



United States Department of the Interior
 OFFICE OF SURFACE MINING
 Reclamation and Enforcement
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Mr. Wayne Hedberg
 Division of Oil, Gas, & Mining
 4241 State Office Building
 Salt Lake City, Utah 84114

03 DEC 1981

DIVISION OF
 OIL, GAS & MINING

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RE: Approval of culvert diversion

Dear Wayne:

This is to confirm Vernon Maldonado's telephone conversation with you of November 24, 1981, and to grant preliminary OSM approval of the Natomas Trail Mountain Coal Company submission for the temporary diversion of Cottonwood Creek. Cottonwood Creek is a perennial stream having an average annual flow of between three and four cubic feet per second. It is my understanding that although this diversion is of a temporary nature, the design storm of a 50 year/24 hour event has been agreed upon by the U.S.F.S., and Natomas Coal Company, in place of the 10 year/24 hour event.

Our review of the culvert size and inherent carrying capacity has predicted that an additional nine feet of headwater storage is needed to convey the 535 cfs flow through the culvert diversion. This a "ball park" estimate of the Vaughn Hansen results, which use similar methodology.

Although it has not been determined where the discrepancy between these similar applications of the Darcey Weisbach equation originates, we are confident that the culvert diversion will safely convey the 50 year/24 hour storm flow of 450 cfs. It should also be noted that the Darcey-Weisbach equation is presently one of the more accurate methodologies presently available to the hydrologist for such design considerations, therefore, the difference between calculations is within tolerable limits and a valid estimation.

A final concern of this diversion is that eleven feet of headwall is actually available above the eight foot culvert entrance. Existing diagrams did not adequately demonstrate that eleven feet of storage was available above the culvert. This probably could be clarified in a state inspection report.

Sincerely,

Richard E. Dawes
 Deputy Director
 Western Technical Service Center