STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

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

September 9, 1982

Mr. David R. Chenoweth, Coordinator
Permits and Compliance
Anaconda Minerals Company
555 Seventeenth Street
Denver, Colorado 80202

RE: Proposed Coal Exploration Program
Anaconda Minerals Company
Emery County, Utah
CEP/015/007

Dear Mr. Chenoweth:

The Division has made a cursory review of Anaconda Minerals Company's proposed changes to the culvert sizing for the road in Bear Canyon. An in depth study will be done to verify the calculations but we feel it is not necessary to hold up construction of the road while we do the study. As provided, the plan under consideration adequately satisfies the State's concerns under the requirements of Parts 776 and 815 of the regulations promulgated under the 1979 Act, "Regulation of Coal Mining and Reclamation Operations", Title 40-10-1 et seq, Utah Code Annotated, 1953.

The Division requires no additional information at the present time. Should we have any concerns with the amended calculations, you will be notified. Upon completion of the exploration operations the Division will require notification of completion and a description of the plugging and reclamation activities which have taken place for each site.

Thank you for your cooperation. In reply, please refer to CEP/015/007.

Sincerely,

THOMAS N. TETTING
ENGINEERING GEOLOGIST

TNT/mn

Board/Charles R. Henderson, Chairman • John L. Bell • E. Steele McIntyre • Edward T. Beck
Robert R. Norman • Margaret R. Bird • Herm Olsen

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EXHIBIT D

CULVERT DESIGN

WILD HORSE RIDGE PROJECT

Redesign culverts based on new flow data: revised storm distribution curve.

Original calcs used SCS Type B distribution; new calcs use Farmer-Fletcher distribution which is site specific to Utah area.

DESIGN BASIS: 10 yr. - 24 hr.

Culvert 1 Drainage areas contributing - 1 thru 4 per attached map.

Peak Q_{10} = 130 CFS per Muller Eng. computer printout

Available cover across Bear Creek = 20'

Assume inlet control: use Figure 4-18 attached

Q_{10} CFS	Diam. In.	HW/D	HW Ft.
130	36	Off chart Est. 7.0	Est. 21' - no good
130	42	3.8	13.3 - OK
130	48	2.2	8.8 - OK

USE 48" 18 gage 3x1 corr.

Culverts 5,6 (Formerly 4,5)

These culverts intercept creek at lower end of area 4 (.78 AC)

Q_{10} for area 4 = 40 CFS per Muller Eng.

DA contributing = .60 AL

Q design = $40 \left(\frac{.6}{.78}\right)^{\frac{1}{2}}$ = 35 CFS

Available cover = 8-10'

Q_{10}	Diam.	$\frac{HW}{D}$	HW
35	24	4.0	8.0
35	30	1.7	4.25
35	36	1.1	3.3

Local high water marks indicate higher flows, use a larger diam. to insure flow.

USE 36" 2-2/3 x 1/2 18 gage

Culverts 9, 10 (Formerly 7,8)

These culverts intercept creek at upper end area 4 (.78 AC)

DA contributing = .20 AC

Q design = $40 \left(\frac{.20}{.78}\right)^{\frac{1}{2}} = 20$ CFS

Available cover = 12-15'

Q_{10}	Diam.	$\frac{HW}{D}$	HW	
20	24	1.7	3.4	OK

USE 24" min at creek for cleaning/plugging

USE 24" 2-2/3 x 1/2 18 gage

Culverts 2,3,4,7,8 (Formerly 2,3,6,9)

These culverts intercept drainage from natural gullies at lower end area 4 but do not intercept creek bed.

DA contributing = .13 AC

Q design = $40 \left(\frac{.13}{.78}\right)^{\frac{1}{2}} = 16$ CFS

Estimated height of cover 5'-10'

Q	Diam.	$\frac{HW}{D}$	HW	
16	18	Off chart est. 8	12	No good
16	24	1.3	2.6	OK

USE 24" 2-2/3 x 1/2 18 gage

Remaining culverts 11 thru 20
These culverts intercept natural gullies along route with flows similar to lower culvert 2,3,4,7,8

USE Q design = 16 CFS

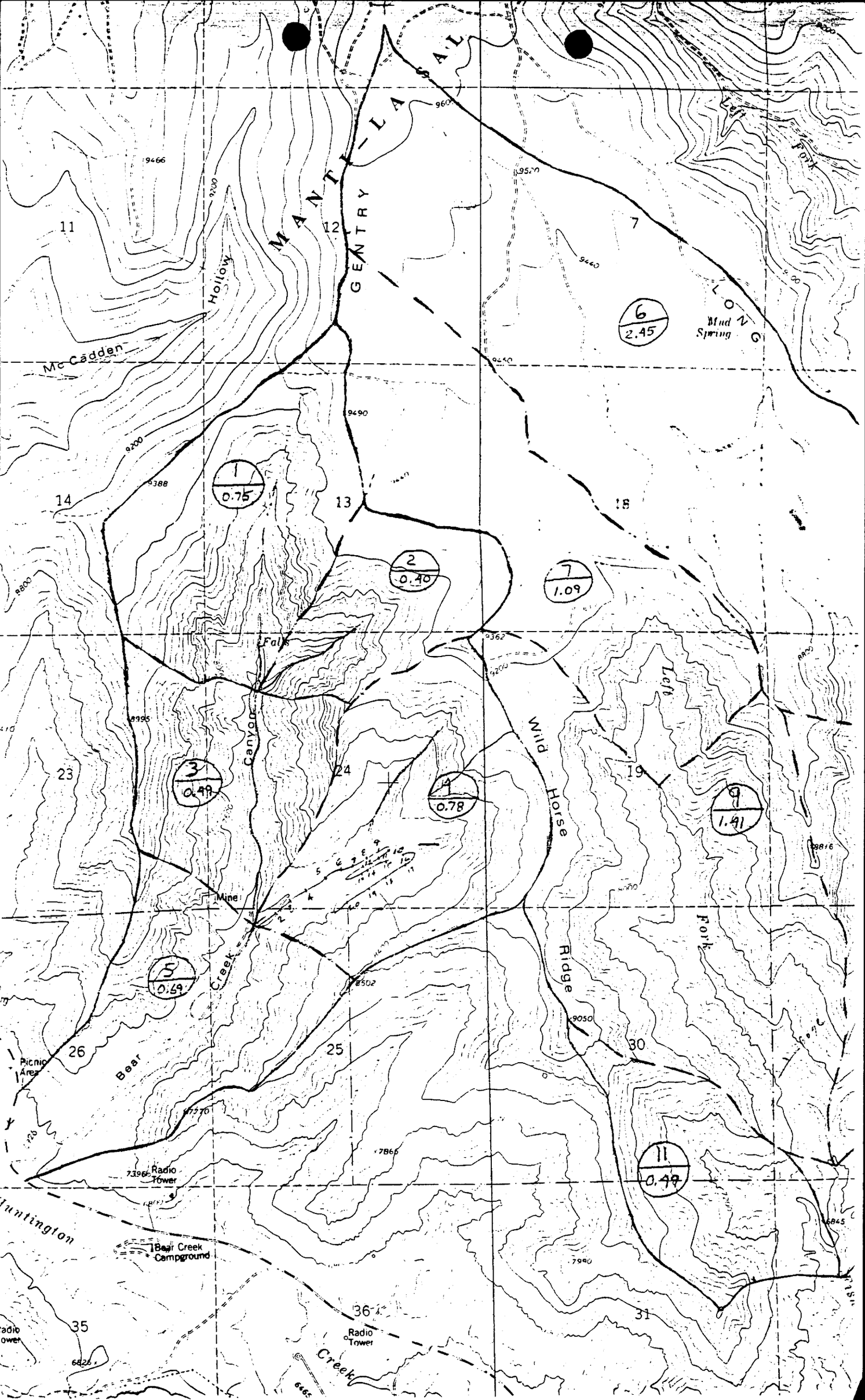
Cover varies 5'-15'

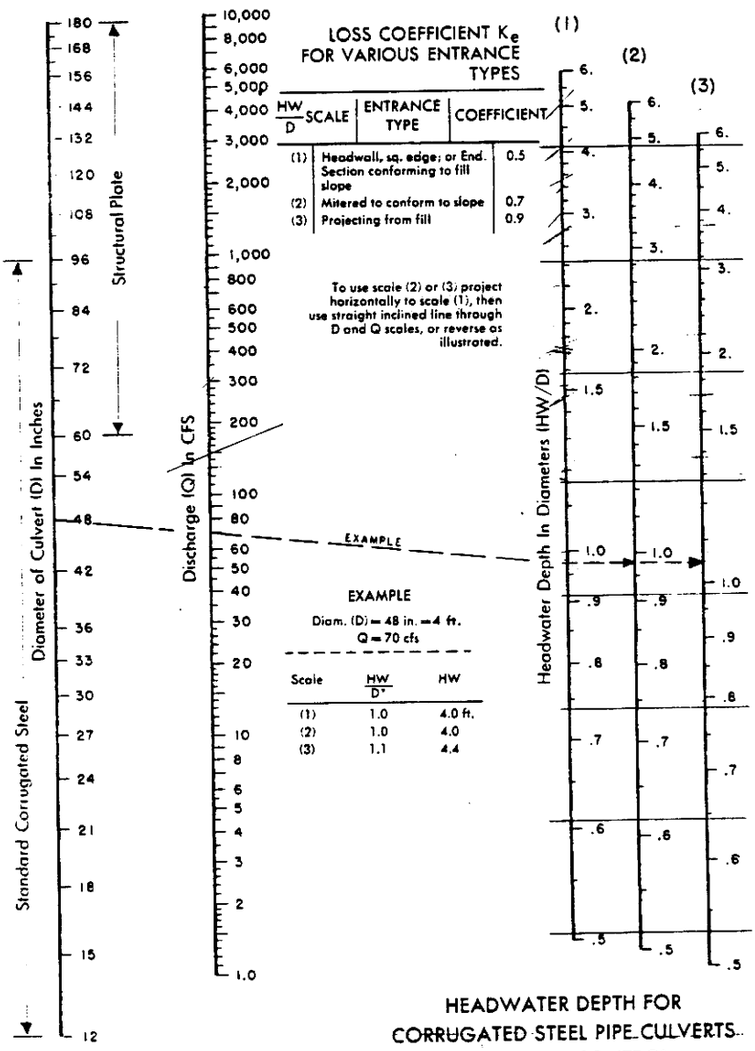
From previous call for culverts 2,3,4,7,8 (pg. 3)

USE 24" 2-2/3 x 1/2 18 gage

Culvert Summary

CMP No.	Diam.	Corr.	Gage
1	48"	3 x 1	18
5,6	36"	2-2/3 x 1/2	18
2,3,4,7,8,9,10, 11-20	24"	2-2/3 x 1/2	18


MANTI-LA SAL
GENTRY
LONG
Left Fork
Mud Spring
McCadden
Hollow
Falls
Canyon
Wild Horse Ridge
Left Fork
Mine
Bear Creek
Picnic Area
Radio Tower
Huntington
Bear Creek Campground
Radio Tower
Creek
1 0.75
2 0.40
3 0.49
4 0.78
5 0.69
6 2.45
7 1.09
9 1.41
11 0.49



HEADWATER DEPTH FOR CORRUGATED STEEL PIPE CULVERTS WITH INLET CONTROL

Fig. 4-18. *Inlet control* nomograph for corrugated steel *pipe* culverts. The manufacturers recommend keeping *HW/D* to a maximum of 1.5 and preferably to no more than 1.0.

	5.11			32.987			(NULL)				
	5.95			31.891			(NULL)				

TIME HYDROGRAPH, TZERO= 0.0 DELTA T= 0.10 DRAINAGE AREA= 2.42

0.0	DISCHG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.34	6.22
1.00	DISCHG	22.52	46.76	75.02	94.93	100.27	103.83	108.35	115.53	123.80	120.22
2.00	DISCHG	101.33	85.55	75.92	72.76	72.64	68.87	59.83	52.74	43.46	46.95
3.00	DISCHG	46.75	44.71	40.15	36.63	34.52	33.75	33.62	33.01	31.63	30.57
4.00	DISCHG	29.97	29.82	29.83	29.24	27.72	26.52	25.91	25.69	25.71	26.79
5.00	DISCHG	29.01	30.83	32.04	32.65	32.98	32.80	32.11	31.59	31.32	31.29
6.00	DISCHG	31.30	26.52	14.33	8.27	3.23	1.09	0.38	0.10	0.02	0.0

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 0.1697 CFS-HRS= 265.04 ACRE-FT= 21.90

ENDCMP

SUMMARY TABLE 1

ALT	STORM	ID	DA SQ-MI.	RAIN TBLE	AMC	DELTA-T HRS.	T/BRU HRS.	PRECIP IN.	PRECIP DURATION	PEAK-Q CFS	PEAK TIME	PEAK-ELEV	RUNOFF IN	CSH
1	1	-1	0.75	2	2	0.10	0.0	2.25	24.00	49.32	4.3	0.0	0.59	54.43
1	1	-2	0.40	2	2	0.10	0.0	2.25	24.00	22.29	4.76	0.0	0.58	55.51
1	1	12	1.15	2	2	0.10	0.0	2.25	24.00	63.01	4.77	0.0	0.59	54.79
1	1	3	1.15	2	2	0.10	0.0	2.25	24.00	61.33	4.83	0.0	0.59	53.81
1	1	-3	0.49	2	2	0.10	0.0	2.25	24.00	26.82	4.77	0.0	0.59	54.74
1	1	13	1.64	2	2	0.10	0.0	2.25	24.00	[illegible]	4.81	0.0	0.59	53.15
1	1	-4	0.78	2	2	0.10	0.0	2.25	24.00	[illegible]	4.77	0.0	0.59	54.74
1	1	14	2.42	2	2	0.10	0.0	2.25	24.00	[illegible]	4.77	0.0	0.59	52.58
1	2	-1	0.75	2	2	0.10	0.0	1.40	6.00	40.06	1.83	0.0	0.17	53.41
1	2	-2	0.40	2	2	0.10	0.0	1.40	6.00	[illegible]	1.77	0.0	0.17	55.66
1	2	12	1.15	2	2	0.10	0.0	1.40	6.00	62.26	1.79	0.0	0.17	54.14
1	2	3	1.15	2	2	0.10	0.0	1.40	6.00	57.71	1.93	0.0	0.17	51.92
1	2	-3	0.49	2	2	0.10	0.0	1.40	6.00	25.41	1.77	0.0	0.17	53.89
1	2	13	1.64	2	2	0.10	0.0	1.40	6.00	[illegible]	1.86	0.0	0.17	51.04
1	2	-4	0.78	2	2	0.10	0.0	1.40	6.00	42.04	1.79	0.0	0.17	53.89
1	2	14	2.42	2	2	0.10	0.0	1.40	6.00	124.03	1.83	0.0	0.17	51.25

Alt 1 Alt 2

104a-24hr

Basin 4

Below Confluence

SUMMARY TABLE 3

DISCHARGE,CFS

	01	02	03	04	05	06	07	08	09	010
XSEC/STRUC NO. -4										
ALTERNATE 1	42.79	42.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XSEC/STRUC NO. -3										
ALTERNATE 1	26.82	26.41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XSEC/STRUC NO. -2										
ALTERNATE 1	22.29	22.36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XSEC/STRUC NO. -1										
ALTERNATE 1	49.22	40.06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XSEC/STRUC NO. 3										
ALTERNATE 1	61.83	56.71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

@ Mouth of Basin 4