

0009



Consolidation Coal Company

Western Region
2 Inverness Drive East
Englewood, Colorado 80110
303-770-1600

To Mike T.
R
ACT/015/015
Route # File
Approval letter sent
3/19/79 XMP

AS
Looks good!

JWS
To Me Too!
MAW

March 6, 1979

Mr. Cleon B. Feight, Director
Utah Division of Oil, Gas, & Mining
1588 West North Temple
Salt Lake City, Utah 84116

RE: Compliance with OSM regulations, Arch bridge over Quitcupah Creek

Dear Mr. Feight:

Enclosed are the flow calculations Mike Thompson requested for the bridge that is to be constructed over Quitcupah Creek. We have also enclosed two new sets of prints for the bridge; please disregard the bridge prints we had sent you previously. The culvert will handle 2230 cfs flow which is more than the required 2186 cfs for a 10 year, 24 hour storm.

If the bridge design is acceptable or if you have any questions please call Carl Muha at the above listed number. Thank you.

Yours very truly,
Tim O'Connor
Timothy J. O'Connor
Staff Mining Engineer

TJO/ja

Enclosures

cc: Muha, C.
Hanks, T.
Hughes, R.



Consolidation Coal Company

Western Region
ENGINEERING DEPARTMENT

Mine EMERY DEEP

Sheet 1 of 2

Subject FLOW THROUGH ARCH BRIDGE

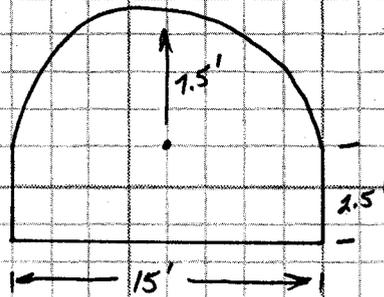
Proj. No. _____

Job No. _____

Made by TIM O'CONNOR

Dwg. No. _____

Checked by _____ Appr'd by _____ Date MAR 6 1979



ASSUME MAXIMUM FLOW WILL BE 2186 CFS AS SHOWN ON PAGE 29 OF D'APPOLONIA'S CALCULATION BRIEF

TO FIND MAXIMUM FLOW THROUGH THE CULVERT USE THE PIPE EQUATION WHERE:

$$Q = \sqrt{\left(\frac{H + L \sin \phi - \frac{1}{2} H_0}{1 + k_e + \frac{fL}{4R}} \right) (A^2 2g)}$$

where

$H = 12'$ ASSUME PONDING BEHIND THE CULVERT

$H_0 = 10'$ HEIGHT OF PIPE

$L = 26'$ LENGTH OF PIPE

$\phi = 1.15^\circ$ ANGLE OF SLOPE

$k_e = 0.5$ INLET LOSS (HYDRAULIC LOSSES FOR THE SELECTION OF HIGHWAY CULVERTS)

$f = 0.019$ FRICTION FACTOR OF PIPE AND CONCRETE

$$f = 0.024 \left(\frac{23.56}{43.56} \right) + 0.014 \left(\frac{26}{43.56} \right) = 0.019$$



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Mine EMERY DEEP Sheet 2 of 2
 Subject _____ Proj. No. _____
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$$A = \frac{1}{2}(\pi)(7.5)^2 + 2.5(15) = 125.86'$$

$$WP = \pi(7.5) + 2(2.5) + 15 = 43.56$$

$$R = \frac{A}{WP} = \frac{125.86}{43.56} = 2.89$$

$$Q = \sqrt{\left(\frac{12 + 26 \sin 115^\circ - \frac{1}{2}(10)}{1 + 0.5 + \frac{0.019(26)}{4(2.89)}} \right) (125.86)^2 (64.4)}$$

$$Q = \underline{\underline{2230.21 \text{ yd}}}$$