bond for 10-year bond liability period)

Vegetation - field survey, sampling, analysis and report writing @ $1,000.000/day + $80.00/day vehicle expense (Mt. Nebo Scientific), 3 days/yr		$3,240.00/yr
Erosion - 1 day to field survey @ $141.44/day		141.44/yr
Subsidence 2 day field survey @ $141.44/day 1 day certified surveyor @ $250/day		532.88/yr
	Subtotal	$3,914.32/yr
Cost Total	10 yrs x $3,914.32 =	$39,143.20

h. Hydrology Monitoring, Quarterly

Labor - 4 days annually @ $126.64/day		$ 506.56/yr
Laboratory work - per Commercial Testing and Engineering Co. Huntington, Utah ($87.73/sample)(7 samples) - $614.11/quarter x 4		2,456.44/yr
	Subtotal	$2,963.00/yr
Cost Total	10 yrs x $2,963.00 =	$29,630.00

i. Supervision - 21.0 weeks @ $707.20/week $14,851.20

j. Mobilization and Demobilization of $ pieces of equipment @ $500 each $2,500.00

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

SOIL PLACEMENT

Areas	Earth Moved	Cu Yds	Equipment Used	Cost/hr	Time (hrs)	Cost
Tank Seam Access Road & Portal Pad	Cut	20,551	BH-235	$104.45	62.28	$ 6,505.15
	Fill	20,551				
	Hauled	13,288*				
Upper Storage Pad	Cut	6,447	BH-235	$104.45	24.49	$ 2,557.98
	Fill	8,083				
Portal Pad Area & Road	Cut	6,648	BH-235	$104.45	23.96	$ 2,502.62
	Fill	7,908				
Portal Access Road	Cut	7,778	BH-235	$104.45	27.78	$ 2,901.62
	Fill	9,167				
Lower Road to Switchback	Cut	4,028	BH-235	$104.45	12.21	$ 1,275.33
	Fill	4,028				
Tipple Access Road	Cut	1,167	BH-235	$104.45	3.54	$ 369.75
	Fill	1,167				
Coal Storage Pad	Cut	19,453	BH-235	$104.45	58.95	$ 6,157.33
	Fill	19,453				
	Excess Cut	4,120**				
Scale House	Cut	711	D9 Cat	$118.97	1.38	$ 164.18
	Fill	711				
Sediment Pond "A"	Cut	1,556	D9 Cat	$118.97	3.02	$ 359.29
	Fill	1,556				
Sediment Pond "B"	Cut	1,167	D9 Cat	$118.97	2.27	$ 270.06
	Fill	1,167				
Sediment Pond "C"	Cut	324	D9 Cat	$118.97	0.63	$ 74.95
	Fill	324				
Shower House	Cut	3,426	D9 Cat	$118.97	6.65	$ 791.15
	Fill	3,426				
Totals	Cut	77,376			227.16	$23,929.41
	Fill	77,541			(28.40 days)	

*See Appendix 3-L and the following page.

**Excess Cut will be hauled from the Coal Storage Pad to the Upper Storage Pad, Portal Pad Area & Road, and Portal Access Road, as discussed in Appendix 3-L.

Hauling

Where possible 10 yd dump trucks will be loaded with the 980 loader, otherwise they will be loaded with the BH-235.

Round trip time for 1 truck = (load time) + (dump time) + 2(haul time):
980 Loader load time = 2 cycles/(106 cycles/hr) = 1.13 min.
BH-235 load time = 5 cycles/(165 cycles/hr) = 1.82 min.
Average truck dump time = 4.75 min.
Round trip time (with 980 Loader):
= 1.13 + 4.75 + 2(haul time) = 5.88 min. + 2(haul time)
Round trip time (with BH235):
= 1.82 + 4.75 + 2(haul time) = 6.57 min. + 2(haul time)

Tank Seam Access Road & Portal Pad Area

Of the total soil to be moved (20,551 cu yd) 13,288 cu yd will need to be hauled from one part of this area to another as needed.

Approx. 70% will be loaded with the 980 Loader and 30% with the BH-235.
Avg. Distance = 0.26 miles @ Avg. speed of 7 MPH; haul time = 2.23 min.

Round trip time for 1 truck load (with 980 Loader):
= 5.88 + 2(2.23) = 10.34 min.
Round trip time for 1 truck load (with BH-235):
= 6.57 + 2(2.23) = 11.03 min.

Number of loads = 13,288 cu yd/10 cu yd truck = 1,329 loads
980 Loader time = (10.34 min.)(hr/60 min)(0.7x1,329 loads)/3 trucks = 53.44 hrs
= 6.68 days (concurrent with soil placement)
BH-235 time = (11.03 min)(hr/60 min)(0.3x1,329 loads)/3 trucks = 24.43 hrs
= 3.05 days

980 Loader cost = (102.11/hr)(53.44 hrs) =	5,456.76
BH-235 cost = (104.45/hr)(24.43 hrs) =	2,551.71
Dump Truck cost = (43.30/hr)(53.44 hrs + 24.43 hrs)(3 trucks) =	10,115.31
	$18,123.78

Excess Cut From Coal Storage Pad to Upper Areas:

Avg. Distance = 0.7 miles @ avg. speed of 7 MPH; haul time = 6.00 min.
Round trip time for 1 truck load (980 Loader):
= 5.88 + 2(6.00) = 17.88 min.

Number of loads = 4,120 cu yd/10 cu yd truck = 412 loads
Hauling time = (17.88 min.)(hr/60 min)(412 loads)/3trucks = 40.93 hrs
= 5.12 days (concurrent with soil placement)

980 loader cost = (102.11/hr)(40.93 hrs) =	$ 4,179.36
Dump Truck cost = (43.30/hr)(40.93 hrs)(3 trucks)=	$ 5,316.81
	$ 9,496.17

Cost Subtotal	$27,619.95
Time Subtotal	3.05 days

Hauling Material to Fill Borehole

10,560 cu yd will need to be hauled from the Blind Canyon Seam portal.

Round trip time:
Loader haul time = 0.3 miles @ 7 mph x 2 loads = 5.14 min. to haul
Loader cycle time = 2 cycles/(106 cycles/hr) = 1.13 min. to load
Truck haul time = 1.1 miles @ 7 mph = 9.43 min.
Total cycle time = 15.70 min.

Number of loads = 10,560 cu yd/10 cu yd truck = 1,056 loads

980 Loader time = (15.7 min)(hr/60 min)(1,056 loads)/3 trucks = 92.1 hrs.
= 11.5 days (concurrent with soil placement)

980 Loader cost = (102.11/hr)(92.1 hrs) =	9,404.33
Dump Truck cost = (43.30/hr)(92.1 hrs)(3 trucks) =	11,963.79
	$21,368.12

Cost Total	$21,368.12
Time Total	11.5 days

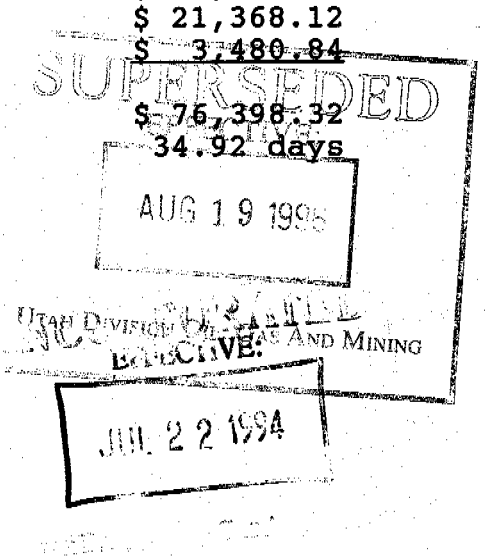
Ripping (Cat - D9)

Rip top 14 in of soil to prepare for revegetation.
Area to be ripped (See table 8.9-1) = 22.34 - 1.27 (ball park) = 21.07 acres
+ 2.7 (new road, etc. for tank seam) = 23.77 acres

Volume = (23.77 acres)(43,560 sq ft/acre)(14/12)(cu yd/27 cu ft) = 44,740 cu yd

Time = 44,740 cu yd/(1,610 cu yd/hr) = 27.8 hrs = 3.47 days
Cost = (27.8 hrs)($125.21/hr) = $3,480.84

Soil Placement Cost Subtotal =	$ 23,929.41
Hauling Excess Cut Cost Subtotal =	$ 27,619.95
Filling Borehole Cost Subtotal =	$ 21,368.12
Ripping Cost Subtotal =	$ 3,480.84
Cost Total	$ 76,398.32
Time Total	34.92 days



c. **Soil Placement and Ripping**

Soil Placement Volume Summary:

Tank Seam Access Road & Portal Pad

See Appendix 3-L.

Cut Subtotal	20,551 cu yds
Fill Subtotal	20,551 cu yds

Upper Storage Pad

See Appendix 3-L, Cross Sections C-C, D-D and J-J.

Section C-C	Cut (250 sq ft)x(130 ft)=32,500 cu ft=	1,204 cu yds
	Fill (250 sq ft)x(130 ft)=32,500 cu ft=	1,204 cu yds
Section D-D	Cut (513 sq ft)x(120 ft)=61,560 cu ft=	2,280 cu yds
	Fill (513 sq ft)x(120 ft)=61,560 cu ft=	2,280 cu yds
Section J-J	Cut (250 sq ft)x(320 ft)=80,000 cu ft=	2,963 cu yds
	Fill (388 sq ft)x(320 ft)=124,160 cu ft=	4,599 cu yds
	Cut Subtotal	6,447 cu yds
	Fill subtotal	8,083 cu yds

Portal Pad Area & Road

See Appendix 3-L, Cross Sections E-E and F-F.

Section E-E	Cut (250 sq ft)x(340 ft)=85,000 cu ft=	3,148 cu yds
	Fill (350 sq ft)x(340 ft)=119,000 cu ft=	4,408 cu yds
Section F-F	Cut (450 sq ft)x(210 ft)=94,500 cu ft=	3,500 cu yds
	Fill (450 sq ft)x(210 ft)=94,500 cu ft=	3,500 cu yds
	Cut Subtotal	6,648 cu yds
	Fill subtotal	7,908 cu yds

Portal Access Road

See Appendix 3-L, Cross Section H-H.

Section H-H	Cut(140 sq ft)x(1,500 ft)=210,000 cu ft=	7,778 cu yds
	Fill(165 sq ft)x(1,500 ft)=247,500 cu ft=	9,167 cu yds

Lower Road to Switchback

See Appendix 3-L, Cross Section K-K.

Section K-K	Cut(75 sq ft)x(1,450 ft)=108,750 cu ft=	4,028 cu yds
	Fill(75 sq ft)x(1,450 ft)=108,750 cu ft=	4,028 cu yds

Tipple Access Road

See Appendix 3-L, Cross Section G-G.

Section G-G	Cut(63 sq ft)x(500 ft)=31,500 cu ft=	1,167 cu yds
	Fill(63 sq ft)x(500 ft)=31,500 cu ft=	1,167 cu yds

Cost Subtotal $7,406.55
Time Subtotal 7.53 days

Building Enclosure for Tank Seam Belt Portal

020-604-0500 (Steel Building, includes disposal)
Volume = (12 ft)(12 ft)(12 ft) = 1,728 cu ft
Cost = (0.923)(0.16/cu ft)(1,728 cu ft) = $255.19
Time = 1,728 cu ft/(14,800 cu ft/day) = 0.12 days

Cost Subtotal $255.19
Time Subtotal 0.12 days

Remove Structures Cost Total = $63,815.97
Remove Structures Time Total = 38.3 days

Summary of Reclamation Cost Estimate

a.	Seal Portals and Backfill	$ 45,500.00
b.	Removal of Structures	$ 63,815.97
c.	Soil Placement and Ripping	$ 76,398.32
d.	Channel Restoration	$ 51,045.00
e.	Revegetation	$ 44,119.78
f.	Monitor Well Plugging	$ 114.32
g.	Maintenance and Monitoring of Subsidence, Vegetation and Erosion (10 yr bond liability Period)	$ 39,143.20
h.	Hydrology Monitoring (10 yr bond liability period)	$ 29,630.00
i.	Supervision (21.0 weeks)	$ 14,851.20
j.	Mobilization and Demobilization	$ 2,500.00
		$ 367,117.79
	5.1% Reclamation Management Cost	$ 18,723.01
	10 pct contingency (1990 dollars)	$ 36,711.78
		$ 422,552.58

Escalated Values	Escalation Factor
1991 - 427,919	1.27% (actual)
1992 - 437,376	2.21% (actual)
1993 - 448,485	2.54% (actual)
1994 - 457,500	2.01% (est)
1995 - 466,696	2.01% (est)
1996 - 476,076	2.01% (est)
1997 - 485,645	2.01% (est)
1998 - 495,407	2.01% (est)
1999 - 505,365	2.01% (est)
2000 - 515,522	2.01% (est)

A bond in the amount of $525,000 was posted on July 31, 1995.

3.3.14 Total Area for Surface Disturbance During Permit Term

The surface acreage within the disturbed area boundaries of the mine operation are shown on Plates 2-4 and summarized as follows:

Table 3.3-1 Surface Disturbance Summary

DESCRIPTION	Total acres	Pre-1977 acres	New acres
Ball Park Topsoil Pile	1.27	-0-	1.27
Lower Haul Road	1.6	1.6	0.0
Sed Pond B & Scale Office Pad	2.56	1.23	1.33
Sed Pond A	0.75	-0-	0.75
Main Pad Area	12.30	8.86	3.44
Portal Access Road	2.62	0.01	2.61
Blind Canyon Seam Portal Area	1.70	0.51	1.19
Upper Storage Pad	0.74	-0-	0.74
Shower House Pad	1.84	-0-	1.84
Tank Seam Access Road	2.25	-0-	2.25
Tank Seam Portal Pad	0.68	-0-	0.68
TOTAL	28.31	12.21	16.10

There are approx 17 total acres of Pre-1977 disturbed area in the permit area. Additional information concerning disturbed acreage is found in Section 8.7.

3.3.15 Detailed Construction Schedule

Construction starting and completion dates are listed in Table 3A-1, Appendix 3-A.

3.3.3 Surface Buildings and Structures

Surface structures consist of; shops, parts warehouse, bath house; truck scales, weighman office, mine offices; caretaker dwelling, mine run coal receiver bin, crushing and sizing structure, truck load out bins, stockpile towers, and conveyors to carry coal to storage and load out sites, etc. A complete list of surface buildings and structures is in Appendix 3-A and shown on Plate 2-4.

3.3.4 Coal Handling, Storage and Loading

Coal carried from the mine by conveyor belt to a receiver bin, conveyed to the sizing and crushing plant, the lump removed and diverted to the lump bin or seasonal storage area, the rest of the oversized crushed, and the coal sized to meet the various requirements of the different customers, then conveyed to the truck load out bins, or the stockpile area.

Coal will be transferred from the Tank Seam through a 4 foot drop tube to the Blind Canyon Seam of the Bear Canyon No. 1 Mine through a borehole. The borehole will be approximately 8 ft diameter, bored from the surface adjacent to the portal. The conveyor from the portal and the drop tube structure will be enclosed. Vibrators will be placed on the outside of the drop tube to prevent the wedging of coal in the tube.

CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528

Office (801) 687-2450
FAX (801) 687-5238
Coal Sales (801) 687-5777

March 26, 1996

Peter Hess
Utah Division of Oil, Gas & Mining
C.E.U. Box 169, 451 East 400 North
Price, Utah 84501-2699

#2
96A

Mr. Hess,

Re: Tank Seam/Bathhouse As-Builts, Bear Canyon ACT/015/025, Emery County, Utah

Enclosed are copies of an amendment to the Bear Canyon MRP. The amendment includes pages and plates which have been updated to reflect the as-built contours and facilities for the Tank Seam Access Road and Portal Pad and the Bathhouse Pad and Structure. The amendment also includes revisions to the drainage structures for the Tank Seam Access Road. Changes to the text have been shown using a redline/strikeout format to aid in the review. Pages and plates have been marked DRAFT to distinguish them from previously approved pages and plates.

Upon approval, 3 finalized copies will be sent to the Division. If you have any questions, please call Charles Reynolds at (801) 687-2450.

Thank You,

Wendell Owen

Wendell Owen,
Resident Agent

Enclosure(s)

Form 1 OGM - C1 (Last Revised 6/93)

File Folder # 3

APPLICATION FOR PERMIT CHANGE

Title of Change: Tank Seam / Bathhouse As-builts

Permit Number: ACT/015/025

Mine: Bear Canyon Mine

Permittee: Co-Op Mining Company

Description, include reason for change and timing required to implement:
Purpose is to update the MRP to show the As-built Information for the Tank Seam Road/Pad and the Bathhouse Pad Areas

☐ Yes	☒ No	1. Change in the size of the Permit Area? _____ acres ☐ increase ☐ decrease.
☒ Yes	☐ No	2. Change in the size of the Disturbed Area? 0.78 acres ☒ increase ☐ decrease.
☐ Yes	☒ No	3. Will permit change include operations outside the Cumulative Hydrologic Impact Area?
☐ Yes	☒ No	4. Will permit change include operations in hydrologic basins other than currently approved?
☐ Yes	☒ No	5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☒ No	6. Does permit change require or include public notice publication?
☐ Yes	☒ No	7. Permit change as a result of a Violation? Violation #
☐ Yes	☒ No	8. Permit change as a result of a Division Order? D.O.#
☐ Yes	☒ No	9. Permit change as a result of other laws or regulations? Explain:
☐ Yes	☒ No	10. Does permit change require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☒ No	11. Does the permit change affect the surface landowner or change the post mining land use?
☐ Yes	☒ No	12. Does permit change require or include collection and reporting of any baseline information?
☐ Yes	☒ No	13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	☒ No	14. Does permit change require or include soil removal, storage or placement?
☐ Yes	☒ No	15. Does permit change require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	☒ No	16. Does permit change require or include construction, modification, or removal of surface facilities?
☒ Yes	☐ No	17. Does permit change require or include water monitoring, sediment or drainage control measures?
☒ Yes	☐ No	18. Does permit change require or include certified designs, maps, or calculations?
☐ Yes	☒ No	19. Does permit change require or include underground design or mine sequence and timing?
☐ Yes	☒ No	20. Does permit change require or include subsidence control or monitoring?
☒ Yes	☐ No	21. Have reclamation costs for bonding been provided or revised for any change in the reclamation plan?
☐ Yes	☒ No	22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling?
☐ Yes	☒ No	23. Is this permit change coal exploration activity ☐ inside ☐ outside of the permit area?

☒ **Attach 3 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.**

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.

Wendell Owen Res Agent 3/22/96
Signed - Name - Position - Date

Subscribed and sworn to before me this 22 day of March, 19 96

Leanne Stone
Notary Public

My Commission Expires: _____, 19__

Attest: STATE OF _____

COUNTY OF _____

Notary Public
LEANNE STONE
P.O. Box 300
Huntington, Utah 84528
My Commission Expires
June 18, 1997
State of Utah

Received by Oil, Gas & Mining

ASSIGNED PERMIT CHANGE NUMBER

Form DOGM - C2 (Last Revised 6/93) File Folder # 3

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change: Tank Seam/Bathhouse As-builts

Permit Number: ACT/015/025
Mine: Bear Canyon Mine
Permittee: Co-Op Mining Co.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Plates 2-4B, 2-4C, 2-4E; Surface Facilities Mps Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3-3; Description of Coal handling updated.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3-10; Table 3.3-1 Updated for disturbed acreage
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3-86, 3-97, 3-98, 3-100, 3-101, 3-101A, 3-105; Bond updated
☐ ADD	☒ REPLACE	☐ REMOVE	pg. 3-111; Reclamation seeding techniques revised.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3A-2, 3A-3, 3A-4, 3A-5, 3A-6, 3A-7, 3A-8, 3A-18;
☐ ADD	☐ REPLACE	☐ REMOVE	Surface Facilities descriptions revised.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3D-7, 3H-10, 3L-14; Tank Seam Road Information Updated
☒ ADD	☐ REPLACE	☐ REMOVE	Pg 3H-71, 3H-72; As-built Cut + Fill Volumes Added
☐ ADD	☒ REPLACE	☐ REMOVE	Plates 3-2B, 3-2C, 3-2E; disturbed boundary Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 3-5C; As-built Roads shown on Plate
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 7-85, 7-85A, 7-87, 7-87A, 7-89, 7-89A; Hydrology Tables Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 76-9, 76-2, 76-2A, 76-3, 76-13A, 76-14, 76-14A, 76-14B,
☐ ADD	☐ REPLACE	☐ REMOVE	76-15, 76-15A, 76-24, 76-24A, 76-27, 76-34, 76-38C,
☐ ADD	☐ REPLACE	☐ REMOVE	76-38D, 76-38E, 76-38F, 76-38G, 76-38H, 76-45E, 76-46,
☐ ADD	☐ REPLACE	☐ REMOVE	76-47, 76-68, 76-69, 76-77, 76-93, 76-94, 76-95, 76-108,
☐ ADD	☐ REPLACE	☐ REMOVE	76-109, 76-110, 76-111, 76-112, 76-113, 76-114, 76-115; Hydrology
☐ ADD	☐ REPLACE	☐ REMOVE	Calculations Updated*
☐ ADD	☐ REPLACE	☒ REMOVE	Pg. 76-14C, 76-14D, 76-38I, 76-38J, 76-38K, 76-38L, 76-45F,
☐ ADD	☐ REPLACE	☐ REMOVE	76-116; Pages not needed in Calculations.
☐ ADD	☒ REPLACE	☐ REMOVE	7K-8, 7K-9, 7K-10, 7K-11, 7K-12, 7K-13, 7K-14, 7K-14A;
☐ ADD	☐ REPLACE	☐ REMOVE	ASCA Area descriptions updated for As-builts
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 7-1B, 7-1C, 7-1E, 7-5; Updated for As-built.

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

* Note: 76-2, 76-2A Replace old 76-2A + 76-2B. 76-24 + 76-24A replace old 76-24A + 76-24B.

Form DOGM - C2 (Last Revised 6/93)

File Folder # 3

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change: Tank Seam / Bathhouse As-built (con't)

Permit Number: ACT 1 015 1025

Mine: Bear Canyon Mine

Permittee: Co-Op Mining Co.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 8-26, 8-43; disturbed acreage updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 8-35, 8-36, 8-37; Topsoil Information Updated.
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 8-1, 8-5B, 8-5C, 8-5E; Plates updated for As-built
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 8-3, 8-6; As-built Topsoil Stockpiles shown
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
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☐ ADD	☐ REPLACE	☐ REMOVE	

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

May 6, 1996

Utah Division of Oil, Gas and Mining
Price Field Office
c/o College of Eastern Utah
451 East 400 North
Price, Utah 84501

Mr. Joe Helfrich, Permit Supervisor
Utah Division of Oil, Gas, and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Dear Joe:

RE: Amendment 96A, Tank Seam As-Builts, Bear Canyon Mine, CO-OP Mining Company, ACT/015/025-96A, Folder # , Emery County, Utah

I have reviewed the portions of the aforementioned which I feel I am competent to review. Mr. Charles Reynolds and I have already made what changes I felt were necessary and included these in the three submitted copies. The pages which I have approved include the following; 3-3, 3-10, 3-86, 3-97, 3-98, 3-100, 3-101, 3-101A, 3-105, 3-111, 3A-2, 3A-3, 3A-4, 3A-5, 3A-6,3A-7, 3A-8, 3A-13, 3A-18, 3D-7, 3H-10, 3H-71, 3H-72, and 3L-14. I have also reviewed the material submitted for BTCA areas H through V, and pages 8-26, 8-35, 8-36, 8-37, and 8-43. All are adequate with regard to the R645 regulations.

I would appreciate it if you would have one of the personnel trained in hydrology review that portion of this amendment which pertains to same. These include the following pages; 7-85, 7-85A, 7-87, 7-87A, 7-89, 7-89A, Appendix 7-G from pages 7G-2 through 7G-115.

Thank you for your immediate attention in this matter. Should any questions surface, please have the reviewer feel free to contact Mr. Charles Reynolds at (801) 687-2450, or myself at (801) 637-5806.

Sincerely,

Peter Hess
Reclamation Specialist III

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

July 10, 1996

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

Re: Approval of Amendment 96A, Tank Seam As-Builts, Co-Op Mining Corporation, Bear Canyon Mine, ACT/015/025-96A, Folder #2, Emery County, Utah

Dear Mr. Reynolds:

In concert with Pete Hess's Recommendation for approval, hydrologist's Steven Johnson and Sharon Falvey have concurred with the approval of the tank seam as-builts, effective July 5, 1996.

Please submit 3 finalized copies of text and maps for incorporation into the appropriate mining and reclamation plans. One copy will be stamped approved and incorporated and will be returned to you for incorporation into your permit.

If you have any questions please call Pete Hess or me.

Sincerely,

Joseph C. Helfrich
Permit Supervisor

blb
cc: Pete Hess

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

July 1, 1996

TO: File

THRU: Joe Helfrich, Inspection Supervisor

FROM: Sharon Falvey, Senior Reclamation Specialist SF

RE: 96A, Tank Seam As-Builts, Bear Canyon Mine, CO-Op Mining Company, ACT/015/025-96A, Folder #2, Emery County, Utah

Synopsis:

The Permittee has submitted some changes in the drainage and routing of the Tank Seam Amendment 96 A on 3-28-96 which was routed to the SLC office on 5/7/96 and routed to me sometime after 5/6/96. The drainage features presented in this submittal should be inspected against in the field. It is recommended that the submitted changes be approved and incorporated into the plan.

Analysis:

The general concepts that were applied in the original approval were applied in this submittal. Therefore no review of the hydrologic input values used in the original approval were conducted. A few of the changes were calculated to test values presented and were determined to be reasonable. Text changes and methods used in Alternate Sediment Control areas were reviewed and found to be similar to earlier approved methods.

A couple of technical issues were noted. The silt fence design diagram do not have a spillway notched into the structure. Without a low point for the water to discharge the water will tend to back up and circumvent the structure sometimes resulting in a widened channel the channel where this occurs. It is recommended that the operator adjust the silt fence where constructed in drainages. Another engineering standard that was not followed was a minimum of a 0.3 foot freeboard. This standard is less critical where drainage reports to a sedimentation pond. However, where undisturbed drainages and alternate sediment control measures using drainage conveyance structures are emplaced these practices should generally be followed.

Findings:

The hydrologic changes presented in this "as-built submittal" meet the general design criteria and methods employees with the original submittal. A cursory review of the Technical Analysis completed for the Tank Seam Amendment indicate no TA changes are required by this amendment.

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

July 5, 1996

TO: File

THRU: Joe Helfrich, Permit Supervisor

FROM: Steven M. Johnson, Reclamation Hydrologist

RE: Tank Seam As-Builts, Bear Canyon Mine, CO-OP Mining Company, ACT/015/025-96A, File #2, Carbon County, Utah

SYNOPSIS:

The Division has received an amendment to the Mining and Reclamation Plan (MRP) for Bear Canyon Mine. The amendment is the as-builts for the Tank Seam facilities area. This memorandum address the hydrologic design and construction as shown in the as-builts. The as-builts have been analyzed assuming that the sight inspector, Mr. Peter Hess, has accepted the information as being true to the site condition. The hydrology has been analyzed only for regulatory adequacy.

OPERATIONAL HYDROLOGY

R645-301-742

Analysis:

The as-builts show several changes over the originally approved designs. These changes predominately reflect modification made in the field which resulted in the removal of a culvert and the combination of a few watersheds. Plate 7-1B, C and E shows the hydrologic conditions as constructed in the Tank Seem project. Tables 7.2-9, 10 and 11 show the resulting watershed criteria, diversion calculations, and culvert characteristics, respectively. Appendix 7-G includes the diversion calculations.

The channels and culverts have been constructed with conservative dimensions. Most channels are allowed 0.2 feet to 1 foot of freeboard. Almost all culverts are designed to run less than 50-percent of capacity.

Findings:

Co-Op, though making some significant changes to the facilities designs, has met the requirements of the regulations. The diversions are adequately designed according to the as-builts. This analysis includes a comparison of the as-builts to the regulations only.

RECOMMENDATION:

The hydrologic as-builts are adequate to be approved as part of the MRP. This analysis includes a comparison of the as-builts to the regulations, only. The comparison of the as-built to field conditions should be made by the site inspector.

cc: Pete Hess (PFO)
O:\015025.BCN\DRAFT\TANKHYDR.SJ

May 6, 1996

Utah Division of Oil, Gas and Mining
Price Field Office
c/o College of Eastern Utah
451 East 400 North
Price, Utah 84501

5/7/96

Mr. Joe Helfrich, Permit Supervisor
Utah Division of Oil, Gas, and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Dear Joe:

RE: Amendment 96A, Tank Seam As-Builts, Bear Canyon Mine, CO-OP Mining Company, ACT/015/025-96A, Folder # , Emery County, Utah

I have reviewed the portions of the aforementioned which I feel I am competent to review. Mr. Charles Reynolds and I have already made what changes I felt were necessary and included these in the three submitted copies. The pages which I have approved include the following; 3-3, 3-10, 3-86, 3-97, 3-98, 3-100, 3-101, 3-101A, 3-105, 3-111, 3A-2, 3A-3, 3A-4, 3A-5, 3A-6,3A-7, 3A-8, 3A-13, 3A-18, 3D-7, 3H-10, 3H-71, 3H-72, and 3L-14. I have also reviewed the material submitted for BTCA areas H through V, and pages 8-26, 8-35, 8-36, 8-37, and 8-43. All are adequate with regard to the R645 regulations.

I would appreciate it if you would have one of the personnel trained in hydrology review that portion of this amendment which pertains to same. These include the following pages; 7-85, 7-85A, 7-87, 7-87A, 7-89, 7-89A, Appendix 7-G from pages 7G-2 through 7G-115.

Thank you for your immediate attention in this matter. Should any questions surface, please have the reviewer feel free to contact Mr. Charles Reynolds at (801) 687-2450, or myself at (801) 637-5806.

Sincerely,

Peter Hess

Peter Hess
Reclamation Specialist III

May 6, 1996

Utah Division of Oil, Gas and Mining
Price Field Office
c/o College of Eastern Utah
451 East 400 North
Price, Utah 84501

Mr. Joe Helfrich, Permit Supervisor
Utah Division of Oil, Gas, and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Dear Joe:

RE: Amendment 96A, Tank Seam As-Builts, Bear Canyon Mine, CO-OP Mining Company, ACT/015/025-96A, Folder # , Emery County, Utah

I have reviewed the portions of the aforementioned which I feel I am competent to review. Mr. Charles Reynolds and I have already made what changes I felt were necessary and included these in the three submitted copies. The pages which I have approved include the following; 3-3, 3-10, 3-86, 3-97, 3-98, 3-100, 3-101, 3-101A, 3-105, 3-111, 3A-2, 3A-3, 3A-4, 3A-5, 3A-6,3A-7, 3A-8, 3A-13, 3A-18, 3D-7, 3H-10, 3H-71, 3H-72, and 3L-14. I have also reviewed the material submitted for BTCA areas H through V, and pages 8-26, 8-35, 8-36, 8-37, and 8-43. All are adequate with regard to the R645 regulations.

I would appreciate it if you would have one of the personnel trained in hydrology review that portion of this amendment which pertains to same. These include the following pages; 7-85, 7-85A, 7-87, 7-87A, 7-89, 7-89A, Appendix 7-G from pages 7G-2 through 7G-115.

Thank you for your immediate attention in this matter. Should any questions surface, please have the reviewer feel free to contact Mr. Charles Reynolds at (801) 687-2450, or myself at (801) 637-5806.

Sincerely,

Peter Hess
Reclamation Specialist III

CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528

Office (801) 687-2450
FAX (801) 687-5238
Coal Sales (801) 687-5777

March 26, 1996

Peter Hess
Utah Division of Oil, Gas & Mining
C.E.U. Box 169, 451 East 400 North
Price, Utah 84501-2699

Mr. Hess,

96A

Re: Tank Seam/Bathhouse As-Builts, Bear Canyon ACT/015/025, Emery County, Utah

Enclosed are copies of an amendment to the Bear Canyon MRP. The amendment includes pages and plates which have been updated to reflect the as-built contours and facilities for the Tank Seam Access Road and Portal Pad and the Bathhouse Pad and Structure. The amendment also includes revisions to the drainage structures for the Tank Seam Access Road. Changes to the text have been shown using a redline/strikeout format to aid in the review. Pages and plates have been marked DRAFT to distinguish them from previously approved pages and plates.

Upon approval, 3 finalized copies will be sent to the Division. If you have any questions, please call Charles Reynolds at (801) 687-2450.

Thank You,

Wendell Owen

Wendell Owen,
Resident Agent

Enclosure(s)

Form 7 OGM - C1 (Last Revised 6/93) File Folder # 3

APPLICATION FOR PERMIT CHANGE

Title of Change: Tank Seam / Bathhouse As-builts

Permit Number: ACT/015/025

Mine: Bear Canyon Mine

Permittee: Co-Op Mining Company

Description, Include reason for change and timing required to implement:
Purpose is to update the MRP to show the As-built Information for the Tank Seam Road/Pad and the Bathhouse Pad Areas

☐ Yes	☒ No	1. Change in the size of the Permit Area? _____ acres ☐ increase ☐ decrease.
☒ Yes	☐ No	2. Change in the size of the Disturbed Area? 0.78 acres ☒ increase ☐ decrease.
☐ Yes	☒ No	3. Will permit change include operations outside the Cumulative Hydrologic Impact Area?
☐ Yes	☒ No	4. Will permit change include operations in hydrologic basins other than currently approved?
☐ Yes	☒ No	5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☒ No	6. Does permit change require or include public notice publication?
☐ Yes	☒ No	7. Permit change as a result of a Violation? Violation #
☐ Yes	☒ No	8. Permit change as a result of a Division Order? D.O.#
☐ Yes	☒ No	9. Permit change as a result of other laws or regulations? Explain:
☐ Yes	☒ No	10. Does permit change require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☒ No	11. Does the permit change affect the surface landowner or change the post mining land use?
☐ Yes	☒ No	12. Does permit change require or include collection and reporting of any baseline information?
☐ Yes	☒ No	13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	☒ No	14. Does permit change require or include soil removal, storage or placement?
☐ Yes	☒ No	15. Does permit change require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	☒ No	16. Does permit change require or include construction, modification, or removal of surface facilities?
☒ Yes	☐ No	17. Does permit change require or include water monitoring, sediment or drainage control measures?
☒ Yes	☐ No	18. Does permit change require or include certified designs, maps, or calculations?
☐ Yes	☒ No	19. Does permit change require or include underground design or mine sequence and timing?
☐ Yes	☒ No	20. Does permit change require or include subsidence control or monitoring?
☒ Yes	☐ No	21. Have reclamation costs for bonding been provided or revised for any change in the reclamation plan?
☐ Yes	☒ No	22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling?
☐ Yes	☒ No	23. Is this permit change coal exploration activity ☐ inside ☐ outside of the permit area?

☒ Attach 3 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.

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.

Wendell Owen, Res. Agent 3/22/96
Signed - Name - Position - Date

Subscribed and sworn to before me this 22 day of March, 19 96.

Notary Public

My Commission Expires: _____, 19__

Attest: STATE OF _____

COUNTY OF _____

Received by Oil, Gas & Mining

ASSIGNED PERMIT CHANGE NUMBER

Form DOGM - C2 (Last Revised 6/99) File Folder # 3

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change: Tank Seam/Bathhouse As-builts

Permit Number: ACT/015/025

Mine: Bear Canyon Mine

Permittee: Co-Op Mining Co.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Plates 2-4B, 2-4C, 2-4E; Surface Facilities Maps Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3-3; Description of Coal handling Updated.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3-10; Table 3.3-1 Updated for disturbed acreage
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3-86, 3-97, 3-98, 3-100, 3-101, 3-101A, 3-105; Bond Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3-111; Reclamation seeding techniques revised.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3A-2, 3A-3, 3A-4, 3A-5, 3A-6, 3A-7, 3A-8, 3A-18;
☐ ADD	☐ REPLACE	☐ REMOVE	Surface Facilities descriptions revised.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3D-7, 3H-10, 3L-14; Tank Seam Road Information Updated
☒ ADD	☐ REPLACE	☐ REMOVE	Pg 3H-71, 3H-72; As-built Cut + Fill Volumes Added
☐ ADD	☒ REPLACE	☐ REMOVE	Plates 3-2B, 3-2C, 3-2E; disturbed boundary Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 3-5C; As-built Roads shown on Plate
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 7-85, 7-85A, 7-87, 7-87A, 7-89, 7-89A; Hydrology Tables Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 7-6, 7-6-2, 7-6-2A, 7-6-3, 7-6-13A, 7-6-14, 7-6-14A, 7-6-14B,
☐ ADD	☐ REPLACE	☐ REMOVE	7-6-15, 7-6-15A, 7-6-24, 7-6-24A, 7-6-27, 7-6-34, 7-6-38C,
☐ ADD	☐ REPLACE	☐ REMOVE	7-6-38D, 7-6-38E, 7-6-38F, 7-6-38G, 7-6-38H, 7-6-45E, 7-6-46,
☐ ADD	☐ REPLACE	☐ REMOVE	7-6-47, 7-6-68, 7-6-69, 7-6-77, 7-6-93, 7-6-94, 7-6-95, 7-6-108,
☐ ADD	☐ REPLACE	☐ REMOVE	7-6-109, 7-6-110, 7-6-111, 7-6-112, 7-6-113, 7-6-114, 7-6-115; Hydrology
☐ ADD	☐ REPLACE	☐ REMOVE	Calculations Updated*
☐ ADD	☐ REPLACE	☒ REMOVE	Pg. 7-6-14C, 7-6-14D, 7-6-38I, 7-6-38J, 7-6-38K, 7-6-38L, 7-6-45F,
☐ ADD	☐ REPLACE	☐ REMOVE	7-6-116; Pages not needed in Calculations.
☐ ADD	☒ REPLACE	☐ REMOVE	7K-8, 7K-9, 7K-10, 7K-11, 7K-12, 7K-13, 7K-14, 7K-14A;
☐ ADD	☐ REPLACE	☐ REMOVE	ASCA Area descriptions updated for As-builts
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 7-1B, 7-1C, 7-1E, 7-5; Updated for As-builts

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

* Note: 7-6-2, 7-6-2A Replace old 7-6-2A + 7-6-2B. 7-6-24 + 7-6-24A replace old 7-6-24A + 7-6-24B

Form DOGM - C2 (Last Revised 6/93) File Folder # 3

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change:

Tank Seam / Bathhouse As-built (con't)

Permit Number: ACT / 015 / 025

Mine: Bear Canyon Mine

Permittee: Co-Op Mining Co

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

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☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 8-35, 8-36, 8-37; Topsoil Information Updated.
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 8-1, 8-5B, 8-5C, 8-5E; Plates updated for As-built
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 8-3, 8-6; As-built Topsoil Stockpiles shown.
☐ ADD	☐ REPLACE	☐ REMOVE	
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Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528

Office (801) 687-2450
FAX (801) 687-5238
Coal Sales (801) 687-5777

March 26, 1996

Peter Hess
Utah Division of Oil, Gas & Mining
C.E.U. Box 169, 451 East 400 North
Price, Utah 84501-2699

Mr. Hess,

Re: Tank Seam/Bathhouse As-Builts, Bear Canyon ACT/015/025, Emery County, Utah

Enclosed are copies of an amendment to the Bear Canyon MRP. The amendment includes pages and plates which have been updated to reflect the as-built contours and facilities for the Tank Seam Access Road and Portal Pad and the Bathhouse Pad and Structure. The amendment also includes revisions to the drainage structures for the Tank Seam Access Road. Changes to the text have been shown using a redline/strikeout format to aid in the review. Pages and plates have been marked DRAFT to distinguish them from previously approved pages and plates.

Upon approval, 3 finalized copies will be sent to the Division. If you have any questions, please call Charles Reynolds at (801) 687-2450.

Thank You,

Wendell Owen,
Resident Agent

Enclosure(s)

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change: Tank Seam / Bathhouse As-builts

Permit Number: ACT/015/025

Mine: Bear Canyon Mine

Permittee: Co-Op Mining Co.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Plates 2-4B, 2-4C, 2-4E; Surface Facilities Maps Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3-3; Description of Coal handling Updated.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3-10; Table 3.3-1 Updated for disturbed acreage
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3-86, 3-97, 3-98, 3-100, 3-101, 3-101A, 3-105; Bond updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3-111; Reclamation seeding technique revised.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg 3A-2, 3A-3, 3A-4, 3A-5, 3A-6, 3A-7, 3A-8, 3A-18;
☐ ADD	☐ REPLACE	☐ REMOVE	Surface Facilities descriptions revised.
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 3D-7, 3H-10, 3L-14; Tank Seam Road Information Updated
☒ ADD	☐ REPLACE	☐ REMOVE	Pg 3H-71, 3H-72; As-built Cut + Fill Volumes Added
☐ ADD	☒ REPLACE	☐ REMOVE	Plates 3-2B, 3-2C, 3-2E; disturbed boundary Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 3-5C; As-built Roads shown on Plate
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 7-85, 7-85A, 7-87, 7-87A, 7-89, 7-89A; Hydrology Tables Updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 76-9, 76-2, 76-2A, 76-3, 76-13A, 76-14, 76-14A, 76-14B,
☐ ADD	☐ REPLACE	☐ REMOVE	76-15, 76-15A, 76-24, 76-24A, 76-27, 76-34, 76-38C,
☐ ADD	☐ REPLACE	☐ REMOVE	76-38D, 76-38E, 76-38F, 76-38G, 76-38H, 76-45E, 76-46,
☐ ADD	☐ REPLACE	☐ REMOVE	76-47, 76-68, 76-69, 76-77, 76-93, 76-94, 76-95, 76-108,
☐ ADD	☐ REPLACE	☐ REMOVE	76-109, 76-110, 76-111, 76-112, 76-113, 76-114, 76-115; Hydrology
☐ ADD	☐ REPLACE	☐ REMOVE	Calculations Updated*
☐ ADD	☐ REPLACE	☒ REMOVE	Pg. 76-14C, 76-14D, 76-38I, 76-38J, 76-38K, 76-38L, 76-45F,
☐ ADD	☐ REPLACE	☐ REMOVE	76-116; Pages not needed in Calculations.
☐ ADD	☒ REPLACE	☐ REMOVE	7K-8, 7K-9, 7K-10, 7K-11, 7K-12, 7K-13, 7K-14, 7K-14A;
☐ ADD	☐ REPLACE	☐ REMOVE	ASCA Area descriptions updated for As-builts
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 7-1B, 7-1C, 7-1E, 7-5; Updated for As-builts

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

* Note: 76-2, 76-2A Replace old 76-2A + 76-2B. 76-24 + 76-24A replace old 76-24A + 76-24B

Form DOGM - C2 (Last Revised 6/93) File Folder # 3

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change: Tank Seam / Bathhouse As-built (con't)

Permit Number: ACT 1 015 1025

Mine: Bear Canyon Mine

Permittee: Co-Op Mining Co.

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 8-26, 8-43; disturbed acreage updated
☐ ADD	☒ REPLACE	☐ REMOVE	Pg. 8-35, 8-36, 8-37; Topsoil Information Updated.
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 8-1, 8-5B, 8-5C, 8-5E; Plates updated for As-built
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 8-3, 8-6; As-built Topsoil Stockpiles shown
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
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Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?