BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

February 15, 1988

Mr. Lowell P. Braxton
Administrator
Utah Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Re: Little Snider Canyon Drainage
Blazon No. 1 Mine
INA/007/021
Carbon County, Utah

Dear Mr. Braxton:

Enclosed are 3 copies of the proposed drainage design for the Little Snider Canyon area of the Blazon No. 1 Mine.

This conceptual design has been completed and is being submitted by Blackhawk Engineering Co. at the request of Mr. Richard Stuckey of North American Equities, Ltd.

If you have any questions, or need any further information, please contact me or Mr. Stuckey.

Respectfully,

Dan W. Guy, P.E.
President

cc: Richard Stuckey, N.A.E.
File

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
Dianne R. Nielson, Ph.D., Division Director

355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

June 9, 1988

CERTIFIED RETURN RECEIPT REQUESTED
P 879 596 365

Mr. Allan W. Smith
North American Equities, N.V.
Snow Mountain Development
3160 Crow Canyon Road, Suite 210
San Ramon, CA 94583

Dear Mr. Smith:

RE: Blazon Mine Reclamation, North American Equities, Blazon #1 Mine, ACT/007/021, Folders #2 and #3, Carbon County, Utah

In accordance with the approved Reclamation Plan for the Blazon #1 Mine, NAE needs to complete the design for the reconstruction of Little Snyder Drainage. This requirement is based on the Stipulations to the approved permit, as follows:

" Stipulations 817.44 - (1-2) - RS

1. The permittee shall submit complete and adequate designs for a stable channel through the mine waste developments area within 15 days of notification by the regulatory authority regarding need for said designs. Division notification will be based upon an onsite inspection of the conditions existing at the channel following removal of the waste material. The designs must be approved and implemented within 30 days of said notification.

2. The permittee must submit complete and adequate plans for an energy dissipater and culvert headwall for dissipation of the flow from the restored channel to culverts D and D' within 7 days of commencement of excavation for the installation of culvert D' and no longer than 20 days following the completion of removal of the mine development waste pile phase of the reclamation process. The designs must be approved and implemented at the site within 30 days following commencement of the excavation for culvert D'."

On February 16, 1988, the Division received conceptual plans for the reclamation design of Little Snyder Canyon drainage from Blackhawk Engineering Company. Due to snow and winter conditions, a site survey and final design specifications for the drainage have not been presented to the Division for approval.

On June 7, 1988, representatives from the Division did visit the site and determined that these adverse winter conditions no longer exist and that NAE must proceed with the drainage design. Mr. Mel Coonrad indicated on site that Blackhawk Engineering was no longer interested in completion of the design and that another consultant would have to be selected by NAE in order to complete the design work.

Regardless of the consultant selected to complete the design of the drainage, NAE must resume work on the design and the construction of Little Snyder Drainage. The completion of this area of the site is critical to the resumption of earthwork on the site and the completion of the reclamation activities.

In accordance with the requirements of the above stipulations and the approved permit, NAE is required to submit to the Division for approval, complete and adequate plans for the Little Snyder drainage area within 15 days from the receipt of this letter.

Pursuant to discussions with Claire O'Neal, please be advised that additional design and engineering work will have to be accomplished on the site prior to and upon completion of the reclamation activity for bond release. This work includes the certification and as-built of the sediment ponds and fill areas of the site in accordance with UMC's 817.46 and 817.49. Certification of the reclamation work in accordance with the plan must also be submitted upon completion of the reclamation along with the certified as-built drawings of the site.

Additionally, field conditions at the site have been found to differ considerably from the specifications and drawings as are currently in the approved plan. Modifications and changes in the actual reclamation work compared to that proposed in the plan must be presented to the Division in writing and must be shown to be in accordance with the performance standards for reclamation prior to implementation.

NAE is encouraged to retain qualified personnel to accomplish the above requirements as well as to approve any other field modifications which may be required on the site during construction.

Mr. Mel Coonrad has indicated that he is not a representative for NAE outside the limits of his contract except for inspections and water sampling. He has indicated that items such as the drainage design for Little Snyder Canyon and any other modifications that the Division may require are not in the scope or the capacity of his work. The Division must have an authorized representative for NAE on site during constructing who can represent NAE in all aspects of the reclamation work to be accomplished under the approved plan. The Division's technical and inspection staff will be made available to help expedite minor changes to the plan and guide NAE through the final reclamation requirements.

Please notify the Division as soon as possible once you have selected an engineering consultant and designated a representative to be available on site. Time is of the essence and your cooperation in this matter is appreciated. Should you have any further questions regarding these matters please call.

Sincerely

Lowell P. Braxton
Administrator
Mineral Resource Development
and Reclamation Program

JRH/as
Attachment
cc: Clare O'Neal
S. Linner
J. R. Harden
Allan Bachman
1007R:10-12

UTAH COAL MINE ASSIGNMENTS

ACT NO.	MINE NAME	COMPANY NAME	CO-LEAD	TEAM	INSPECTOR
F 025/003	Alton Mine	Utah International	Smith	A	*
N 015/025	Bear Canyon Mine	Co-Op Mining Co	Duce	A	
N 007/022	C. V. Spur	Beaver Creek Coal	Fricke	A	Malencik
F 015/018	Deer Creek	Utah Power & Light	Smith	A	
F 015/017	Des Bee Dove	Utah Power & Light	Munson	A	
F 007/016	Gordon Creek 2 & 7	Beaver Creek Coal	Stettler	A	Malencik
N 007/017	Gordon Creek 3 & 6	Beaver Creek Coal	Smith	A	Malencik
N 015/007	Hidden Valley	California Portland	Munson	A	
F 007/013	Horse Canyon	Kaiser Coal	Duce	A	Malencik
F 015/004	Huntington #4	Beaver Creek Coal	Munson	A	Malencik
N 015/002	J. B. King	Western States	G.-Littig	A	
F 007 006	Star Point Mine	Plateau Mining	G.-Littig	A	Malencik
F 007/007	Sunnyside Mine	Kaiser Coal Corp	Fricke	A	Malencik
N 015/021	Trail Canyon Mine	Co-Op Mining Co	Stettler	A	
F 015/009	Trail Mountain #9	Beaver Creek Coal	G.-Littig	A	Malencik
F 015/019	Cottonwood/Wilberg	Utah Power & Light	Duce	A	
F 007/033	Wildcat Loadout	Andalex Resources	Stettler	A	Malencik
F 007/034	Banning Loadout	Soldier Creek Coal	Wheeler	B	Haddock
F 007/001	Belina Complex	Valley Camp of Utah	Summers	B	Haddock
N 019/004	Blackjack Mine No. 1	New Tech Mining	Summers	B	*
N 007/021	Blazon Mine No. 1	North American Equ	Harden	B	Sandbeck
049/009	Blazon Tipple	Koch Carbon, Inc.		B	*
N 043/008	Boyer Mine	Summit Coal Company	Summers	B	Sandbeck
F 007/004	Castle Gate Coal	Castle Gate Coal	Darby	B	Sandbeck
F 007/019	Centennial Project	Andalex Resources	Darby	B	Haddock
F 041/002	Convulsion Canyon Mine	Southern Utah Fuel	Wheeler	B	Haddock
F 015/032	Crandall Canyon Mine	Genwal Coal Company	Leatherwood	B	Sandbeck
F 015/015	Emery Deep Mine	Consolidation Coal	Kunzler	B	Haddock
F 007/011	Hiawatha Mines Comp	U. S. Fuel	Kunzler	B	Haddock
N 041/005	Knight Mine	Utah International	Kunzler	B	Sandbeck
007/032	Pacific Basin Loadout	Pacific Basin Coal		B	*
F 007/005	Skyline Mine	Utah Fuel Company	Harden	B	Sandbeck
F 007/018	Soldier Canyon Mine	Soldier Creek Coal	Leatherwood	B	Haddock
N 043/001	Summit Minerals #1	Summit Minerals Co	Harden	B	Sandbeck
N 007/012	Wellington Prep Plant	Kaiser Coal Corp	Linner	B	Haddock
F 007/002	Willow Creek	Blackhawk Coal Co	Darby	B	Sandbeck

049/009	Koch Tipple	Koch Carbon, Inc.

* Inspections not required

1267R-1
Revised 5/12/88

RECLAMATION DRAINAGE DESIGN
For
LITTLE SNIDER CANYON

BLAZON MINE
INA/007/021
CARBON COUNTY, UTAH

Prepared For:
North American Equities, Ltd.
Denver, Colorado

Prepared By:
Blackhawk Engineering, Co.
Helper, Utah

February 15, 1988

TABLE OF CONTENTS

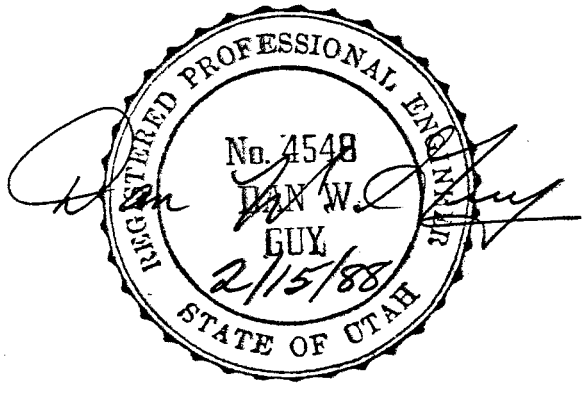
1.0 Statement of Certification

The enclosed reclamation drainage design for the Little Snider Canyon area of the Blazon Mine has been prepared for North American Equities, Ltd. by Dan W. Guy, Registered Professional Engineer, State of Utah No. 4548.

Certain information used in this design was aquired by others, including: Topographic data, slope stability data, rainfall and runoff data, and culvert design data.

All original designs and drawings are certified and dated by the undersigned.

I hereby certify that this proposed design was constructed by the undersigned, and are true and accurate to the best of my knowledge,



2.0 General Site Description

The Blazon Mine site is located approximately 3/4 mile south of the town of Clear Creek, Utah, in the NW$\frac{1}{4}$ of Sec. 4, T. 14 S., R. 7E, S.L.B.& M. The general location is shown on Figure 1, Location Map.

The site is located in a high mountainous area with an elevation of approximately 8400 feet.

3.0 Hydrologic Description

The drainage for which this design is submitted is referred to as the Little Snider Canyon drainage. This is an ephemeral drainage that runs from east to west and empties into the main drainage flowing north into Mudd Creek.

The Little Snider Canyon drains an area of approximately 135 acres. The drainage was previously conveyed under the mine site disturbed area via a 24" culvert. During reclamation, the culvert is to be removed, and replaced by an engineered channel. This channel will drain into a 42" culvert which will be installed under the reclaimed mine pad.

The approximate slope of the restored drainage will be 23%. All designs are based on the 50-year, 24 hour precipitation event, which , for this canyon, will result in a design flow of 63.0 cfs.

4.0 Design Criteria and Assumptions

The following design criteria were used in the proposed hydrologic design for this canyon:

1.	Drainage Area	135 acres
2.	Rainfall Intensity	
	50 yr.-24 hr. event	3.29 inches
3.	Time of Concentration	0.43 hours
4.	Land Slope	45.0 %
5.	Runoff Curve Number	64
6.	Flow [Q_{50}]	63.0 cfs
7.	Channel Slope	23 %

The following assumptions and controls were used in the design of the reclaimed channel:

1. Owner requires full use of reclaimed deck.
2. Maximum finished slope must be less than 36°, as required by the slope stability analysis.
3. Topographic data was partially supplied by others, and was assumed correct for this design. On-ground survey was not possible at this time of year.
4. Culvert size of 42" has been predetermined to be adequate for flow.

5. Slope of restored channel area is approximately 23% after coal removal.

6. Peak flow calculated for the runoff from this area is 63.0 cfs, per Final Technical Analysis, Oct. 8, 1985, p. 9, UMC 817.43.

7. Peak flow from the 50 year-24 hour precipitation event is acceptable, per Final Technical Analysis, Oct. 8, 1985, page 10, UMC 817.44.

5.0 Hydrologic Design

Channel - The restored channel will be approximately 175' long and will run from the upper limit of the reclaimed area [just below the existing debris fence] to the inlet structure of the 42" culvert. The channel area will be prepared by over-excavating and creating a sub-base of compacted borrow or undisturbed natural ground, depending on conditions. A filter blanket consisting of well graded, granular material will then be placed to a minimum depth of 12". The entire channel will then be lined with an angular rock rip-rap with a median size of 18". The restored channel will have a finished bottom width of 3', with side slopes not to exceed 2h:1v and a minimum depth of 2'. This will allow for at least 1' of freeboard above the maximum expected depth of flow. A typical section of the proposed channel is shown in Plate 2, and a plan/profile of the restored channel is shown on Plate 1.

Energy Dissipators - Due to the steep slope of the reclaimed channel, it is proposed to use "Loose Rock Check Dams" as energy dissipators. These check dams will be installed at approximately 50' intervals along the restored channel, as shown on Plate 1. The "Loose Rock Check Dam" is proposed for 2 main reasons: [1] It has been successfully used on other reclaimed channels, with comparable slopes and even greater flow potentials, and [2] It is a "natural" appearing

energy dissipator, usually constructed of native materials. A typical section and plan of the Loose Rock Check Dam is shown in Plate 2.

Culvert Inlet Structure - The proposed inlet structure for the 42" culvert will be constructed of concrete as shown on Plate 3. The structure will consist of a drop inlet, protected by a hinged, galvanized trash rack, and equipped with an overflow/ surge structure. Complete design details for the inlet structure are shown on Plate 3.

42" Culvert - The proposed 42" culvert will be a corrugated metal pipe, approximately 60' long. The culvert will be buried on a minimum slope of 3.5%, a minimum of 6' below the finished grade of the reclaimed mine pad. The culvert bottom will be laid on a minimum 6" of sand. The backfill around the culvert will be mechanically compacted, taking care not to place large rocks adjacent to the culvert, or otherwise deforming the culvert during backfilling operations. The culvert location and profile are shown on Plate 1.

Culvert Outlet - The outlet on the 42" culvert will be a concrete structure, designed to convey the culvert discharge and direct it into the main channel without erosion. The structure will consist of a concrete apron from the culvert through the main channel, with a concrete cut-off wall installed on the upstream

end of the main channel, to prevent undercutting of the apron. Flow will be directed by angled walls, arranged to dissipate energy, and allow the side flow to enter the main channel in a downstream direction. Complete design details of the outlet structure are shown on Plate 3.

6.0 Calculations

Drainage Area - The drainage area of 135 acres was planimetered from the Drainage Basin Map 23A "Drainage Area to Culverts D-D'", Drainage Basin Map 23A of the approved mine plan, and agrees with the area used on Figure 1, [Culver D' Calculations] on page 11 of Section 23 of the mine plan.

Other Hydrologic Parameters - The following parameters were taken directly from Figure 1, [Culvert D' Calculations] on page 11, Section 23 of the approved mine plan:

CN = 64 [Ref CN for Mudd Creek]

Hydraulic Length = 4700'

50 yr.-24 hr. event = 3.29 in.

Storm - SCS Type 2

AMC Condition II

Slope - The average land slope was measured at 45% from the Drainage Basin Map 23A of the approved mine plan. This figure is less than the 69.5% shown in Figure 1, p. 11, Section 23.

Time of Concentration - Using the measured slope of 45%, the time of concentration was recalculated using the following formula:

$$t_L = \frac{L^{0.8}\ [S+1]^{0.7}}{1900\ Y^{0.5}} = 0.255 \text{ hrs.}$$

Where: $L = 4700'$

$$S = [\frac{1000}{64} - 10] = 5.625$$

$Y = 45\%$

And:

$$tc = \frac{tL}{0.6} = \underline{\underline{0.4256 \text{ hrs.}}}$$

Flow - The peak flow from the 50 yr.-24 hr. event was calculated using the SCS-TR55 Method, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983, p. 114, and closely agrees with the figure of 63 cfs taken from the "Final Technical Analysis", October 8, 1985, UMC 817.43, p. 9. 63.0 cfs was therefore used as the peak flow for this drainage.

Manning's Number - The Manning's number of 0.032 was taken from Table 3.1, "Typical Values for Manning's n", Applied Hydrology and Sedimentology for Disturbed Areas, Barfield, Warner and Haan, 1983, p. 159. This number is considered conservative for a rip-rapped channel.

Velocity - The velocity of flow was calculated using the following formula:

$$V = \frac{1.49}{n} R^{2/3} S^{\frac{1}{2}} = 16.0 \text{ fps}$$

Where: $n = 0.032$

$$R = \frac{A}{P} = \frac{4.22}{6.93} = 0.61$$

$S = .23$ ft./ft.

Channel Slope - The slope of the restored channel was taken as 23%, based on communication with UDOG&M hydrologist and engineers.

Minimum Structure Area - The proposed channel will have a finished area of 14 ft.^{2}, based on a trapezoidal shape with a 3' bottom width, 2' depth and 2h:1v side slopes.

Depth of Flow - The depth of flow was calculated by using the formula Q = AV to find the area of flow and then converting the area to depth. The depth of flow was calculated as 0.88 ft.

Freeboard - The proposed channel will have greater than 1' of freeboard above expected peak flows. [See Plate 2 of this plan].

Rip-Rap - A median diameter [D_{50}] of 1.3' was extrapolated from the chart on Figure 7.25, p. 539, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983. This figure was taken from the chart by applying the peak flow [63 cfs] to the expected velocity of 16 fps. A D_{50} of 1.5' is therefore considered conservative.

The rip-rap will be an angular, non-slaking rock material and will conform to the following size distribution [as suggested in Figure 3.17, p. 195 of the above referenced manual]:

Maximum Size	3.0'
50% of Material	1.5' or less
20% of Material	0.75' or less
Smallest Size	0.30'

The depth of the rip-rap will be at least 2.0'. Rip-rap will be placed by end dumping if possible, or other comparable means to avoid segregation of the material.

Filter Blanket - Since the characteristics of the base material are not known, a filter blanket has been designed using a well graded sand/gravel mixture at a depth of .67 D_{50} or 1', with the following size distribution:

1" - 1½' - 25%

3/4" - 1" - 25%

¼" - 3/4" - 25%

Minus ¼" - 25%

This size distribution, coupled with the depth of installation, should serve to prevent piping beneath the rip-rap into the base material.

Apron - Since the entire restored channel will be lined with 2 feet of 18" M.D. rip-rap, an apron below the loose rock check dams will not be necessary. The only apron specifically

designed for this project is the concrete apron and cut-off wall to be located at the discharge end of the outlet structure as shown on Plate 1.

Culvert Slope - The proposed 42" culvert is designed at a slope of 3.50%.

Culvert Flow - The culvert will have a headwater depth of approximately 3 x D. The "Culvert Nomograph", Figure 3 shows a 42" culvert to be capable of handling flows up to 140 cfs under such conditions, far in excess of the expected 63 cfs design flow.

Section 7.0

Design Figures and Plates

Figure. 2

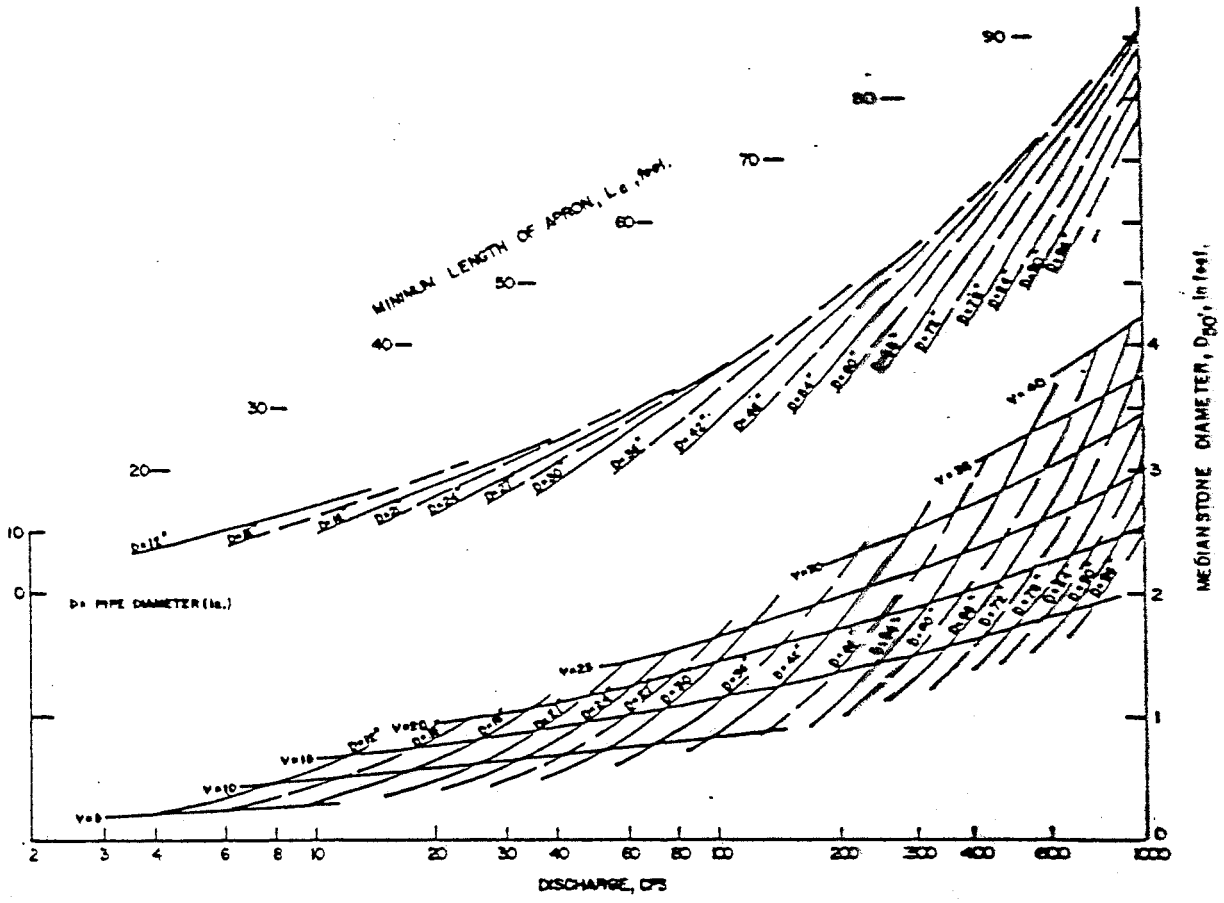
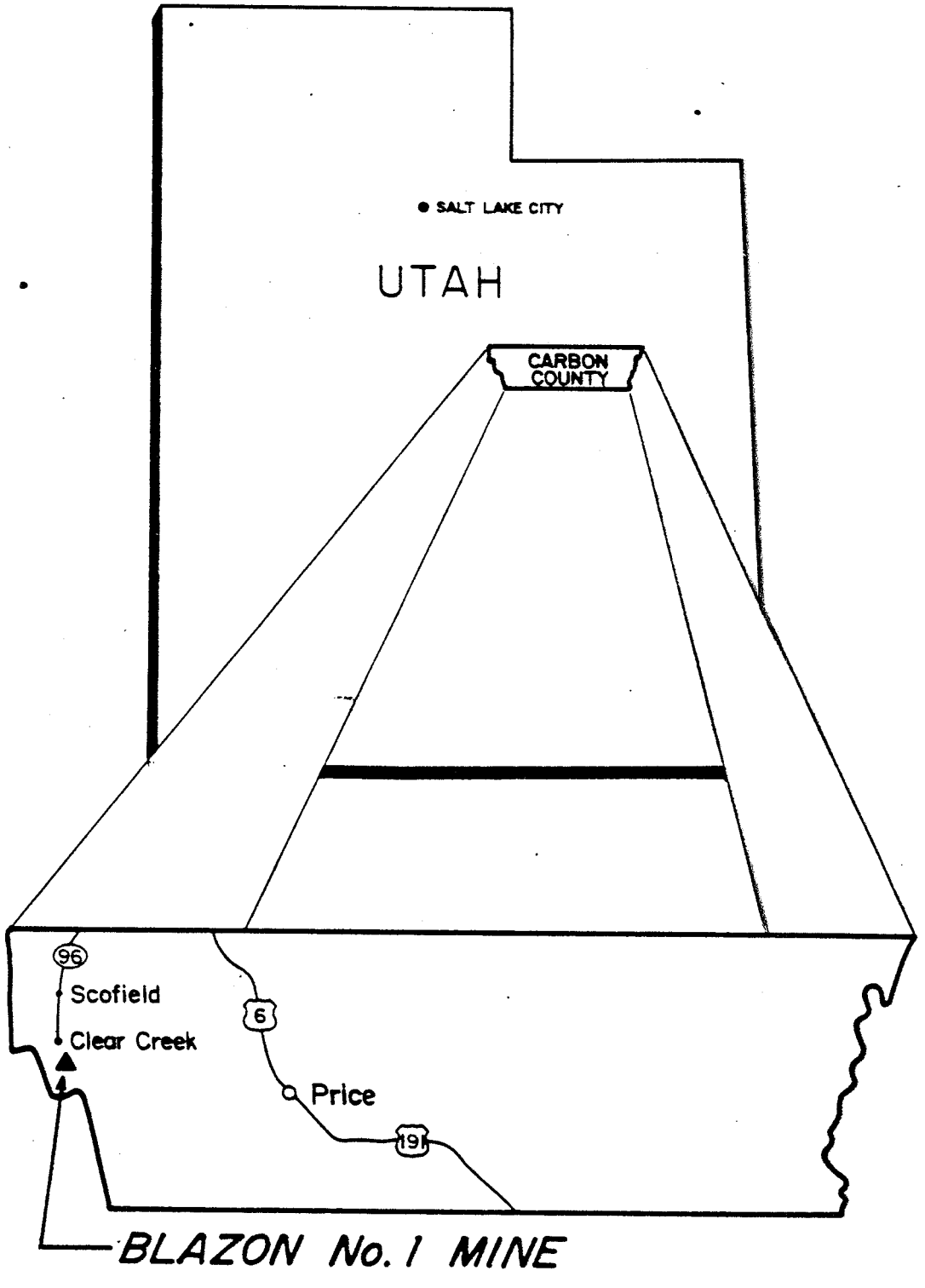


Figure 7-13

DESIGN OF OUTLET PROTECTION

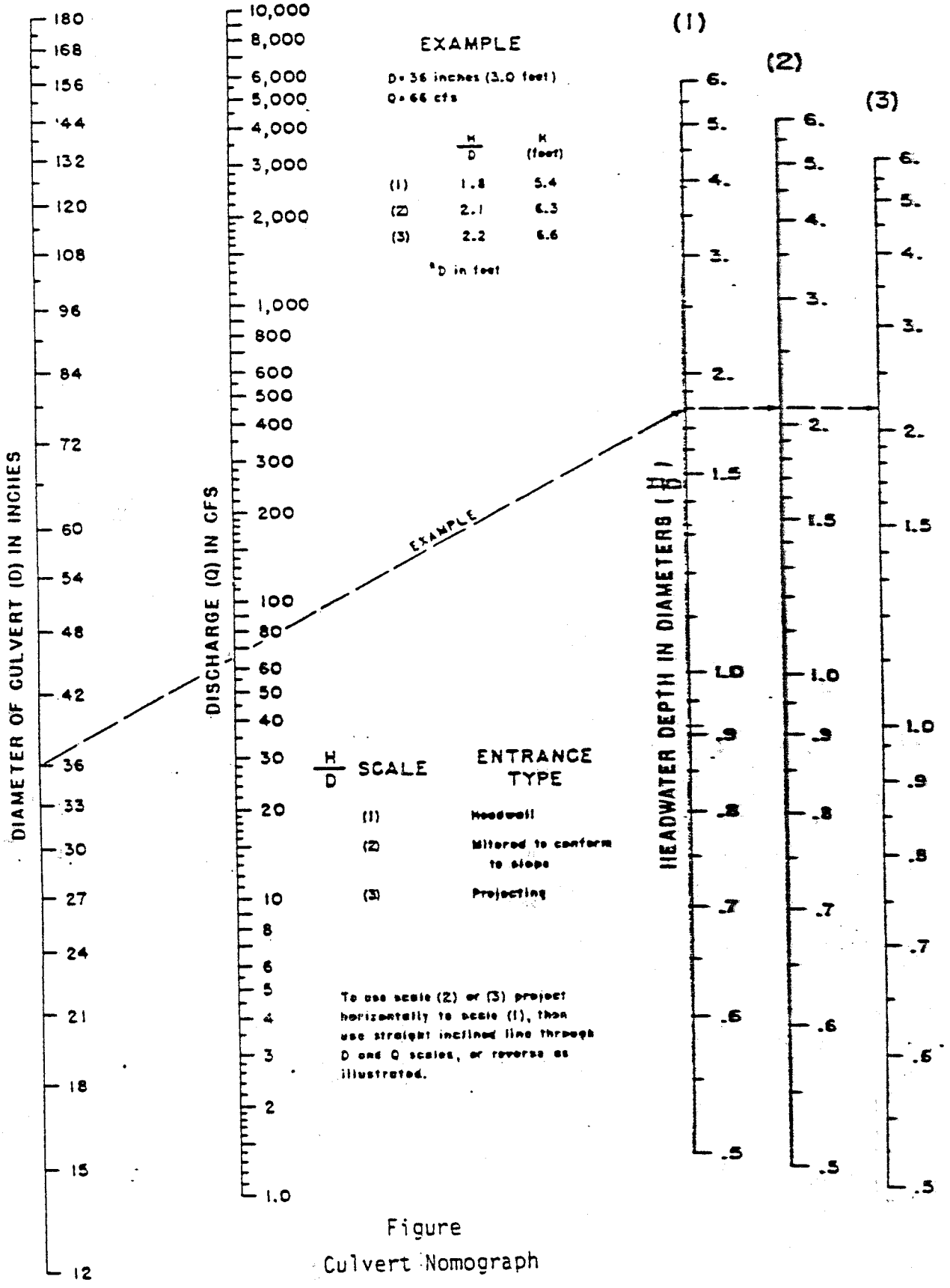
Minimum Tailwater Condition $T_w < 0.5D$

(U.S. EPA, 1976)



GENERAL LOCATION

FIGURE 1



Figure

Culvert Nomograph

Headwater depth for corrugated-metal pipe culverts with entrance control. (U.S. Bureau of Public Roads.) 288—D—2909.